DEVELOPMENT OF A SPECIALTY EDUCATION PROGRAM IN NEPHROLOGY FOR NURSE PRACTITIONERS

A DOCTORAL PROJECT

Submitted in Partial Fulfillment of the Requirements

For the degree of

DOCTOR OF NURSING PRACTICE

By

Theresa Marie Payne

Doctoral Project Committee:

Beth Keely, PhD, RN, Project Chair
David Kumrow, EdD, RN, CNS, Committee Member
John Robertson, MD, Committee Member

2015
ABSTRACT

The presence of nurse practitioners (NP) caring for patients with chronic kidney disease (CKD) has been increasing due to the rise in the numbers of CKD patients and the decline in the number of nephrologists. Currently, NPs lack clear, consistent, and standardized training or education pathways to enter nephrology practice. To fill this gap, a nephrology specialty curriculum must be developed for novice nephrology NPs.

To develop a curriculum and learning modules, expert nephrology NPs were asked to identify the content topics necessary for entry-level practice. The combination of these topics with the current standards and scope of practice were the guidelines for development of the curriculum and learning modules.

This project developed a standardized nephrology specialty curriculum outline in a modular format for use by novice nephrology NPs during entry into practice. This curriculum bridges the gap by standardizing an education training program for novice nephrology NPs. The potential beneficial impact on the care of the complex CKD patient managed by nephrology-trained NPs is far reaching. The exponential effect of standardized training and quality care could potentially influence mortality, morbidity, quality of life, and health care costs for the CKD patient.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>viii</td>
</tr>
<tr>
<td>BACKGROUND</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td>Statement of the Purpose</td>
<td>3</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>3</td>
</tr>
<tr>
<td>Inputs</td>
<td>5</td>
</tr>
<tr>
<td>Activities</td>
<td>5</td>
</tr>
<tr>
<td>Outputs</td>
<td>6</td>
</tr>
<tr>
<td>Potential Outcomes</td>
<td>7</td>
</tr>
<tr>
<td>LITERATURE REVIEW</td>
<td>8</td>
</tr>
<tr>
<td>Nurse Practitioners in Nephrology</td>
<td>8</td>
</tr>
<tr>
<td>Training Programs for Postgraduate NPs and Registered Nurses</td>
<td>9</td>
</tr>
<tr>
<td>Curriculum Needs</td>
<td>12</td>
</tr>
<tr>
<td>Modular Learning</td>
<td>13</td>
</tr>
<tr>
<td>METHODS</td>
<td>15</td>
</tr>
<tr>
<td>Ethical Considerations</td>
<td>15</td>
</tr>
<tr>
<td>Information Tools for Interviews</td>
<td>15</td>
</tr>
<tr>
<td>Demographic Tool</td>
<td>16</td>
</tr>
<tr>
<td>Semi-structured Interview Questions</td>
<td>17</td>
</tr>
<tr>
<td>Interview Phase for Needs Assessment</td>
<td>17</td>
</tr>
<tr>
<td>Curriculum Development</td>
<td>18</td>
</tr>
<tr>
<td>Expert Review of the Curriculum</td>
<td>19</td>
</tr>
<tr>
<td>Product</td>
<td>19</td>
</tr>
<tr>
<td>Data Collection</td>
<td>19</td>
</tr>
<tr>
<td>Data Management</td>
<td>20</td>
</tr>
<tr>
<td>RESULTS</td>
<td>21</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Participant Nurse Practitioners’ Years of Experience in Nephrology</td>
<td>22</td>
</tr>
<tr>
<td>2. Professional and Education Resources Reported by the Participants</td>
<td>24</td>
</tr>
<tr>
<td>3. Types of Information Cited by Participants as Critical to the Nurse</td>
<td>25</td>
</tr>
<tr>
<td>Practitioner in Nephrology</td>
<td></td>
</tr>
<tr>
<td>4. Comparison of Participant-Identified Content with Scope and Standards</td>
<td>27</td>
</tr>
<tr>
<td>of Practice</td>
<td></td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Developing an Educational Curriculum for NPs Specializing in Nephrology:</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>A Conceptual Framework</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Developing an education curriculum for nurse practitioners specializing in</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>nephrology: A learning theory</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Arrangement of learning objectives from concrete to abstract, adapted</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>from Tyler’s curriculum development and Bloom’s cognitive taxonomy</td>
<td></td>
</tr>
</tbody>
</table>
ACKNOWLEDGMENTS

The completion of this incredible journey could not have been possible without the support of my husband, family, friends and all who have walked this path with me. It is with special recognition and profound love that I must thank my mother, Charlotte C. Paige. A woman who not only believed and loved me without reserve but was a teacher’s teacher, she often said “True teachers are born, it is a gift that it comes from within.” To her I lovingly dedicate this work, for this journey has been completed with a new adventure waiting to begin.
BACKGROUND

Chronic kidney disease (CKD) is a progressive disease that is recognized as a worldwide epidemic (Bakris & Ritz, 2009). The large numbers of persons making the progression from early kidney disease to end stage renal disease (ESRD) places a substantial burden on global health care resources (Nahas & Bello, 2005). The most common diseases associated with the development of CKD are diabetes and hypertension. The estimation of diabetes worldwide in 2011 was 240 million, with an expected increase to 380 million by the year 2025 (U.S. Department of Health and Human Services, National Institutes of Health, & National Institute of Diabetes and Digestive Kidney Disease [USRDS], 2011). Currently, there are 1 billion adults over age 18 with hypertension worldwide, with the expectation that this number will increase to 1.56 billion by the year 2025 (Bakris & Ritz, 2009). In the United States alone, 1 in 3 adults have hypertension, which equates to approximately 68 million people (Centers for Disease Control and Prevention [CDC], 2011). The overall estimates for renal disease in the United States are that 13.6% of adults over 20 years old have CKD, which equates to 27 million people. Further review of this startling statistic reveals that 10.4% are 65 years of age and older, with that percentage expected to continue to rise with the aging Baby Boomer population. The ESRD population increased by 9% per year through 2010 but has subsequently slowed to an annual increase of about 3.2% (USRDS, 2014).

The cost of care for CKD has steadily increased from 3.9% of total Medicare expenditures in 1993 to 17% or $44.6 billion in 2012. These costs to the Medicare system are up 0.7% from 2006 (USRDS, 2014a). The rising cost for renal care has kept pace with the increasing number of CKD and ESRD patients who require the specialty
care of nephrology (Foley, Gilbertson, Murray, & Collins, 2011). These added costs include the need for additional staff to handle the increased Medicare reporting demands, additional expensive medical tests and treatments due to changes in the standards of care, and revenue reductions resulting from cost reduction and reimbursement bundling for the cost-intensive care of renal patients (USRDS, 2014b).

The number of nephrologists entering practice has not kept up with the need to treat the burgeoning population of patients with CKD and ESRD. This is because the number of practicing nephrologists is not growing. The number of practicing nephrologists in 2010 was the same as the number of nephrologists practicing in 1997 (Neilson et al., 1997). Currently, there are too few nephrologists to care for these highly complex and challenging patients (Bolton, 1998). This demand for high-quality care and the costs of such care, combined with the limited supply of available nephrologists, has led to the need to integrate nurse practitioners (NPs) into the renal care team. NPs can collaborate with their nephrologist colleagues to provide complex care within their scope of practice (Alpert, Fjone, & Candela, 2002; Bryant-Lukosius, DiCenso, Browne, & Pinelli, 2004).

**Statement of the Problem**

Primary care NPs entering the specialty of nephrology need additional education to secure essential knowledge that will allow them to function effectively. In reality, the actual nephrology specific education of the NP is often limited to on-the-job learning, observation of other providers, and attending meetings and conferences. Current collaborative practice models have failed to delineate pathways into specialty education or residency type programs for NPs trained in primary or acute care (Bolton, 1998;
Douglas & Bonner, 2011; Gardner, Dunn, Carryer, & Gardner, 2006; Mehrotra, Shaffer, & Molitoris, 2011). NPs currently lack clear, consistent, and standardized training or education pathways to enter into collaborative nephrology practice. Quality of care could be advanced by development of a curriculum for NPs who are entering nephrology practice.

**Statement of the Purpose**

The purpose of this Doctor of Nursing Practice (DNP) project is to develop content outlines, objectives, and evaluation strategies for a modular nephrology specialty curriculum designed for NPs as they enter the field of nephrology. The goal of this standardized curriculum is to prepare the nephrology novice NP to practice as an integral member of the team, providing highly complex care to renal patients.

Development of a specialty curriculum in nephrology for NPs required a conceptual framework to act as a “roadmap for stakeholders” (Instone & Palmer, 2013, p. 117), which will allow for curriculum and clinical development.

**Conceptual Framework**

Developing and evaluating a nephrology curriculum requires a series of steps or processes. This need led to selection of the logic model as the framework to provide structure for this project (Figure 1). The feedback loop in this model achieves the goal of continual and consistent improvements in learning outcomes as outlined in the W. K. Kellogg Foundation (2004) *Logic Model Development Guide*. This model has been used by other disciplines, as well as by nursing educators, for development and ongoing evaluation of new programs (MacPhee, 2009).
Figure 1. Developing an educational curriculum for nps specializing in nephrology: A conceptual framework.

Using the loop system inherent in the logic model allows for examination of the content effectiveness and teaching methods of the curriculum. The function of the feedback component is to identify and examine the effectiveness of the curriculum. This allows for real-time correction in content, presentation, and outcome goals of the curriculum. The adaptability of the logic model provides a practical framework to guide this project.
The logic model posits the following constructs: inputs in the form of feedback to reach the goal, activities as actions required for development, outputs (which for this project was the curriculum), and the outcomes or results (Instone & Palmer, 2013).

**Inputs**

The first step in the logic model is to identify the curricular content, potential teaching methodologies, and expected learning outcomes. In this project, the required level of nephrology knowledge and practice performance for an entry-level NP was the focus. Direction for the curricular content and practice understanding was determined by a combination of expert interviews and current standards of practice guidelines gathered in a literature review.

**Activities**

The activities section of the logic model delineates the processes that allow this specialty education curriculum to meet the goals established for the curriculum (W. K. Kellogg Foundation, 2004). The goals for the nephrology specialty education curriculum are similar to those of other academic programs and include building support through stakeholder activities, a group of potential NP participants, and administrative support and faculty buy-in (Instone & Palmer, 2013). In addition, national support for the entire curriculum comes from the Institute of Medicine, which recommended development and implementation of residency programs in nursing in its 2010 report (Instone & Palmer, 2013).

**Outputs**

The project product or output in the logic model is development of a nephrology specialty curriculum in a modular format containing content outline and objectives. The
program was developed using guidelines of the adult learning model by Knowles (1980), shown in Figure 2. This model of learning is based on the assumption that adults are internally motivated, self-directed, and goal oriented and bring a set of life experiences

![Figure 2](image)

*Figure 2. Developing an education curriculum for nurse practitioners specializing in nephrology: A learning theory.*

and knowledge to the specialty education curriculum (Knowles, 1980). An integral portion of implementation of the logic model is the logistics of scheduling classes, location, and acceptance criteria for the course (Armstrong & Barsion, 2006).

The logic model as a framework for this project guided dynamic development of the curriculum at all points in development. This particular adaptation of the logic model with a feedback loop permits evaluation of measurable short-term outcomes at every
stage identified in the logic model, along with identifying and evaluating long-term learning outcomes.

**Potential Outcomes**

In this step in the logic model, immediate and long-term program benefits to be evaluated are identified (Armstrong & Barsion, 2006). The immediate or short-term outcome from participation in the curriculum by novice NPs is expected to be an understanding of the clinical knowledge and skills required to care for renal patients at all stages of the disease. The change in knowledge will be evaluated via a pretest/posttest for all participants for each module. The long-term program benefits may include increased clinical competence in care of nephrology patients.
LITERATURE REVIEW

The search for evidence to develop a specialty education curriculum in nephrology for NPs utilized the following article inclusion criteria: (a) related to NP in nephrology and specialty training programs, (b) written in English and in no other language, (c) developed for NP postgraduate specialty programs, and (d) relevant to the subject of this project. Due to the lack of current standardized training programs or residencies for NPs in nephrology other postgraduate and specialty programs were also reviewed. Reviewing other specialties with similar concerns and problems related to a standard level of entry into practice provides structure and context to the changing landscape of health care delivery (Alleman & Houle, 2013).

The databases utilized for this search were CINAHL, PubMed, Medline, ProQuest, and Google Scholar. All journal sources were scholarly, peer-reviewed articles. Other sources included position papers, dissertations, governmental reports, and commentaries. The goal for this review of the literature was to describe elements of a standardized training program or curriculum for NPs who are not expert in nephrology.

Nurse Practitioners in Nephrology

The presence of NPs in the practice of nephrology is not a new phenomenon. NPs have been in the nephrology specialty since 1973 (Nhan & Zuidema, 2007). The increase in the number of NPs in nephrology coincided with the increase of the numbers of CKD and ESRD patients and the decline in the number of available nephrologists (Mehrotra et al., 2011; Neilson et al., 1997). Care provided by NPs in nephrology practice is efficient and cost effective and yields improvement in process and outcome measures (Becker, 2010). Presently in the United States, Vanderbilt University offers the only program that
addresses NP postgraduate training in nephrology (Golper, 2007). At Vanderbilt, nephrology education is included as a part of the adult-gerontology acute care NP training program (Vanderbilt University School of Nursing, 2014), which addresses only the care of acutely ill nephrology patients in the hospital setting. For the chronic dialysis or CKD clinic patient, a standardized curriculum or training program for NPs in nephrology does not exist (Mehrotra et al., 2011).

**Training Programs for Postgraduate NPs and Registered Nurses**

The concepts of residency or internship type programs are not unique to NPs or medicine. They have been discussed in many fields, including nursing, nurses moving from nursing student to the entry-level role of registered nurses (RNs), and mentored organization-sponsored programs (Blanzola, Lindeman, & King, 2004). Blanzola et al. evaluated an internship program intended to strengthen the entering nursing work force that differed from traditional orientation (e.g., organizational skills, as well as clinical competencies were measured for all participants before and after their experience). The utilization of experiential learning in the internship led to increased clinical comfort, \( p = .002 \), confidence, \( p = .013 \), and organizational core competence, \( p = .005 \). The program included structured learning that was dynamic and allowed for development of skills with knowledge (Blanzola et al., 2004). This supports utilization of adult learning theory as the foundation for continued growth and development of NPs entering nephrology practice.

Another report on a formal residency program for new graduate primary care NPs recognized the demands and difficulties of entry into practice (Flinter, 2010). The residency program closely mimicked the educational model of medicine covered during
that first year of transition into primary practice, while retaining the key elements of nursing (Flinter, 2010). NP residence programs in primary care in federally qualified health centers create a shared commitment and partnership in the provision of quality care to a focused population (Flinter, 2010). Although Flinter’s report addressed transition into NP primary care, it recognized the need for nursing residency programs in other NP specialties or advanced practice nursing roles such as nephrology.

To address the shortages of NPs in orthopedics, a proposal for a residency program was developed utilizing the logic model as a conceptual framework (Instone & Palmer, 2013). The authors recognized that most NPs in orthopedics, like those in nephrology, receive on-the-job training and physician mentoring. They addressed the lack of structured curriculum and training in orthopedics and proposed to address this need with an orthopedic residency training program as part of a DNP program. The program included a residency that adhered to national guidelines and academic requirements of the institution (Instone & Palmer, 2013). The clinical standards for the orthopedic specialty as set by the Orthopedic Nurse Practitioner Certification Board guided the curricular content and clinical practice hours. This proposal defined a focused area of specialty practice as a clinical experience option within a post-master’s DNP program. Upon graduation from this program, nurses would attain the DNP and be novice practitioners in orthopedic practice (Instone & Palmer, 2013).

Nhan and Zuidema (2007) described utilization of NPs since 2004 in the Northern Alberta Renal Program (NARP) in Edmonton. Change in their practice model became apparent in 2004, resulting in increasing numbers of patients being managed by nephrologists. The NARP NPs were master’s prepared and adult care trained, and they
made the transition into nephrology independently, without standardized nephrology core training (Nhan & Zuidema, 2007). The NARP report is typical of the currently available narrative reports in the literature that report quality and cost-effective care with inclusion of NPs as part of the care team, but they lack standardized curriculum or training for entry into nephrology practice. The NARP report authors concluded that, as part of the Alberta continuing competency program, NPs must collect feedback on their practice to develop and implement a learning plan. NARP recognized that the growth of their program would be enhanced by participation by NPs.

In 2008, American Nephrology Nurses Association (ANNA) published a consensus statement on the scope and standards of advanced practice in nephrology (Douglas & Bonner, 2011). A similar Australian report addressed NPs in nephrology and the direction of clinical education (Douglas & Bonner, 2011). Both consensus statements pointed to the need for advanced nephrology standards and specific nephrology clinical education. A conclusion of the Australian report was the need for further research and development by universities and clinical mentors of nephrology-specific programs (Douglas & Bonner, 2011). The ANNA and Australian consensus statements highlight the need for development of standardized education in nephrology for entry-level NPs.

Bolton (1998) clearly described a structured type of training program for NPs in nephrology at the University of Virginia, which had been in place for more than 20 years at the time of the report. Although the report contained no descriptive statistics, it was reported that NP orientation and further education in nephrology were offered on the job and were self-directed (e.g., composed primarily of divisional conferences and continuing education). Bolton noted that graduates of the program demonstrated an increased
number of clinic visits for pre-ESRD patients and decreased number of pages from dialysis units for nephrologists, both indicators of enhanced efficiency. This program was a collaborative model, making it difficult to assess the impact of the individual practitioners (Bolton, 1998). To address the clinical outcomes of the program, Bolton (1998) compared the USRDS mortality outcomes data to the mortality outcomes data at the University of Virginia from 1991 to 1993, demonstrating 5% to 25% improvements. The major takeaway message from this report was the pivotal role that appropriately trained nephrology NPs can have in patient outcomes (Bolton, 1998).

**Curriculum Needs**

Gaps were noted in a recent report on postgraduate education of NPs and their current clinical practice (Keough, Stevenson, Martinovich, Young, & Tanabe, 2011). These included a lack of structured residency programs for the transition to practice, along with missing structured postgraduate specialty education (Keough et al., 2011). However, developing residency programs, as with all educational programs, is a complex task (Goldenberg, Andrusyszyn, & Iwasiw, 2004). The task requires commitment by a team that includes faculty, administrators, students, and other stakeholders (Goldenberg et al., 2004). Team composition and involvement by stakeholders require dynamic adaptations to current and prevailing health care needs (Gagan, Berg, & Root, 2002). The challenge of curriculum development is the realization that the landscape of health care is changing. Educators and NPs should establish programs that contain specialty content to support clinical expertise (Furlong & Smith, 2005) while maintaining the goal of curriculum development and flexibility. The programs must also adhere to the national standards for NP education and nephrology practice.
Modular Learning

Modular learning is common in industries that contain complex quality-driven systems, such as those employing physicians and nurses (Armstrong, Mackey, & Spear, 2004). Such a learning process requires focus on development of skills that incorporate the educational pedagogy to reach the intended outcomes for the learner (Dark & Perrett, 2007). Learning modules serve as a method for presenting information in a linear format with all elements connected (Robinson & Crittenden, 1972). It is this linear characteristic that allows the necessary flexibility to adapt to individual or group learning needs (Robinson & Crittenden, 1972). The content contained in one learning module can build on information contained in related modules (Crowder, 2011).

Learning modules routinely contain an introduction, which outlines why the information contained in the module is important. Following the introduction are the learning objectives, background on the subject of the module, learning activities to be done in the module, and, often, a summary of the learning activities (Dark & Perrett, 2007).

The completion of sequential learning activities contained in a module develops a foundation on which future learning activities can build. In this manner, each learning module builds on those preceding it. This teaching strategy assigns learning activities for both students and educators in each learning module (Armstrong et al., 2004). The skills and knowledge sets in each module should be mastered prior to advancement to the next module. The inherent flexibility and interaction between learner and educator allows for growth by all participants, as well as continued development of the module’s curricular content (Armstrong et al., 2004).
Modular learning is consistent with Knowles’s adult learning theory (1980), in which adults are assumed to be internally motivated, self-directed, goal oriented, and equipped with a set of life experiences and knowledge that they bring to the learning experience (Figure 2). Postgraduate NPs entering the nephrology training program bring with them practice experience, knowledge, and skills acquired during their NP programs or previous clinical service that can facilitate their learning (Armstrong et al., 2004; Furlong & Smith, 2005).
METHODS

The driving goal of this project was to improve and standardize the education of NPs entering nephrology. Specifically, the purpose of this doctoral project was to develop content outlines, objectives, and evaluation strategies for a modular nephrology specialty curriculum aimed at NPs who are entering the field of nephrology. Although a national certification examination for nephrology NPs is available, it is designed for experienced NPs who have acquired the prerequisite number of clinical practice hours in nephrology. Currently, there is no formal training available for novice NPs as they enter this complex specialty.

Ethical Considerations

Prior to the preliminary needs or content assessment phases of this project, the proposed project was reviewed and approved by the California State University, Long Beach (CSULB) institutional review board (IRB) to assure that the rights and autonomy of the participants in this project were protected (Appendix A).

The experienced nephrology NPs participating in this project would not routinely be considered a vulnerable population. Populations are considered vulnerable when they do not have decision-making capacity or are in positions that facilitate ease of exploitation (Devettere, 2010). However, rights as participants in this project must be protected, which called for IRB approval of this project.

Information Tools for Interviews

The NP experts were purposively chosen from the ANNA professional organization membership (Appendix B). The invitation email was sent to all ANNA NP members who listed at least 3 years experience in nephrology and an active email
address. The invitation email (Appendix C) explained the purpose of the interview, why they were being recruited, the procedures that would be followed in the interview, and how the data would be handled and analyzed.

**Demographic Tool**

A demographic information tool (Appendix D) was utilized for the nephrology expert NPs. The tool gathered data concerning (a) number of years in nephrology practice as an NP, (b) current employment status, (c) current work in nephrology practice, (d) types of nephrology patients typically managed (e.g., CKD office [pre-ESRD], hemodialysis, peritoneal dialysis, transplant or a combination of all four types), (e) current age in years, and (f) status of national certification as a nephrology NP.

Nephrology experience was defined as working with kidney patients in chronic dialysis, pre-dialysis CKD, kidney transplant, or kidney patients in acute care settings. The nephrology expert NP was defined for this project as having more than 3 years experience in nephrology and currently practicing in nephrology.

Insight gained from these nephrology experts assisted with identification of essential content and performance areas needed in the curricular development. Many of the NP experts selected to participate in this project experienced their transition to the nephrology specialty without the benefit of a standardized training program. They are considered pioneer NPs in this specialty area. The panel of nephrology expert NPs was selected from the first five to return the demographics information, consent form, and contact information. All of the respondents received the email invitation to participate through ANNA, each had a minimum of 3 years experience in nephrology as a NP, and each was currently practicing in nephrology.
Semi-structured Interview Questions

The semi-structured interview was topic driven and consisted of a predetermined set of 10 questions to prompt discussion (Polit & Beck, 2012). The interview questions were scripted and included some questions about background information to develop a rapport with the participants (Appendix E). This design gave the nephrology expert NP participants the opportunity to expand on their answers. Given the information assisted in content selection and sequencing of learning activities outlined in the curriculum in nephrology for NPs.

Interview Phase for Needs Assessment

The procedure for the expert interviews was as follows:

- An invitation via email was sent to ANNA member NPs to participate in this project, with a letter introducing the purpose of the project and their roles in participating.
- Included in the email communication was a description of the procedures for the telephone interview.
- An informed consent form (Appendix F) was included as an attachment to the email invitation.
- A demographic survey was included as an attachment to the email invitation.
- Interested NPs were instructed to contact the investigator via the email address supplied with their contact information to schedule the telephone interview.
- The consent forms and demographic information were returned with the contact information by email attachment or fax, prior to the telephone interview.
• The first five nephrology expert NPs who responded and met the inclusion criteria based on their responses to the demographic questionnaire were selected.
• Telephone interviews (30 minutes) were scheduled with the participants.
• Telephone interviews were conducted using scripted semi-structured questions.
• The telephone interviews were audiotaped.
• Contents of the audiotaped interviews were transcribed by the researcher.
• Transcriptions were reviewed for significant topics, themes, or focus of curricular development.

Curriculum Development

The development of the essential curricular content outlines and objectives in a modular format was based on the nephrology expert NP interviews and the current clinical standards of nephrology NP practice. The interviews identified the essential elements of the core curriculum. The intent was to develop a standardized curriculum in a modular format to prepare for the nephrology novice NP’s entrance into practice.

Based on the nephrology expert NP interviews, the content areas were identified. Then the current clinical standards of nephrology practice for NPs were reviewed. From this review the salient standards for the novice NP were extracted for inclusion in the curriculum. The clinical practice guidelines from the National Kidney Foundation (NKF) kidney disease outcomes quality initiatives (KDOQI) and kidney disease improving global outcomes (KDIGO) in the management of CKD guided the sequencing of the modules (Eknoyan et al., 2013; Inker et al., 2014).
Based on the content identification by the nephrology expert NPs and the current clinical guidelines, objectives were developed for each content area. Utilizing the suggestions and prior experience of the nephrology expert NPs, teaching and learning activities were developed for each module in the curriculum.

**Expert Review of the Curriculum**

At the time of the interview, the participant experts were offered a copy of the completed curriculum outline at the completion of this scholarly project, and all requested a copy. The opinions of these nephrology expert NPs in the review and possible recommendations for curriculum modifications are beyond the scope of this project but would be of benefit for continued development of nephrology specialty learning modules.

**Product**

The product of this DNP project was the content outlines, objectives, and evaluation strategies for a nephrology specialty curriculum in a modular format.

**Data Collection**

The qualitative data were collected as part of the nephrology expert NP telephone interviews. The interviews were audio recorded and notes were taken at the time of the interviews. The audio recordings were subsequently transcribed. These transcriptions were reviewed for recurrent themes and content by the researcher. The demographic information tool, as well as the audio recordings, notes, and transcripts, were free from any identifying information; all audio recordings, notes, and transcripts were identified by sequential letters (A through E). These were collected by the researcher via email attachment, direct fax, telephone interviews, audio recordings, and transcriptions.
Data Management

The data were entered into a personal computer by the researcher and stored in a password-protected program, with backup to a password-protected secure hard drive and drop-box folder. The demographic information tool, audio recordings, and transcripts will be kept in a locked safe for 3 years after completion of the project, then will be destroyed by the researcher.
RESULTS

This section is divided into two segments. The first segment provides an overview of the demographics of the nephrology expert NP participants. This includes years in practice as an NP, current employment, present practice in nephrology as an NP, and national certification in nephrology as an NP. These data were utilized to validate the NPs’ expertise in the field of nephrology. The second segment is a content analysis of the results of the semi-structured interviews. This information, in conjunction with the current scope and standards of practice, was used to guide content development for the outline, objectives, and evaluation strategies in the nephrology specialty curriculum.

Demographics

An invitation email was sent to 341 ANNA member NPs because they had 3 or more years experience in nephrology. Eight members responded to the invitation, expressing interest in the study. The first five participants who returned the completed demographic survey and consent form were selected to participate in the interviews. The total sample size was five, in accordance with the initial plan.

In reviewing the years of experience in nephrology as a NP, 60% \((n = 3)\) of the participants had 3 to 5 years experience (Table 1) and 40% \((n = 2)\) had more than 10 years experience. This met the inclusion criteria of 3 or more years experience in nephrology.

The Certified Nephrology Nurse-Nurse Practitioner (CNN-NP) is currently used as the national certification examination for the experienced NP in nephrology. This examination was developed and is administered by the Nephrology Nursing Certification Commission (NNCC; Alleman & Houle, 2013). Although all participants in this project
Table 1

*Participant Nurse Practitioners’ Years of Experience in Nephrology*

<table>
<thead>
<tr>
<th>Years</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 to 5</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>10 to 12</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>16+</td>
<td>1</td>
<td>20</td>
</tr>
</tbody>
</table>

had an adequate number of clinical hours in nephrology as a NP to qualify to take the examination, only one was nationally certified as a CNN-NP at the time of the interview. The percentage of national certifications in this project is typical of the population; the 2014 NNCC report cited that only 12% ($N = 79$) of the 687 APN NPs nationwide (NNCC, 2014).

Five nephrology expert NPs participated in the interviews, of whom three were family trained NPs, one was an adult trained NP, and one was an acute care trained NP. Two of the five participants had prior experience in caring for renal patients in the outpatient dialysis setting as an RN. This variation in advanced practice education gives strength to the variations in opinion regarding the entry-level content areas for nephrology NPs.

The participants described their perceptions and experiences of transition to nephrology practice as an NP. Three of the five participants had received some training or mentorship on initial hiring, ranging from 2 to 3 months. The primary mentor for three participants was an NP who was currently in the practice. Two participants had not received any form of structured mentoring and both were the only NPs in practice. One participant’s statement exemplifies the experience: “I shadowed the nephrologist for 6
weeks, to see what he did . . . then he was available (by phone) if I had questions. I did not have a NP mentor to guide me on the day-to-day.” This emphasizes the need for a standardized program to assist NPs in the transition to nephrology practice.

All participants in this project were currently in practice as NPs caring for renal patients. This met the definition of a nephrology expert NP having at least 3 years experience and currently practicing in nephrology

**Interview Analysis**

The audio recording of each interview was transcribed and reviewed by the researcher for content accuracy (Appendix H). Qualitative content analysis was performed to identify themes and topics (Polit & Beck, 2012) that were used to describe the background and experience of the nephrology expert NPs.

**Professional and Education Resources**

The information obtained from each participant was identified by a letter (A through E) that corresponded to the letter identifying the corresponding transcript. A resource table was developed utilizing this information. The educational and reference resources utilized during the initial 6 months to 1 year of practice by all five participants were medical and nursing nephrology text books, website resources such as (NKF), National Institutes of Health (NIH) or National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), ANNA, and Epocrates or similar medication references (Table 2). Protocols and guidelines from dialysis providers and NKF, such as KDOQI were also utilized as reference resources.
The information provided by the nephrology expert NPs highlighted the use of a variety of educational and practice guideline references. This information generated a list of potential resources for inclusion in the learning activities for each module.
Table 2

*Professional and Education Resources Reported by the Participants*

<table>
<thead>
<tr>
<th>Resource</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NKF Website</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>NKF kidney primer text</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NKF-KDOQI and KDIGO</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ANNA website</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Epocrates/medication reference</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Internet search</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>WebMD website</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>NIH/NIDDK website</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Dialysis industry protocols</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Dialysis industry website</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Medical/renal text books</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Professional organizations</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Inservices/clinical rounds</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Professional conferences</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>


**Identified Content Areas**

The nephrology expert NP participants described the critical types of information of which novice NPs in nephrology should be aware. These suggestions were reviewed by the researcher and a frequency table was developed (Table 3). Each participant’s suggestions were identified by the corresponding letter on the audio transcripts.
Table 3

*Types of Information Cited by Participants as Critical to the Nurse Practitioner in Nephrology*

<table>
<thead>
<tr>
<th>Information</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medications</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Renal labs and diagnostic tests</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Dialysis types, management, and complications</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Resources</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Anatomy and physiology</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Patient teaching</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Communication</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Pre-ESRD CKD management and complications</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Comorbid diseases</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Policy/guidelines</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Psychosocial in renal disease</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet and lifestyle</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic disease management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice barriers</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Acute kidney injury</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>End of life in renal disease</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

*Note.* ESRD = end stage renal disease, CKD = chronic kidney disease.
The results helped to set priorities for the curricular content in each of the learning modules. These topics were grouped by similar content to develop specific modules.

**Standards and Scope of Practice**

The information obtained from the expert panel was compared to the current standards and scope of practice for nephrology NPs from the *Nephrology Nursing Scope and Standards of Practice* (7th edition; Gomez, 2011) and the *Core Curriculum for Nephrology Nursing* (5th edition; Counts & Russell, 2008). These guidelines (Table 4) were used to establish standards by which NPs practice in nephrology (Gomez, 2011).
<table>
<thead>
<tr>
<th>Identified Content</th>
<th>Scope and Standards of Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medications</td>
<td>• Utilize pharmacologic knowledge and experience to adjust medications as indicated for kidney disease</td>
</tr>
<tr>
<td>Renal labs and diagnostic tests</td>
<td>• Initiates and interprets diagnostic tests and procedures relevant to the patient’s current status</td>
</tr>
</tbody>
</table>
| Dialysis types, management, and complications | • Prepare, educate patients and their families on all of the available renal replacement treatments and no treatment options  
• Management and care of patient on dialysis, including all of the risk factors and treatment complications  
• Assessment, management, and placement referral for insertion of dialysis access |
| Resources          | • Identifies the evidence base when evaluating the resource  
• Advocate for resources, including technology that enhances practice  
• Utilizes resources effectively, including interdisciplinary plans of care |
| Anatomy and physiology | • Understand normal renal system structure and function as a foundation |
| Patient teaching   | • Empowering patients to actively participate and oversee their health care by utilizing basic strategies and education  
• Preparing the patient and their family or significant others for dialysis, transplant, or no therapy when appropriate  
• Education designed to slow progression of CKD, managing complications and comorbidities, controlling symptoms of CKD, management of other chronic conditions, and minimizing effect of CKD on lifestyle |
| Communication      | • Assessment, development, and improvement of communication skills between providers, colleagues, patients, and families  
• Utilize communication formats that promote accuracy for patients, interdisciplinary team, and others  
• Minimizes risks associated with transfers and transition in care delivery  
• Identification and provision of culturally competent care |
| Pre-ESRD CKD management and complications | • Prevent or slow the progression of the disease, educate, and prepare patients and families for dialysis therapies, transplant, or no therapy  
• Diagnose and treat complications that commonly occur at all stages of CKD |
| Comorbid diseases  | • Identify, diagnose, manage, and reduce modifiable risk factors for comorbid conditions common with CKD at all stages |
| Policy/guidelines  | • Incorporation of NKF’s guidelines KDOQI and KDIGO  
• Recommendations and guidelines from the Renal Physician Association (RPA) and ANNA |
Table 4 (Continued)

<table>
<thead>
<tr>
<th>Identified Content</th>
<th>Scope and Standards of Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychosocial in renal disease</td>
<td>• Identify, manage, treat, and reduce the cultural, social, economic, psychiatric, and spiritual impact of renal disease</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>• Pathophysiology for acute and chronic kidney disease, etiology, pathology, assessment data, and treatments</td>
</tr>
<tr>
<td>Diet and lifestyle</td>
<td>• Identification, evaluation, intervention, education, and behavior modification for all stages of CKD</td>
</tr>
<tr>
<td></td>
<td>• Goal of health maintenance and risk reduction</td>
</tr>
<tr>
<td>Chronic disease management</td>
<td>• Identify and treat the impact of chronic disease on patients/families, communities and the healthcare system</td>
</tr>
<tr>
<td>Practice barriers</td>
<td>• Promotes NP in nephrology and role development</td>
</tr>
<tr>
<td></td>
<td>• Models expert NP practice to colleagues, patients/families, communities, and health care system</td>
</tr>
<tr>
<td>Acute kidney injury</td>
<td>• Assess, diagnose, and manage hospitalized patients in collaboration with the nephrologist</td>
</tr>
<tr>
<td>End of life in renal disease</td>
<td>• Identification of patient understanding, providing education and presence of advance medical directive, provide referrals and resources</td>
</tr>
</tbody>
</table>

DISCUSSION

The expert participants identified the topics required for entry-level clinical practice. This information was compared to the current scope and standards of practice guidelines, utilizing a gap analysis methodology. The value of a gap analysis method is that it compares the current guidelines or best practices with those currently utilized by clinical practitioners (U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, 2014).

To understand the current guidelines or best practices, it is important to review their evolution. The first scope and standards of advanced practice for nephrology nursing were established in 1999 by ANNA and updated in 2005 to achieve full implementation of the NKF’s KDOQI guidelines (Hudson & Prowant, 2005). The 2005 update included guidelines from American Heart Association, American Diabetes Association, the CDC, and the Association for the Advancement of Medical Instrumentation (Hudson & Prowant, 2005). The most recent update of the scope and standards of practice was published in 2011 and are currently in use for nephrology nursing (Gomez, 2011).

The gap analysis guided comparison of the clinical practice guidelines with the topics identified by the clinical experts. This process helped to determine whether any topic areas were not identified by the experts but were deemed important in the current guidelines for the scope and standards of practice. The process effectively demonstrated the absence of a gap between the clinical guideline standards and topics identified for clinical practice. The result supported inclusion of the current scope and standards of practice as a guide to development of the specialty curriculum. The next step was to
group related content areas into topics (Appendix G). Each of these topics was the foundation for development of a specific learning module.

Utilizing the topics developed from the grouping, the development of the curriculum is described in the next section. From this foundation the outline of the learning modules was developed.
CURRICULAR OUTLINE

This section presents the curricular outline for the nephrology specialty modules. The grouping of related content areas, identified by the content experts and practice guidelines, were placed into discreet topics that created the foundation for the curriculum. The next step in development of the learning modules was assigning learning objectives, selected content, and evaluation strategies.

The design of the curriculum framework, based on the logic model, acts as an educational road map for learning and teaching (Remillard, 2013). The foundation of this curriculum is evidenced based, with a framework designed to facilitate acquisition of knowledge and skill sets necessary for entry into nephrology practice. Learner development, based on Benner’s (1984) seminal work for understanding acquisition of knowledge and skills, is built into the curricular framework (Altmann, 2007). The use of Benner’s philosophy in the curricular structure assists in understanding the transition from novice to entry level, as each module is mastered before transition to the next (Remillard, 2013).

Curricular Mapping for the Learning Modules

The sequencing and curricular mapping of the learning modules gives learners and educators an effective way to define the subject matter (McCoy & Anema, 2012). This process of definition allows identification of what the learners have mastered, in addition to helping educators to continue to build on previous knowledge (McCoy & Anema, 2012). This concept of knowledge building was identified by the expert NP participants for the novice NP entering into nephrology practice. “Nephrology nursing is a specialty practice addressing the protection, promotion, and optimization of the health
and well-being of individuals with kidney disease” (Gomez, 2011, p. 1). Gomez (2011) highlighted ANNA’s recognition that NP practice in nephrology “requires substantial analytical knowledge in nephrology nursing, and the application and advancement of that knowledge in providing expert care to individuals diagnosed with kidney disease, their families, and the community at large” (p. 3). Attainment and subsequent application of that knowledge is a part of the provision of expert care (Gomez, 2011). The curricular outcome goals and sequencing of the learning modules are designed for the nephrology novice NP to grasp the additional foundation theory, as well as clinical experience.

**Curricular Mapping**

The sequencing of the learning modules is mapped to reach the outcome goals for the entry-level NP in nephrology. Although novice NPs in nephrology come with diverse knowledge and skills, the value of incorporation of Knowles’s (1980) adult learning theory will achieve active involvement by the learner. This, in turn, facilitates acquisition of new knowledge and clinical experience. By maintaining a learner-focused approach, an interactive dichotomy makes the learning process relevant to current clinical practice. Further, this approach facilitates successive movement from one module to the next. The utilization of multiple teaching approaches and modalities addresses different learning styles of adult learners. Keeping learners as the central focus facilitates the outcome goal of transition from nephrology novice to entry-level practice (Bastable, 2014).

**Sequencing of the Learning Modules**

Attaining curricular outcome objectives is achieved by systematic progression through the learning modules (Appendix I). To understand delivery and process of
progression from one learning module to the next in the curriculum, it is important to understand the mental or cognitive learning underpinning.

Tyler (1949) defined the curriculum shaping and design process in his pivotal work on curriculum development, which is commonly known as the “Tyler rationale.” The Tyler process delivers learning experiences in a sequential order that are related to each other, with each building on the preceding at a deeper and broader level (Tyler, 1949). Organization and delivery of each learning experience in a sequential manner that will reinforce each other to achieve the learning objectives (Tyler, 1949). When this is combined with Bloom's (1956) cognitive learning taxonomy in an instructional framework, the learning process is built on a hierarchy that begins with concrete (simplest) to abstract (complex) (Shrawder & Warner, 2009). Bloom’s taxonomy identifies three thinking behaviors: cognitive domain, affective domain, and psychomotor domain. Different learning behaviors occur within each of these domains (Bloom, 1956). In the combination of these seminal works learning objectives proceed from concrete to abstract (Figure 3).

In this manner, instruction methods and learning objectives for the curriculum and each learning module are arranged with this cognitive skill structure. Successful completion of each evaluation strategy readies the learner for the next learning module. Within each learning module, the teaching approach should allow for flexibility in order to meet the needs of the nephrology novice NP learners, keeping them as the focus of the learning process. This dynamic approach acknowledges the skills that each learner develops while monitoring advancement through each module. Utilizing the logic
model’s feedback structure during the delivery of instruction within the learning module keeps the content current and relevant.

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Remembering basic facts, terms, labels, methods, principles, and concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension</td>
<td>Understanding what that knowledge means, translation, interpretation, and extrapolation</td>
</tr>
<tr>
<td>Application</td>
<td>Using the knowledge and comprehension skills in new or practical situations</td>
</tr>
<tr>
<td>Analysis</td>
<td>Dividing the whole into parts and identifying the components and the relationships, organization, and principles</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Combining parts into a whole, production of a plan or set of operations</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Determining the value or worth of something; judgment of internal and external evidence</td>
</tr>
</tbody>
</table>

Figure 3. Arrangement of learning objectives from concrete to abstract, adapted from Tyler’s curriculum development and Bloom’s cognitive taxonomy.

**Discussion**

The curriculum uses a dynamic process by which educational goals, philosophy, regulations, and standards are structured on a defining framework. This framework must allow for adaptability to meet evidenced-based development while continually meeting the requirements of the learner and society. The delivery of the learning content, within the curriculum and learning module outlines, is sequential. Each expands and builds on the previously presented content or module. The delivery of the content to reach the outcome objectives for each module utilizes guiding principles from the seminal works of Tyler (1949) and Bloom (1956) as an underpinning.

Adaptation of these principles directed the sequencing of the learning experiences in a manner that builds from concrete (simplest) to abstract (complex). The arrangement
of the teaching activities in this manner optimizes the learning experiences in a way that works in an interlocking manner. Essentially, this interlocking of experiences lays a solid foundation on which to build. This type of foundation allows for further development of the curriculum with expert content review, implementation, and evaluation. The potential for the nephrology novice NP learner is continued professional growth from entry level, upon completion of this curriculum, to expert nephrology NP and national certification.
SUMMARY

The prevalence of chronic kidney disease continues to rise worldwide, placing substantial burdens on already limited health care resources (Nahas & Bello, 2005). The increasing demand for nephrology care has challenged financial resources, as well as the number of nephrologists (Neilson et al., 1997). This demand for high-quality care and the costs of such care, combined with the limited supply of available nephrologists, has led to the need to integrate NPs into the renal care team. The presence of NPs in nephrology is not a new phenomenon and their numbers are increasing (ANNA, 2014; Bolton, 1998). NPs who are entering the nephrology specialty need to be prepared to provide effective care to the complex renal patient. Currently, NPs lack clear, consistent, and standardized training or education pathways to enter collaborative nephrology practice. The present and future generations of nephrology NPs must provide effective care to these complex patients. The specialty education curriculum outline that prepares the primary care NP for care of the nephrology patient is essential.

Curriculum, like health care, is a dynamic process by which educational goals, philosophy, regulations, and standards are structured on a defining framework. The framework utilized in this project allowed for adaptability of evidenced-based practice, while continually meeting the requirements of the learner and society. The participation of nephrology expert NPs in this project defined the critical topics and content that are required for entry level. The gap analysis of the experts identified topics with the current standards and scope of practice, support utilization of both as guidelines in development and delivery of the learning modules.
The goal of this Doctor of Nursing Practice project was development of a curricular outline for NPs as they enter nephrology practice. The structure of the curriculum and subsequent learning modules for this project laid the foundation for further development. For the future, the curriculum and learning modules should be reviewed by expert nephrology NPs to gain their opinions on content, relevance, and completeness, with possible recommendations. Trial implementation and evaluation of this specialty curriculum will be required as part of continued development. Further development of this curriculum should address and remove barriers in content, delivery, and financial support. The potential of having this standardized nephrology education curriculum available to postgraduate NPs in centers of nursing education, has far-reaching implications. The provision of care to the complex renal patient by NPs trained in the specialty of nephrology, has a potential impact on patient mortality and morbidity, as well as health care costs.
REFERENCES


doi:10.1111/j.1365-2354.2007.00795.x


U.S. Department of Health and Human Services, National Institutes of Health, &
Renal Data System, USRDS 2014 annual data report: Costs of chronic kidney

U.S. Department of Health and Human Services, National Institutes of Health, &
Renal Data System, USRDS 2014 annual data report: Chronic kidney disease in

Vanderbilt University School of Nursing. (2014). Adult-gerontology acute care nurse
practitioner (AG-ACNP). Retrieved from https://www.nursing.vanderbilt.edu/
msn/acnp_plan.html

Author.
APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL OF THE STUDY DESIGN

CALIFORNIA STATE UNIVERSITY, LONG BEACH

OFFICE OF RESEARCH & SPONSORED PROGRAMS

DATE: January 9, 2015

TO: Theresa Payne, MSN
FROM: California State University, Long Beach (IRB)

PROJECT TITLE: [667295-2] DEVELOPMENT OF A SPECIALTY EDUCATION PROGRAM IN NEPHROLOGY FOR NURSE PRACTITIONERS

REFERENCE #: 15-110s
SUBMISSION TYPE: Revision

ACTION: APPROV
ED APPROVAL DATE: December 22, 2014
EXPIRATION DATE: December 21, 2015
REVIEW TYPE: Administrative

This is to advise you that the Institutional Review Board for the Protection of Human Subjects (IRB) of California State University, Long Beach, has reviewed your protocol application. Your application is approved. The requested modifications have been received, reviewed, and accepted.
Approval is for a period of one year and conditional upon your willingness to carry out your continuing responsibilities under University policy. If you would like to continue this research after this one year period, please submit a renewal application and an annual report to the Office of Research & Sponsored Programs two months prior to your expiration date of December 21, 2015.

1. You must clearly indicate in the header or footer of each page of your approved Informed Consent Form the approval and expiration dates of the protocol as follows: “Approved from December 22, 2014 to December 21, 2015 by the CSULB IRB”.

2. You are required to inform the Director or Senior Associate Director, Office of Research & Sponsored Programs, in writing (email is acceptable) or through IRBNet within twenty-four hours of any adverse event in the conduct of research involving human subjects. The report shall include the nature of the adverse event, the names of the persons affected, the extent of the injury or breach of security, if any, and any other information material to the situation.

3. You may not change any aspect of your research procedure involving human subjects without written permission from the Director, Office of Research & Sponsored Programs or the Chair of the IRB. Please use the Protocol Modification Form on IRBNet to request any changes.

4. Maintain your research records as detailed in the protocol.

Should you have any questions about the conduct of your research under this protocol, particularly about providing informed consent and unexpected contingencies, please do not hesitate to call the Office of Research & Sponsored Programs at (562) 985-8147. We wish you the best of success in your research.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within

California State University, Long Beach Institutional Review Board’s record
APPENDIX B

PERMISSIONS AND AGREEMENTS

MEMBERSHIP LIST RENTAL POLICY AGREEMENT

I affirm that I have been a member of the American Nephrology Nurses’ Association (ANNA) for at least three (3) consecutive years preceding this list request and am using the membership list for the purpose of completing an advanced degree.

I agree to provide the following documentation required to lease the American Nephrology Nurses’ Association’s (ANNA) mailing list for my research project:

- Evidence of approval through my own facility’s institutional review board.
- If the request is approved by ANNA’s Research Committee and National President, ANNA, I will share the study’s findings in an ANNA education venue (e.g. submitting an article for publication or submitting an abstract for presentation at the National Symposium or Fall Meeting).

In addition, I agree to:

- Confidentiality about the source of the list. The name of the ANNA organization will not be revealed in publications. The survey sample will be described as being solicited from a nephrology nurse database.
- Including in the mailing an informed consent to the membership identifying the purpose, funding, procedure involved, and primary investigators information.

In exchange for use of ANNA’s membership list, I agree to:

- Provide ANNA with the research data obtained via the ANNA membership list.
- Provide Nephrology Nursing Journal with the right of first refusal for publication of the research study.

In addition, I agree not to duplicate or redistribute the ANNA mailing list and affirm that it will be used only for the expressed intent. ANNA retains the right to refuse rental of the mailing list for any reason. We acknowledge ANNA’s formal policy regarding list rental and we agree to abide by its terms. Each request is for one-time use only and must be destroyed upon completion of the mailing. All lists must be prepaid.
Membership List Rental Agreement

Lists are sent via email (Excel Spreadsheet). We request the list to be sorted as follows:

Choose One

☑ Zip Code Sort
☐ Alphabetical Sort
☐ Other (Please specify)

Other Instructions:

Email List to: Theresa.Payne@CSU.Fullerton.edu

Signature

Theresa M Payne

Name (Please Print)

(951) 886-40-1089

Phone

951 687-

Fax

Date

12/3/11

Please read the following and sign below:

I have read and agree to all terms of ANNA’s list rental policy. ANNA has agreed to specially provide me with an electronic version of the ANNA membership list that I will use for the sample mailing submitted. I agree not to merge the list into a database system. Further, I agree to erase all data immediately upon completion of this mailing.

Signature

Date

12/3/11

Please return this form to:
ANNA National Office, Box 56, East Holly Avenue, Pitman, NJ 08071-0956
Attention: Susan Iannelli, susan.iannelli@annanurse.org (or Fax 856-589-7463)
MEMBERSHIP LIST RENTAL POLICY AGREEMENT

We agree that the leasing of the American Nephrology Nurses' Association's (ANNA) mailing list in no way authorizes any party to indicate, either directly or indirectly, that ANNA or any of its chapters has expressly or implicitly endorsed the products being sold, services being offered or information being distributed, unless written consent has been secured from the National Office.

In addition, we agree not to duplicate or redistribute the ANNA mailing list and affirm that it will be used only for the expressed intent. ANNA retains the right to refuse rental of the mailing list for any reason. We acknowledge ANNA's formal policy regarding list rental and we agree to abide by its terms. Each request is for one-time use only and must be destroyed upon completion of the mailing. All lists must be prepaid.

Lists are sent via email (Excel Spreadsheet). We request the list to be sorted as follows:

Choose One
☐ Zip Code Sort
☐ Alphabetical Sort
☒ Other (Please specify)

Other Instructions: Nurse Practitioners with 2+ yrs in Nephrology

Email List to: theresa.payne@csu.fullerton.edu

Signature: Theresa M. Payne
Date: 12/1/14

Name (Please Print): Theresa M. Payne
Title: NP

Company: CSU
Student: N/A

Phone: (951) 680-1039
Fax: N/A

Shipping Address:
17875 Barton Street
Riverside, CA 92508

Please read the following and sign below:

We have read and agree to all terms of ANNA's list rental policy. ANNA has agreed to specialize provide our company with an electronic version of the ANNA membership list that we will use for the sample mailing submitted. We agree not to merge the list into a database system. Further, we agree to erase all data immediately upon completion of this mailing.

Signature: Theresa M. Payne
Date: 12/1/14

Please return this form to:
ANNA National Office, Box 56, East Holly Avenue, Pitman, NJ 08071-0056
Attention: Susan Iannelli, susan.iannelli@annanurse.org (or Fax 856-589-7463)
December 1, 2014

IRBNNet Support Team  
California State University Long Beach  
Institutional Review Board

**Project Title**  
Development of a Specialty Education Program in Nephrology for Nurse Practitioners

**Principal Investigator**  
Theresa Payne, MSN

Dear IRBNNet Support Team:

This letter will confirm that the American Nephrology Nurses’ Association’s (ANNA) has approved Theresa Payne’s request to rent ANNA’s mailing list to conduct the above referenced study.

ANNA will be releasing a portion of its membership list – ANNA members who are Nurse Practitioners and have been actively been working in nephrology for a minimum of three years – for Ms. Payne to contact requesting their participation in the study.

Please let us know if you need any additional information.

Sincerely,

Susan Iannelli  
Executive Assistant
Dear Fellow Nurse Practitioner,

My name is Theresa Payne; I am DNP student at California State University Fullerton in the doctoral of nursing practice consortium. I have been in the specialty of nephrology for the past 11 years as a nurse practitioner as well as a current American Nephrology Nurses Association member. I entered into the specialty of nephrology with the mentoring of my nephrology physicians, however it lacked the structured curriculum that is required to care for the complex renal patient.

For my doctoral project I am developing a curricular outline and objectives for the new to nephrology nurse practitioner. The goal is to lay the foundation for the potential future development of an entry level training program in nephrology for nurse practitioners.

For this project I am seeking nephrology nurse practitioners with a minimum of three years of experience to participate in a telephone interview that will last approximately 30 minutes.
I would like to invite for you to participate in this doctoral project. If you are interested please sign the enclosed consent form and return it along with the demographic form to the e-mail address listed below. Also include your contact information for the scheduling of the telephone interview. I would like to thank you in advance your consideration of this DNP scholarly project.

Sincerely,
Theresa Payne, MSN, NP-C
DNP Student
theresapayne@csu.fullerton.edu
APPENDIX D

DEMOGRAPHIC INFORMATION TOOL

1. How many years have you been in nephrology as a nurse practitioner?
   - 0-2 years  
   - 3-5 years  
   - 6-8 years  
   - 10-12 years  
   - 13-15 years  
   - 16+ years

2. Are you currently employed?
   - Yes  
   - No

3. Do you currently work in nephrology as a nurse practitioner?
   - Yes  
   - No

4. What types of renal patients do you typically manage? Mark only one
   - CKD Office (pre-ESRD)  
   - Hemodialysis  
   - Peritoneal dialysis  
   - Transplant  
   - Combination of all four types

5. What is your current age?
   - 20-29 years  
   - 30-39 years  
   - 40-49 years  
   - 50-59 years  
   - 60-69 years

6. Are you nationally certified in the specialty of nephrology as a nurse practitioner?
   - Yes  
   - No
APPENDIX E

NEPHROLOGY EXPERT NURSE PRACTITIONER TELEPHONE INTERVIEW QUESTIONS

Introduction:

Good morning/afternoon/evening, my name is Theresa Payne, I am a DNP student at California State University Fullerton in the doctoral of nursing practice consortium. I have been in the specialty of nephrology for the past 11 years as a nurse practitioner. My entry into this specialty was without a structured education or training program. My experience highlights the need for a structured curriculum for nurse practitioners entering nephrology practice.

As noted in the consent form, you were selected for participation due to your expertise. This interview may take about 30 minutes, and you can choose to answer or not answer any of my questions. I would like to thank you in advance for participating in this DNP scholarly project. The purpose of this interview is to explore the needs of a new to nephrology nurse practitioners who are entering practices caring for renal patients.

Interview questions:

1) First I want to ask a little about you. Can you describe your initial education as a nurse practitioner? Why that type of training did you have?
2) How did you enter the specialty of nephrology? Why? Describe any training or education you received initially and along the way.
3) Are you currently certified as a CNN-NP? If yes, how long did you practice in nephrology before you obtained your certification?
4) In your initial practice area in nephrology, you’ve already described training that you received; did you receive any mentorship from nurses or others that you perceived as important to your role as a nephrology nurse practitioner? If yes, describe that mentorship.
5) What kinds of things would you have liked to know during your first 6 months to one year of practice in nephrology as a nurse practitioner?
6) How do you think that these initial knowledge needs could have optimally been met?
7) What educational or professional resources did you use the first 6 months in nephrology practice? For example, did you access nephrology textbooks or videos? What were the strengths or weakness of that approach (or those approaches)?
8) What are the 4 to 5 most critical types of information do you think that novice nephrology nurse practitioners need to have as they begin practice? Be specific as you can.
9) When considering a nephrology specific curriculum for novice nurse practitioners what the 4 to 5 content areas that should be covered to meet the needs for practice in this area?
10) Is there anything else that you would like to add?
Closing Statement:

Thank you for your participation and taking the time to participate in this DNP project. When I have completed of the curriculum outlines and objectives, if you are interested I would like to invite you to evaluate these for completeness and relevance for entry level nephrology novice nurse practitioners.

If you would like a copy of the written transcript of this interview please let me know now, as the audiotape and subsequent transcription will be identified by a random letter. This random identifier will not be connected to any of your identifying information.
APPENDIX F
INFORMED CONSENT

CONSENT TO PARTICIPATE IN RESEARCH
DEVELOPMENT OF A SPECIALTY EDUCATION PROGRAM
IN NEPHROLOGY FOR NURSE PRACTITIONERS

You are asked to participate in a research study conducted by Theresa Payne, NP-C, MSN, from the nursing department at California State University, Long Beach. This project is designed as the capstone of the doctorate of nursing practice dissertation. You were selected as a possible participant in this study because you are a nurse practitioner with 3 years or more in nephrology and a current American Nephrology Nurses Association member.

PURPOSE OF THE STUDY

Primary care nurse practitioners entering the specialty of nephrology need additional education to secure essential knowledge that will allow them to function effectively.

The purpose of this doctorate of nursing practice project is to develop content outlines and objectives for nephrology specialty curriculum in a modular format.

PROCEDURES

If you volunteer to participate in this study, you will do the following things:

- Sign the consent form, and complete the demographic questionnaire, return both along with your contact information to the Theresa Payne, principal investigator by the email address provided below.
- You will be contacted to schedule a mutually convenient time for a telephone interview which will last approximately 30 minutes.
- The phone interview will consist of semi-structured questions, designed to gather information about the preparation needs of nurse practitioners for entry level into the specialty of nephrology.
- The telephone interview will be audiotaped as well as notes taken.
- Each audiotaped interview will be assigned an alphabetic letter which will correspond to the transcription of the interview.
- The contents of the audiotaped interview and interview notes will be transcribed by the principal investigator.
- The transcribed notes and audiotapes will be kept in a locked safe and password protected HP personal computer that is accessible only by the principal investigator.
- Participants may review the transcripts of their interview upon verbal request at the time of the interview.

POTENTIAL RISKS AND DISCOMFORTS

1. Confidentiality – The audiotape of the telephone interviews or the subsequent transcripts potential of containing identifying information that could be connected to the subjects.

2. Reputation – If the subjects in this project are identified with their audiotaped interview or transcripts and the opinions expressed are counter to the popular ideal.

3. Comfort - Questions or subjects which might cause some distress. Conducting the interview at an inconvenient time or uncomfortable environment for the subject.

Management of Potential Risks and Discomforts

1. Confidentiality - The audiotapes and the transcripts from those recordings will be identified with an alphabetical letter only. There will be no ledger or other record connecting the subject to the alphabetical letter of their audiotape interview. The audiotapes, transcripts demographic information, consent forms, and contact information will be kept in a locked safe with the principal investigator having the combination. All transcripts will be kept upon the principal investigator’s personal password protected HP computer.

2. Reputation - The content of the interview transcripts or audiotapes will be labeled with alphabetical letters. Not connecting the information obtained from the audiotaped interviews the subject’s reputations will be maintained.

3. Comfort - All subjects will be treated with professional courtesy and respect. The scheduling of the audiotaped interviews will be at a mutually acceptable time for the subjects and the principal investigator. The principal investigator will conduct the interviews in a quiet, private environment. The participation by all subjects is completely voluntary, the subject is not required to answer any question or topic which they are uncomfortable. The subject can withdraw at any time or stop the interview at any time.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Subjects Benefits:

There is no direct benefit to the participant.

Society Benefits:

The creation of a curricular outline for nephrology specialty training program for nurse practitioners.
PAYMENT FOR PARTICIPATION

My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty. If I decline to participate or withdraw from the study, no one will be told.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

- All telephone interviews will be audiotaped.
- Each audiotaped interview will be assigned an alphabetical letter each in the chronological order.
- Contents of the audiotape interviews will be transcribed into text by the principal investigator.
- The alphabetical letter on the transcripts will correspond with the letter on the audiotape
- The transcripts of the telephone interviews will be made available to the subjects for their review and editing upon their request.
- Should the subjects request the transcripts they must do so at the time of the interview to the principal investigator as there will be alphabetical letters for the recordings or transcripts.
- The subjects identifying information will not be related to the alphabetical letter of the audiotapes or subsequent transcripts.
- The requested transcript copies will be sent by regular post to the subject’s address or to the selected e-mail address.

All transcriptions and audiotapes will be kept in a secure locked safe, they will be destroyed in three years after the completion of the doctoral project.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. Participation or non-participation will not affect your membership in ANNA, or any other personal consideration or right you usually expect. You may also refuse to answer any questions you don’t want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.
IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Theresa M. Payne, NP-C, MSN, Principal Investigator at (951) 640-1029 or theresapayne@csu.fullerton.edu, or Beth Keely, Ph.D., RN Faculty Sponsor at (562) 985-4478 or beth.keely@csulb.edu.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Office of University Research, CSU Long Beach, 1250 Bellflower Blvd., Long Beach, CA 90840; Telephone: (562) 985-5314. E-mail: ORSP-Compliance@csulb.edu.

SIGNATURE OF RESEARCH SUBJECT (AND) OR LEGAL REPRESENTATIVE I understand the procedures and conditions of my participation described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

__________________________________________________
Name of Subject

__________________________________________________
Signature of Subject                                 Date
## APPENDIX G
### MODULAR GROUPING OF CONTENT TOPICS

<table>
<thead>
<tr>
<th>Title/Topic</th>
<th>Guidelines/Purpose</th>
<th>Expert Content</th>
</tr>
</thead>
</table>
| Kidney structure and function, normal and abnormal                       | • Normal anatomy and physiology of the renal system to serve as a foundation for understanding the assessment of kidney function, kidney abnormalities, and how kidney and other diseases affect kidney function.  
• Describe the etiology, pathology, and assessment data related to the causes of acute and chronic kidney failure and other kidney disorders and briefly outline treatment of these disorders. | • Anatomy and physiology  
• Pathophysiology  
• Renal labs and diagnostic tests |
| Chronic Kidney Disease (CKD)                                              |                                                                                                                                                                                                                       |                                                     |
| 1. CKD stages 2-3 management Common complications associated with stages 2-3:  
a) Anemia  
b) Bone mineral management  
c) Malnutrition  
e) Cardiovascular complications | • Prevent or slow progression of the disease, educate and prepare patients and families for dialysis therapies, transplant, or no therapy.  
• Diagnose and treat complications that commonly occur at all stages of CKD.  
• Identify and provide culturally competent care.  
• Identify and treat impact of chronic disease on patients and families, communities, and the health care system.  
• Demonstrate specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease.  
• Identify, manage, treat, and reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.  
• Initiate and interpret diagnostic tests and procedures relevant to the patient’s current status.  
• Identify, evaluate, intervene, educate and apply behavior modification for all stages of CKD.  
• Identify goal of health | • Pre-ESRD CKD management and complications  
• Chronic disease management  
• Psychosocial in renal disease  
• Medications  
• Renal labs and diagnostic tests  
• Diet and lifestyle  
• Patient teaching  
• Communication  
• End of life in renal disease |
Chronic Kidney Disease (CKD)

2. CKD stage 4 management
   Common complications associated with stage 4:
   a) Anemia
   b) Bone mineral management
   c) Malnutrition
   d) Cardiovascular complications
   e) End stage treatment choice education

   • Prevent or slow the progression of the disease, educate and prepare patients & families for dialysis therapies, transplant or no therapy.
   • Diagnose and treat complications that commonly occur at all stages of CKD.
   • Identify and provide culturally competent care.
   • Identify and treat impact of chronic disease on patients, families, communities, and the health care system.
   • Demonstrate specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease.
   • Identify, manage, treat, and reduce the cultural, social, economic, psychiatric, and spiritual impact of renal disease.
   • Initiate and interpret diagnostic tests and procedures relevant to the patient’s current status.
   • Identify, evaluate, intervene, educate, and apply behavior modification for all stages of

   • Empower patients to participate and oversee their health care by utilizing basic strategies and education.
   • Provide education designed to slow progression of CKD, manage complications and comorbidities, control symptoms of CKD, manage other chronic conditions, and minimize effects of CKD on lifestyle.
   • Assess, develop, and improve communication skills between providers, colleagues, patients, and families.
   • Utilize communication formats that promote accuracy for patients, interdiscplinary team, and others.
   • Minimize risks associated with transfers and transition in care delivery.
   • Identify patient understanding, provide education and presence of advance medical directive, and provide referrals and resources.

   • Pre-ESRD CKD management and complications
   • Chronic disease management
   • Psychosocial in renal disease
   • Medications
   • Renal labs and diagnostic tests
   • Diet and lifestyle
   • Patient teaching
   • Communication
   • End of life in renal disease
Chronic Kidney Disease (CKD)

3. CKD stage 5 management
Common complications associated with stage 5:
   a) Anemia
   b) Bone mineral management
   c) Malnutrition
   d) Cardiovascular complications
   e) End stage treatment preparation for dialysis or no treatment.

- Prevent or slow the progression of the disease, educate and prepare patients and families for dialysis therapies, transplant, or no therapy.
- Diagnose and treat complications that commonly occur at all stages of CKD.
- Identify and provide culturally competent care.
- Identify and treat the impact of chronic disease on patients, families, communities, and the health care system.
- Demonstrate specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease.
- Identify, manage, treat, and reduce the cultural, social, economic, psychiatric, and psychiatric

• Identify goal of health maintenance and risk reduction.
• Empower patients to participate in and oversee their health care by utilizing basic strategies and education.
• Prepare the patient and family or significant others for dialysis, transplant, or no therapy when appropriate.
• Provide education designed to slow progression of CKD, manage complications and comorbidities, control symptoms of CKD, manage other chronic conditions, and minimize effects of CKD on lifestyle.
• Assess, develop, and improve communication skills between providers, colleagues, patients, and families.
• Utilize communication formats that promote accuracy for patients, interdisciplinary team, and others.
• Minimize risks associated with transfers and transition in care delivery
• Identify patient understanding, provide education and presence of advance medical directive, and provide referrals and resources.

Pre-ESRD CKD management and complications
• Chronic disease management
• Psychosocial in renal disease
• Medications
• Renal labs and diagnostic tests
• Diet and lifestyle
• Patient teaching
• Communication
• End of life in renal disease
spiritual impact of renal disease.
• Initiate and interpret diagnostic tests and procedures relevant to the patient’s current status.
• Identify, evaluation, intervene, educate, and apply behavior modification for all stages of CKD.
• Identify goal of health maintenance and risk reduction.
• Empower patients to participate in and oversee their health care by utilizing basic strategies and education.
• Prepare the patient and family or significant others for dialysis, transplant, or no therapy when appropriate.
• Provide education designed to slow progression of CKD, manage complications and comorbidities, control symptoms of CKD, manage other chronic conditions, and minimize effects of CKD on lifestyle.
• Assess, develop, and improve communication skills between providers, colleagues, patients, and families.
• Utilize communication formats that promote accuracy for patients, interdisciplinary team, and others.
• Minimize risks associated with transfers and transition in care delivery.
• Identify patient understanding, provide education and presence of advance medical directive, and provide referrals and resources.

Chronic Kidney Disease (CKD)

4. Co-morbid disease management
   a) Hypertension
   b) Diabetes
   c) Auto-immune diseases
   d) Congenital diseases

   • Diagnose and treat complications that commonly occur at all stages of CKD.
   • Identify and provide culturally competent care.
   • Identify and treat the impact of chronic disease on patients, families, communities, and the health care system.
   • Demonstrate specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease.
   • Identify, manage, treat, and
reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.
• Initiate and interpret diagnostic tests and procedures relevant to the patient’s current status.
• Identify goal of health maintenance and risk reduction.
• Empower patients to participate in and oversee their health care by utilizing basic strategies and education.
• Assess, develop, and improve communication skills between providers, colleagues, patients, and families.
• Utilize communication formats that promote accuracy for patients, interdisciplinary team, and others.
• Minimize risks associated with transfers and transition in care delivery.
• Identify patient understanding, provide education and presence of advance medical directive, and provide referrals and resources.

Kidney replacement therapy management for end stage renal disease (ESRD)

1. Hemodialysis management
   a) In-center
   b) Nocturnal in-center
   c) Home
   d) Common complications

   • Management and care of patient on dialysis, including all risk factors and treatment complications.
   • Assessment, management, and placement referral for insertion of dialysis access.
   • Specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease.
   • Initiation and interpretation of diagnostic tests and procedures relevant to the patient’s current status.
   • Identification, evaluation, intervention, education, and behavior modification for all stages of CKD.
   • Goal of health maintenance and risk reduction.
   • Pathophysiology for acute and chronic kidney disease, etiology, pathology, assessment data, and treatments.
   • Empowerment of patients to

   • Dialysis types, management, and complications
   • Medications
   • Renal labs and diagnostic tests
   • Diet and lifestyle
   • Pathophysiology
   • Acute Kidney Injury
   • Patient teaching
   • Communication
   • Psychosocial in renal disease
   • Chronic disease management
   • End of life in renal disease
   • Resources
   • Policy/guidelines
   • Practice barriers
participate in and oversee their health care by utilizing basic strategies and education.
• Assessment, development, and improvement of communication skills between providers, colleagues, patients, and families.
• Communication formats that promote accuracy for patients, interdisciplinary team, and others.
• Minimized risks associated with transfers and transition in care delivery
• Identification and provision of culturally competent care.
• Identification, management treatment, and reduction of cultural, social, economic, psychiatric and spiritual impacts of renal disease.
• Identification and treatment of the impact of chronic disease on patients, families, communities, and the health care system
• Identification of patient understanding, provision of education and presence of advance medical directive, provide referrals and resources.
• Identification of evidence base when evaluating resources.
• Advocate for resources, including technology that enhances practice.
• Effective utilization of resources, including interdisciplinary plans of care.
• Incorporation of NKF guidelines KDOQI and KDIGO.
• Recommendations and guidelines from the Renal Physician Association (RPA) and Association of American Nephrology Nurses Association (ANNA).
• Promotion of Nurse Practitioner (NP) in nephrology and role development.
• Model expert NP practice to colleagues, patients, families, communities, and health care
Kidney replacement therapy management for ESRD

2. Peritoneal dialysis management
   a) Continuous ambulatory
   b) Automated/cycler
   c) Common complications

- Management and care of patient on dialysis, including all of the risk factors and treatment complications
- Specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease
- Initiates and interprets diagnostic tests and procedures relevant to the patient’s current status
- Empowering patients to actively participate and oversee their healthcare by utilizing basic strategies and education.
- Assessment, development and improvement of communication skills between providers, colleagues, patient and families.
- Utilize communication formats that promote accuracy for patients, interdisciplinary team and others.
- Minimizes risks associated with transfers and transition in care delivery
- Identification and provision of culturally competent care.
- Identify, manage, treat, and reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.
- Identify and treat the impact of chronic disease on patients/families, communities and the healthcare system
- Identifies the evidence base when evaluating the resource
- Advocate for resources, including technology that enhances practice.
- Utilizes resources effectively, including interdisciplinary plans of care.
- Incorporation of NKFs guidelines KDOQI & KDIGO.
- Recommendations and guidelines from the Renal Physician Association (RPA) and ANNA
- Promotes NP in nephrology and role development

- Medications
- Renal labs and diagnostic tests
- Diet and lifestyle
- Pathophysiology
- Patient teaching
- Communication
- Psychosocial in renal disease
- Chronic disease management
- End of life in renal disease
- Resources
- Policy/guidelines
- Practice barriers
• Models expert NP practice to colleagues, patients/families, communities and healthcare system
• Identification, evaluation, intervention, education and behavior modification for all stages of CKD.
• Goal of health maintenance and risk reduction.
• Empowering patients to actively participate and oversee their healthcare by utilizing basic strategies and education.

<table>
<thead>
<tr>
<th>Kidney replacement therapy management for ESRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Kidney transplant</td>
</tr>
<tr>
<td>• Specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease</td>
</tr>
<tr>
<td>• Initiates and interprets diagnostic tests and procedures relevant to the patient’s current status</td>
</tr>
<tr>
<td>• Goal of health maintenance and risk reduction.</td>
</tr>
<tr>
<td>• Assessment, development and improvement of communication skills between providers, colleagues, patient and families.</td>
</tr>
<tr>
<td>• Utilize communication formats that promote accuracy for patients, interdisciplinary team and others.</td>
</tr>
<tr>
<td>• Minimizes risks associated with transfers and transition in care delivery</td>
</tr>
<tr>
<td>• Identification and provision of culturally competent care.</td>
</tr>
<tr>
<td>• Identify, manage, treat, and reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.</td>
</tr>
<tr>
<td>• Identify and treat the impact of chronic disease on patients/families, communities and the healthcare system</td>
</tr>
<tr>
<td>• Identifies the evidence base when evaluating the resource</td>
</tr>
<tr>
<td>• Advocate for resources, including technology that enhances practice.</td>
</tr>
<tr>
<td>• Utilizes resources effectively, including interdisciplinary plans of care.</td>
</tr>
<tr>
<td>• Incorporation of NKF's</td>
</tr>
</tbody>
</table>

| Kidney transplant |
| • Medications |
| • Renal labs and diagnostic tests |
| • Diet and lifestyle |
| • Pathophysiology |
| • Patient teaching |
| • Communication |
| • Psychosocial in renal disease |
| • Chronic disease management |
| • End of life in renal disease |
| • Resources |
| • Policy/guidelines |
| • Practice barriers |
Kidney replacement therapy management for ESRD

4. No kidney replacement therapy

- Identification of patient understanding, providing education and presence of advance medical directive, provide referrals and resources.
- Specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease.
- Initiates and interprets diagnostic tests and procedures relevant to the patient’s current status.
- Assessment, development and improvement of communication skills between providers, colleagues, patient and families.
- Utilize communication formats that promote accuracy for patients, interdisciplinary team and others.
- Minimizes risks associated with transfers and transition in care delivery.
- Identification and provision of culturally competent care.
- Identify, manage, treat, and reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.
- Identify and treat the impact of chronic disease on patients/families, communities and the healthcare system.
- Identifies the evidence base when evaluating the resource.
- Advocate for resources, including technology that enhances practice.
- Utilizes resources effectively,

- End of life in renal disease
- Resources
- Policy/guidelines
- Practice barriers
- Medications
- Renal labs and diagnostic tests
- Patient teaching
- Communication
- Psychosocial in renal disease
- Chronic disease management
including interdisciplinary plans of care.
• Recommendations and guidelines from the Renal Physician Association (RPA) and ANNA
• Promotes NP in nephrology and role development
• Models expert NP practice to colleagues, patients/families, communities and healthcare system
• Empowering patients to actively participate and oversee their healthcare by utilizing basic strategies and education

Kidney replacement therapy management for ESRD

5. Dialysis access
  a) Types, management and complications

• Assessment, management and placement referral for insertion of dialysis access.
• Specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease
• Initiates and interprets diagnostic tests and procedures relevant to the patient’s current status
• Empowering patients to actively participate and oversee their healthcare by utilizing basic strategies and education.
• Assessment, development and improvement of communication skills between providers, colleagues, patient and families.
• Utilize communication formats that promote accuracy for patients, interdisciplinary team and others.
• Minimizes risks associated with transfers and transition in care delivery
• Identification and provision of culturally competent care.
• Identify, manage, treat, and reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.
• Identify and treat the impact of chronic disease on patients/families, communities and the healthcare system
• Recommendations and guidelines from the Renal

• Medications
• Renal labs & diagnostic tests
• Diet & lifestyle
• Patient teaching
• Communication
• Psychosocial in renal disease
• Resources
• Policy/guidelines
• Practice barriers
Physician Association (RPA) and ANNA
• Promotes NP in nephrology and role development
• Models expert NP practice to colleagues, patients/families, communities and healthcare system.

Kidney replacement therapy management for ESRD

6. Acute kidney injury (AKI)

• Assess, diagnose and manage hospitalized patients in collaboration with the nephrologist
• Specific pharmacologic knowledge and experience to adjust medications as indicated for kidney disease
• Initiates and interprets diagnostic tests and procedures relevant to the patient’s current status
• Identification, evaluation, intervention, education and behavior modification for all stages of CKD.
• Goal of health maintenance and risk reduction.
• Pathophysiology for acute and chronic kidney disease, etiology, pathology, assessment data and treatments.
• Empowering patients to actively participate and oversee their healthcare by utilizing basic strategies and education.
• Assessment, development and improvement of communication skills between providers, colleagues, patient and families.
• Utilize communication formats that promote accuracy for patients, interdisciplinary team and others.
• Minimizes risks associated with transfers and transition in care delivery
• Identification and provision of culturally competent care.
• Identify, manage, treat, and reduce the cultural, social, economic, psychiatric and spiritual impact of renal disease.
• Identify and treat the impact of chronic disease on patients/families, communities
and the healthcare system
• Identification of patient understanding, providing education and presence of advance medical directive, provide referrals and resources.
• Identifies the evidence base when evaluating the resource
• Advocate for resources, including technology that enhances practice.
• Utilizes resources effectively, including interdisciplinary plans of care.
• Incorporation of NKF’s guidelines KDOQI & KDIGO.
• Recommendations and guidelines from the Renal Physician Association (RPA) and ANNA
• Promotes NP in nephrology and role development
• Models expert NP practice to colleagues, patients/families, communities and healthcare s
APPENDIX H

PARTICIPANT RESPONSES TO INTERVIEW QUESTIONS

I = Interviewer
P = Participant

Interview A

I: First I want to ask a little about you. Can you describe your initial education as a nurse practitioner? Why that type of training did you have?

P: Well, before I became a NP I was a registered nurse working with dialysis patients in the hospital setting, called Acute Dialysis nurse and in that process I was also working on my masters. In my employment capacity I was running into patients where I was starting dialysis for the very first time with a big fear from family and patients about what this entailed. So I knew that there was something missing, there was something -- I tried to fill in the gaps with education information for patients and make the patients and their families feel more comfortable with the process. So in my education as I became a nurse practitioner, I of course I was exposed to the nephrologist, to a nurse practitioner, who also helped me to learn, some of the things a nurse practitioner does in a nephrology setting. Anyhow, having that background, I think that makes me kind of unique because I did work in dialysis beforehand so it was a nice bridge into nephrology. Where I did have some sort of background as far as how the machine ran, and having talked to some of the nephrologists as far as on what to look for with patients, especially when I started to see some problems. So I did have a little background, not necessarily starting without any knowledge in nephrology. So in my education program (NP) there was no emphasis on nephrology. Maybe a short discussion in the pathophysiology curriculum portion but there was nothing that focused on nephrology per se. So my entry into nephrology was chosen because I already had background as a RN. I don’t know if that answers your question?

I: No - That is perfect.

I: How did you enter the specialty of nephrology? Why? Describe any training or education you received initially and along the way.

P: Well, as I mentioned before as a RN, I did had exposure to nephrology and so this is through the company, Davita, and the company did offer some sort of informational sessions. Not necessarily a curriculum, but obtain information about nephrology through different websites for example the National Kidney Foundation (NKF), Davita has its own information sessions, and so just a little bit of exposure here and there. I guess because I wanted to learn more I did continuing education. I looked for continuing education components on-line through various resources, wherever I could find it, I could not find one specific place that offered a lot of information. Until I found ANNA, that is the American Nephrology Nurses Association. I did not find that organization until I became a
nurse practitioner. That is where I found more continuing education on nephrology, as far as what I actually see on the floor, in the unit.

I: Ok, when you actually started practice as a nurse practitioner in nephrology, can you describe any training or education you received initially and along the way?

P: Oh, yeah, yeah. Yes as a nurse practitioner, there was a process where for a period of time I shadowed a nurse practitioner, I shadowed a nephrologist, got to the on the floor in the unit where I got to see the dynamics of the floor. Meaning get to know the social workers, dietitians, staff that I had never had interactions with before. So kind of getting a good feel of how things are managed on the dialysis unit. Also I shadowed a nurse practitioner to see the CKD clinic, with respect as to how the clinic is conducted, how to prepare the room for educational experience for the patient. Meaning that you would have some sort of literature, some sort of posters, making it friendlier for the patient. Because again it is a very scary situation for most patients to be in, to want to learn about their disease. Having said that I, did have, I cannot remember the time-line, I would say a good 2-3 month period where I did get to shadow a nurse practitioner. So that I could again begin to develop my skills, learn skills from another nurse practitioner. To develop my own skills as far as how I would care for my own patients in my own dialysis units.

I: Are you currently certified as a CNN-NP? If yes, how long did you practice in nephrology before you obtained your certification?

P: No I am not

I: In your initial practice area in nephrology, you’ve already described training that you received; did you receive any mentorship from nurses or others that you perceived as important to your role as a nephrology nurse practitioner? If yes, describe that mentorship.

P: Absolutely, I guess part of what I like to think that some of the focus was to building my own confidence. To making sure that I felt comfortable to doing those types of visits. I think that it helped quite a bit. Where again I got to see how other people did it and incorporate that to how I would do those visits.

I: What kinds of things would you have liked to know during your first 6 months to one year of practice in nephrology as a nurse practitioner?

P: Well that is a big one there, again when I looked at Patricia Benner’s transition from novice to expert, as a novice I wanted to know everything. Because again my fear was having somebody ask me a question that I did not know. That was my biggest fear the first few months, if I was asked something I did not know, how would I get the information? So one of the things, I sort of learned on my own or I was always shown. For example using the internet or using my books. Again I was always trying to do things at quick pace. As I was learning new things, seeing new patients, I learned to quickly start utilizing the tools that I had. I knew I had them all along but did not know how actually access them as quickly as I wanted to. Again because of technology, now days, everything is in the palm of your hand. So it is just a matter of getting access to it. Some of the things I learned to utilize for example
with medications is Epocrates. How to do renal dosing for some medication. Again after doing it often it became second nature. But retrieving that information quickly on the spot was one of the things I wanted to focus on. Because again I did not want to create delays and I guess seemingly incompetent, would be a better term. But as I mentioned before for the first six months I wanted to know as much as I could with the fear of not showing people as much of what I did not know.

I: How do you think that these initial knowledge needs could have optimally been met?
P: Excellent question, one of the things that I have learned to try to do now that I have some experience and I do precepting some new nurse practitioners. One of the things I like to have happen, it that I want to have something bad to happen today. I tell them that I want something bad to happen today, the reason being is that way I can show you how to work through it as opposed to just telling you what to do. I can demonstrate some of the things I would do in a difficult scenario, for example having someone pass out in the chair. Do X, Y and Z. I would rather have the situation present its self so that person can see how I would proceed with that given scenario. I think that having as many worse case scenarios happen during the initial process kind of puts things more into perspective as far as this is how it is handled. Instead of trying to scramble on the spot on my own. How to correct things. Experience is the only thing, and unfortunately experience comes only in time. You will not necessary find it in a book, you are not going to find any of those answers in any policy. You have to face it, you have to see it in order to learn to deal with it. As I mentioned, a person who is altered or low blood pressure, or low sugars, and how do you react in those situations. Being exposed to those things, seeing those worse case scenarios with someone who is already there, I think would really help solidify the discomfort of that happening with me being on my own.

I: With that, knowing that it takes time to get in touch with all of those different scenarios would it be possible, in the first six months to set-up some type of case study to show those worse case scenarios to give some exposure?
P: Case Studies, I think that that would definitely be a good alternative.

I: Or would there be another method of being able to at least present the information?
P: Well, I cannot think of any other format, case scenarios would be the next best thing. I that would, yeah, I can see how that would definitely work.

I: What educational or professional resources did you use the first 6 months in nephrology practice? For example, did you access nephrology textbooks or videos? What were the strengths or weakness of that approach (or those approaches)?
P: Well, I utilized whatever I could get my hands on, the thing was I got my hands on a lot of things but was not sure how to utilize them. I did have text books, which was good and handy to have, but again, I was always scrambling to find things. I would keep this and I would keep that, I would use it when I found it most helpful. For example, a person who was having cramping all the time while on the
dialysis machine. I would Google the information and get some resources on how to fix that particular problem. I did not do that on my own, for example I would not sit down on the weekend and try to figure out. I was doing it proactively as things were happening. Because I had so many resources on hand, just was not sure which one I would spend the most time on my own just researching. I wish I had better words to explain it, I was utilizing those resources when I felt I needed to find quick answers. I wish I could have more time to look up things when I did not need it. That way I could have been better prepared instead of trying to find solutions when the emergency presented. I would have those solutions already available in my head. Actually all of that comes with experience as well.

I: Was there any particular website or resource that you utilized more than any other?

P: Having the computer at your hand, you would Google this, whatever would come up first, whatever downloaded the quickest. There was not a particular website, not Wikipedia, I would not use some of these. I would look for WebMD, I would look for things from the national kidney foundation, I learned to pick the sources from things I felt were quite reliable. I would Google for the information and whichever source I felt comfortable with I would choose it. So whatever was on the top 3 to 4 I would select the links.

I: What was your criteria for reliability, is there anything you can pass?

P: Well in school, the focus is that if you are going to use the website, you have to find things that were trustworthy. I cannot think of them right now because I always have them easily accessible. I learned to search for information based on for example like the National Institute of Health, they have good website. Looking for things like that, they come from the national level. Because again you find blogs and things like that, which I skip over. I look for things that came from federally funded or nationally funded programs that I would like, hear about the National Kidney Foundation or the Davita information. I was looking for information that was not opinion based but factual based.

I: Ok, was it research based information?

P: Right, it was research based, that was the word I was trying to find.

I: What was the strengths and weaknesses of these types of resources?

P: The strengths is that they are in the palm of your hand. The weaknesses is that sometimes it takes a little time to download. Or it can take some time to find information. Or you may find information that is from last year or the year before, the timeline of this information. Because information changes quite quickly these days, so you are looking for the most updated information. So again the perks are that it is easily available but the downside, is that you have to be able to weed out those things you do not want to spend your time on.
I: What are the 4 to 5 most critical types of information do you think that novice nephrology nurse practitioners need to have as they begin practice? Be specific as you can.

P: 1) Know your resources. Meaning that this stems from getting comfortable with your nephrologist. Having that comfort level to be able to say that I can contact my nephrologist at any given moment. I am going to have an answer to my question, I am going to have a solution to the scenario that is presented. That goes to being to call your nurse practitioner mentor, being able to have that available. Again it is a very frightening experience being on your own. Feeling that you do not have anyone to call when you need help. Knowing what your resources are.

2) Understanding the policies. Unfortunately dialysis units have policies that vary from one unit to the other even in the same company. Again unfortunately the policies, there are so many of them it is kind of difficult to learn them all in the first 6 months. You can get a feel for what they are, for example with anemia, most places now have an anemia manager, whereas before you were on your own as to how you were going to treat it. Each facility had a different policy for how to treat anemia

3) Getting familiar with your staff that you work with, I remember getting started, people do not know who you are and what you can do. As I got familiar with the facility I started talking with the staff quite a bit. If you can build a good rapport with the staff who are more familiar with the case than you are, the communication is a whole lot better. For example there are some patients who communicate very well with the technician or nurse and if that person does not feel comfortable with you then if the patient needs a prescription refill and that staff does not feel comfortable with you they may not communicate those needs. As simple as that. Everyone thinks the patient will say something, but that often does not happen. Good rapport with the staff often allows for reports on problems with the patients prior to your rounding. That is a tremendous help. Not only that I feel that once the staff is comfortable with you or rely on obtaining information. They trust you with the information, for you to be able to come up with a solution.

4) Talk to the patients, develop relationship. One of the things I do best, taking the opportunity to talk to the patients. Yes everyone has renal disease but they also have other problems, lives and interests. Some of the things that help me most is that I talk with the patients. If I had it to do all over again I would have spent more time talking with the patients in the first 6 months. The patient develops trust. For example if a prescription is written and they patient cannot afford the medication. With trust and good relationships with the patients they would feel more comfortable in sharing that information. Which would allow to search for affordable options.

I: When considering a nephrology specific curriculum for novice nurse practitioners what the 4 to 5 content areas that should be covered to meet the needs for practice in this area?

P: 1) The number 1 thing that still gets me now is the access. I have the opportunity to review the interventions at the access center and see what they do. What I have not done is kind of ask the questions; this is what scares me and what
should I be doing? One of the things a nurse practitioner should learn is how to
evaluate a access, is it a fistula or graft? it does not look good, what do I do about
it? How do I communicate that other than referral to the access center? Yes, that
is a good step, sometimes I feel that I am not including all of the information that
they need. For example: these aneurysms, some of them really scare me. Only
because that they are expanding, I see the shiny skin, I know that these need to
be addressed. But how do I communicate that to the vascular surgeon, hey this is
not looking good because I refer them to the surgeon and they come back with the
note “will evaluate later”. I do talk with my nephrologist. It is important to learn
how to evaluate the peripheral vascular access.
2) Manage difficult scenarios when the patient is on the machine (dialysis) that is
too broad of a statement as there is so many things that can happen on the
machine. As I had mentioned earlier as a novice I think it is important to see what
a bad situation looks like and how to work through it. Because again sometimes
there maybe more than one solution, you want to feel comfortable with the
solution that you pick. I think that having exposure to those worse care scenarios,
whether it is through actually seeing it or case studies. It is kind of challenging to
bring in a new nurse practitioner because not everything goes bad on any given
day. Learning to face challenges when the patient is on the machine.
3) Learning your resources for medication, I used to carry several books for
medication resources. Now I limit myself to a palm device such as Epocrates, for
example to go to renal dosing. Again one of the things you want to do it to obtain
the resources quickly. Become aware with whatever technology that you use.
Become familiar with it and to be able to retrieve information quickly.
4) Familiar with the protocols. For example: access infections, you cannot wait,
you need to address quickly. You have to be familiar with what to do. If you do
nothing the patient winds up in the hospital. You can prevent hospitalization if
you jump on it quickly. Knowing what actions to take, what medications,
antibiotics in a given scenario.
5) Getting familiar with some of the computer systems. Because I remember
wanting to retrieve patient information. I work with two different dialysis
companies with different computer systems. I remember I was able to obtain the
information quickly and the other I dreaded going because could not get the
information quickly. For example lab results, I could not get them quickly, it was
not that the information was not there but because I did not pass codes to retrieve
the information.

I: Is there anything else that you would like to add?
P: 1) One of the things I found quiet helpful was to have the opportunity to go to
these national seminars or national symposiums. I find that quite helpful in so
many ways, because I get to talk with other nurse practitioners either new or
experienced. I kind of get a feel for hey this is the problems that I face in my
practice are not unique to me. You share ideas and you learn. I like that there is
the RPA (Renal Physicians Association), their emphasis is on nurse practitioner
practice. Where we can all come together and learn. Where it relates directly to
what we actually do. To have the opportunity to be able to attend these seminars.
I find it quite helpful as I begin to expand my practice. Having that available to me is valuable.

2) Having a nephrologist willing to accept nurse practitioner. At times, sometimes they do not necessarily know what to do with a nurse practitioner at the beginning. Having good communication to find common ground as to what we can do for the practice. At the beginning it was a little bit challenging, because I had a CKD clinic that just did not develop. Now it is so much better. I think a lot of it had to do with the fact that there was some issues as to how things were being referred to me as a nurse practitioner was not necessary managed as well as it could. Also by communicating with my nephrologist things.

Total Time for the Interview 40.56 minutes
Interview B

I: First I want to ask a little about you. Can you describe your initial education as a nurse practitioner? Why that type of training did you have?

P: My Education is in the adult nurse practitioner arena. I chose that because I am not an expert and have never really enjoyed the OB or the pediatric portion of that. From my experience in taking care of people too, I have worked in the operating room, mostly taking care of adults. So I felt that would be a better fit for me.

I: So, you chose that type of training because it would be a better fit for you.

P: Yes

I: How did you enter the specialty of nephrology? Why? Describe any training or education you received initially and along the way.

P: I had been working as an educator for about 8 years and I was interested in getting back to the nurse practitioner role. So I was looking for work, and this opportunity came about and it sounded very exciting. When I interviewed and met the people and the clientele that I would be working with and working for. I found it to be a very exciting area of practice at that point in time. Even though nephrology is a very big specialty, area that you are not directly taught in school. Well the orientation process, to this nephrology position was very good, the packet of information and the reading material was excellent for understanding the nephrology aspects of care. We were provided very good books, as well as handouts and work sheets. As well as a very good process in orientation in learning to care for these types of patients. There was also very good support from industry, in that they would present their medications and information as to how to utilize their medications efficiently and wisely. So I thought it was a very well rounded beginning into a specialty that is very complex.

I: Are you currently certified as a CNN-NP? If yes, how long did you practice in nephrology before you obtained your certification?

P: No, I am not, I am currently studying and trying to get up to speed to take that test but currently I am not.

I: How long were you in practice before you considered to obtaining your certification.

P: I was in practice about 2-3 years before I started to entertain that certification. Because that is a good baseline of experience before obtaining that type of certification.

I: In your initial practice area in nephrology, you’ve already described training that you received; did you receive any mentorship from nurses or others that you perceived as important to your role as a nephrology nurse practitioner? If yes, describe that mentorship.

P: Yes, there was very good mentorship, many opportunities to round at different dialysis centers which was very helpful in seeing how different centers worked, even though they were the same company. Also had a couple different mentors.
that was very helpful in seeing how different people functioned in this practice. As well as being able to round with the physicians. Very helpful in seeing their focus and how they handled the nephrology practice. As I said all of those experiences were very helpful. As well as in the dialysis centers was able to shadow and see how the different roles functioned there, which was also very helpful.

I: What kinds of things would you have liked to know during your first 6 months to one year of practice in nephrology as a nurse practitioner?

P: Well, I think, boy everything that was presented, the books were very comprehensive, I think they covered the subjects well. I am not sure that there would be a better way of presenting it. There was so much new information and different ways of looking at components of care. It is kind of a chicken and the egg education, you wish you understand it but not until exposure did you truly understand. By using the book and reading and learning, you began practicing it right off the bat. I think that was a big benefit.

I: How do you think that these initial knowledge needs could have optimally been met?

P: Well, I think they were pretty optimally met, there was time to read the information in books. There was a good time allotted to practicing under the guidance of your mentors. There were the work sheets which walked you through the different components of learning about this different field. The opportunity to work with other people within this process of caring for the renal patients. The RN’s, technicians, social workers, dietitians, physicians as well as the manager. Were all very helpful, I am not sure if there was one particular thing that should have been left out. I think that everything was very good.

I: What educational or professional resources did you use the first 6 months in nephrology practice? For example, did you access nephrology textbooks or videos? What were the strengths or weakness of that approach (or those approaches)?

P: Well, one of the things that I like to do in addition to the information that was provided. There were definitely nephrology text books as well as the worksheet. I like to get involved with the professional organizations. I became involved with the ANNA (American Nephrology Nurses Association), the National Kidney Foundation (NKF), and the Renal Physicians Association. So trying to have access to many of those as well as looking at other sites. Such as the Davita site, the organization that I was working with.

Well I think the strengths, the data in the books was very good, and very comprehensive. Some of it was very complex. The disadvantage was there wasn’t any instructor so to speak. That could sit down and test you, going over the important parts. You could kind of glean through the reading, through the different workbook pages to find the important things. But there was no one pointing out what were the salient points so to speak. At least at the beginning having a formal class would be very helpful. Kind of helping me to weed out the most important stuff, from the stuff that will come with time. But otherwise the information was very important, very helpful and easy to
understand experience. The chicken and the egg, with experience the information became easier to understand.

I: What are the 4 to 5 most critical types of information do you think that novice nephrology nurse practitioners need to have as they begin practice? Be specific as you can.

P: 1) Chronic Care focus, the first thing that is very important, that this is a chronic care, in no way an acute care in any sense.
2) Hard to decide when all of this chemistry and information on how the dialyzer works, a nice baseline information.
3) Adult learning type of attitude that you need to take on when working with this population
4) Understanding the pathophysiology of the kidney failure process. Then each of those components that go along with that and how the different processes that go along with that in the body. Relationship to electrolyte imbalances, bone mineral, hemoglobin and anemia problems. So each of those things are very important components in the education on the care of the dialysis and CKD patient.

I: When considering a nephrology specific curriculum for novice nurse practitioners what the 4 to 5 content areas that should be covered to meet the needs for practice in this area?

P: 1) Understanding chronic nature of this disease process and how to approach those chronic care patients.
2) Divide it up into two different areas, more if you think about transplants, hemodialysis, peritoneal dialysis and chronic kidney disease. Then within those areas, the different tests, pathophysiological processes that go on that affect the patients, such as anemia, bone, electrolytes, as well as the medications. Each of those components within each of these areas. Transplants you are also thinking about other things such as antirejection medications.

I: Is there anything else that you would like to add?

P: No

Length 21.14 minutes
Interview C

I: First I want to ask a little about you. Can you describe your initial education as a nurse practitioner? Why that type of training?

P: My NP education was in the Acute Care program as it had a nephrology tract at the University of Pennsylvania. I had been working many years in dialysis and was interested in continuing in the care of renal patients.

I: You chose that type of training because it would be a better fit for you?

P: Yes

I: How did you enter the specialty of nephrology? Why? Describe any training or education you received initially and along the way.

P: During my RN training, a diploma program we saw the dialysis center which was interesting as well as the ICU. I trained as a backup to monitor a business man who was doing home dialysis back in 1975, long before it was as common as it is now. We were to monitor him at night while he slept. I did not have the opportunity to work with him as he was transplanted. It did spark my interest in dialysis, however I was working nights and could not transition into the dialysis unit. The opportunity did present itself in 1977, I have worked in dialysis since that time.

I have always been an avid reader, participated in seminars, lectures, in services and presentations at the hospitals.

I: Are you currently certified as a CNN-NP? If yes, how long did you practice in nephrology before you obtained your certification?

P: No, I am a CNN (Certified Nephrology Nurse) for several years.

I: In your initial practice area in nephrology, you’ve already described training that you received; did you receive any mentorship from nurses or others that you perceived as important to your role as a nephrology nurse practitioner? If yes, describe that mentorship.

P: As an RN I have been a renal educator for several years, a dialysis unit manager and lecturer. The nephrologists knew me from my RN role in dialysis and hired me to work as a nurse practitioner. The nephrologists did not know what a nurse practitioner was or what they could do, really did not know the role. They looked to me to educate them and they in turn mentored me in the dialysis role. It was a mutual mentoring relationship between myself and the nephrologists.

I: What kinds of things would you have liked to know during your first 6 months to one year of practice in nephrology as a nurse practitioner?

P: Really it is the coordination of care, how to order tests, what were my resources, who were my referring doctor panel? I did not have a relationship to
these physicians prior to my role as a nurse practitioner. Another barrier was the politics of medicine, many barriers in my area. Where physicians would not accept my orders or speak with me about a patient. Many barriers to nurse practitioner practice in the state of New Jersey, it has gotten better. However still unable to write orders or obtain privileges in the local hospitals. If privileges are granted they come with several restrictions which impede the scope of practice.

I: How do you think that these initial knowledge needs could have optimally been met?

P: A pre-warning would be helpful, having someone who has experience with the care coordination process as well as the very real political barriers.

I: What educational or professional resources did you use the first 6 months in nephrology practice? For example, did you access nephrology textbooks or videos? What were the strengths or weakness of that approach (or those approaches)?

P: I used text books, on-line applications such as the palm pilot, notes and resources on nephrology. Researched and wrote my own protocols. This was before the ease of internet access and having everything in the palm of your hand. Attended in-services, ANNA (American Nephrology Nursing Association) conferences and meetings. Participated in other national professional organizations meetings and conferences.

Weaknesses is that it is very time consuming, I was always hauling around a stack of books, often I did not know the answer and had to let my patients know that I would need to do research and get back with them. I found that my patients were also a great source of information, I learned a lot from them. They understood that I needed to do research for them and appreciated my efforts.

I: What are the 4 to 5 most critical types of information do you think that novice nephrology nurse practitioners need to have as they begin practice? Be specific as you can.

P: 1) knowing the clinical practice guidelines, very important. For example anemia, bone mineral management and electrolytes.
2) End of life issues with the renal patients
3) Good knowledge of overall primary care for the renal patient

I: When considering a nephrology specific curriculum for novice nurse practitioners what the 4 to 5 content areas that should be covered to meet the needs for practice in this area?

P: 1) Knowledge of physical assessment
2) Understanding the co-morbid problems such as high blood pressure, diabetes, cardiovascular disease
3) Knowing renal specific problems such as anemia, electrolyte, bone mineral
4) Pain management – very common problem with renal patients
5) Psychosocial problems of the renal patient
6) End of life
I: Is there anything else that you would like to add?

P: No

Length 13.1 minutes
Interview D

I: First I want to ask a little about you. Can you describe your initial education as a nurse practitioner? Why that type of training?

P: Family NP program, worked as a primary care NP part time until started into nephrology as a full time NP

I: Why that type of training?

P: Chose it because of the flexibility and wide range of patients from pediatrics to OB and adults

I: How did you enter the specialty of nephrology? Why? Describe any training or education you received initially and along the way.

P: The job opening was mentioned to me, during the interview process it looked like something I would be interested in and could grow in. My background was in cardiac and cardiothoracic patients. Initially I was given a lot of reading material, these were provided along with guidelines and protocols including KDOQI. As well as the dialysis companies guidelines.

I: Are you currently certified as a CNN-NP? If yes, how long did you practice in nephrology before you obtained your certification?

P: No.

I: In your initial practice area in nephrology, you’ve already described training that you received; did you receive any mentorship from nurses or others that you perceived as important to your role as a nephrology nurse practitioner? If yes, describe that mentorship.

P: Yes, I received mentoring. Initial 3 months I was a “twin” of the 1 NP within the practice. It involved dialysis rounding, addressing the psychosocial problems of the patients. The mentorship helped to address my own satisfaction and growth.

I: What kinds of things would you have liked to know during your first 6 months to one year of practice in nephrology as a nurse practitioner?

P: Focus during the time provided on nephrology specific problems. Coming from a primary care background it was very difficult to keep focused on nephrology and not primary care. Such as colonoscopies and other health maintenance problems. Nephrology is not primary care, often felt “was I doing enough” or “am I missing something”. This did affect my own job satisfaction. Need inclusion of a focus on the psychosocial issues that are specific with CKD and ESRD patients. The focus was on the care of the dialysis patient but missed the failed transplant or slow to function transplant and acute renal failure patients. Needed more focus on co-morbid diseases such as diabetes, hypertension and common auto immune problems such as lupus.

I: How do you think that these initial knowledge needs could have optimally been met?
P: More structured program that is focused on skill. The 1st four weeks of training each week have an objective for the learner and the trainer. Need feedback from the learners, some form of an assessment of the learners’ progress. Some system to evaluate the effectiveness of the program. Help in developing clinical skills
I: How do you envision the structure?
P: Defined objectives for the learner and instructor. Taking responsibility for a supported curriculum. Create a specific scope and sequences of care. Focus on the specific needs of the dialysis patient. Also need to utilize a teaching approach that recognize adult learners, allow for them to set their own priorities.
I: What are your thoughts on curriculum content to reach these objectives?
P: The first 6 months in practice the curriculum content should contain the following
1. Dialysis treatment and specifics
2. CKD – different factors that cause CKD, such as diabetes, hypertension and the most common autoimmune diseases
3. The most common complications associated with ESRD such as anemia, bone mineral disease
4. Dialysis treatment complications such as cramping, hypotension
5. Treatment associated with acute kidney injury
6. Management of failed kidney transplants with the complication of being on immunosuppressant.

I: What educational or professional resources did you use the first 6 months in nephrology practice? For example, did you access nephrology textbooks or videos? What were the strengths or weakness of that approach (or those approaches)?
P: Lots of books, some journals, focused on the KDOQI guidelines, figured that if I understood them, then could apply to any problems. The books were helpful in a way, but more so after some clinical experience at around 3 months, felt I learned more after reading them for the second time, the information made more sense. The journals are obviously more specific like a lot of case studies, advantage to me is that they are short and concise. The advantage to me is that it would not take a whole day to read. The disadvantage to me is the issue, especially if I am coordinating to a specific patient that I have, those questions may not be answered within this one journal – it is not always a complete reference. KDOQI is the guidelines, I focus a lot on the advantage to me is that with the guidelines I can deal with a lot of situations that may be different, the guidelines are guidelines so there are limitations, so not everyone fits into one, so there are patients who do not fit. So the guidelines are set to guide my own practice but I still have to learn more about in terms of knowing the exact nature of the disease in terms of the differences of the normal progress of it. It is not always in KDOQI.

I: What are the 4 to 5 most critical types of information do you think that novice nephrology nurse practitioners need to have as they begin practice? Be specific as you can.
P: 1. Managing comorbid, DM, HTN issue autoimmune diseases like lupus, being able to manage confidently. Very important for novice nurse practitioners for example managing high blood pressure in primary care setting is different issue that in terms of dialysis patients. In dialysis they may come into dialysis with very very high then drop very very low, those are issue that are very common in nephrology but not very common in a primary care practice. Being able to confidently managing that is very important. Diabetes, obesity
2. Medications are very important
3. Addressing psychosocial issues
4. Knowledge of pathophysiology or the natural history of ESRD, CKD or lupus
5. Knowing appropriate diagnostics exam, imaging studies effect on kidney function. Knowledge of therapeutic plans specific to nephrology
6. Different abnormalities in terms of blood tests
7. Different treatment approaches in terms of renal replacement therapies

I: When considering a nephrology specific curriculum for novice nurse practitioners what the 4 to 5 content areas that should be covered to meet the needs for practice in this area?
   P: 1. More of a nephrology directed history and physical exam
       2. Identifying and describing ESRD and CKD related symptoms and complications
       3. Recognizing risk factors and other comorbid disease such as DM and HTN
       4. Life style changes and modifications that are a big portion specifically in terms of diet

I: Is there anything else that you would like to add?
   P: The stress the part of building a structured program not only focus on the clinical skills but also confidence and job satisfaction. Also that goals for mentors and new nurse practitioners.
Interview E

I: First I want to ask a little about you. Can you describe your initial education as a nurse practitioner? Why that type of training?

P: I was trained at West Virginia University, I trained AT the university. I did it full time, I did it in two years that included summer sessions. I know a lot of people that I have worked with did it part time but I did it full time. I have been in practice now about 15 years, I graduated in 2000.

I: What type of NP training did you choose?

P: Family Nurse Practitioner

I: How did you enter the specialty of nephrology? Why? Describe any training or education you received initially and along the way.

P: I entered the specialty of nephrology, rather the short story was...I was pursuing my doctorate of nursing practice degree, I had been a family nurse practitioner at that point for many years and enjoyed the field but was starting to become very interested in specializing. And as part of my doctoral work I was working in looking at educational components for patients with osteoporosis and as a result of that I had actually became the manager for an osteoporosis center that had newly opened. So I helped design and create this osteoporosis center. And doing my doctoral work I had to do clinical hours and I had an interest in nephrology but was rather timid about working with these patients. And family practice, a lot of family practitioners are very hesitant to take care of renal patients due to their complexity. So I was one of them. I was very very hesitant about working with kidney patients and what happened is that I needed to do these clinical hours, the nephrologist close to where I lived was working with a drug called Prolea, which is used for osteoporosis, I was very interested in his experience with it. And so since I needed to do clinical hours, my professor said this would be a great opportunity and I thought that this would be good and I could learn about nephrology. And so he had been kind enough to work with one of our other DNP students who was interested in CKD. And so basically I approached him and he was willing to let me come and work with him. And when I started working with him in the role as a DNP student, what I discovered is that I absolutely Loved nephrology. The osteoporosis center that I was running, unfortunately they decided not to continue the program. The economy was taking a pretty big down turn and they were looking at ways to optimize the finances of the institution, I would say. And so I realized that I should probably look for another job and as luck had it I approached a friend of mine who was working with him and happened to say, hey if you hear of anything let me know and she called be back the next day and said how did you know that his NP just resigned. It was so funny, she said you had been there and you know how it works, what do you think? I said ABSOLUTELY, put my name in. And sure enough they called me the next day, interviewed, I think two days later and was offered the job. And that is how I came into nephrology, honestly I was so hesitant before, but by getting to work with him in this DNP role as a student role, I absolutely Love this field and I have not regretted it. It has been awesome!
I: Can you describe any training or education you received initially and along the way?

P: Well... for the, my initial education was to be quite honest, I was told here is the book by the National Kidney Foundation, here is the primer... read this. Basically I would go with him, he would go behind me and that lasted for about 6 weeks. When I came to work with him I had been a family nurse practitioner for many many years before that so very quickly I kinda picked up what he was looking at and I had been with him for a semester about one day a week, so I kinda had a feel for it. Formal training, I was not really exposed to that. So what I decided to do is that I wanted to become better at and educate myself and it was very difficult in a clinical setting for you to follow behind him or go with him. We would have medical students and so I would try to listen when he was talking or presenting a case. But there was really no structured format and so I wanted to learn so I would ask the dialysis nurses, “What would you look at, what would you read?” And I of course discovered the National Kidney Foundation and the information that they had. I just started reading anything I could get my hands on, in terms of continuing education, anything that said this was for someone new to nephrology. Trying to get that background. And when I decided to pursue the Certified Nephrology Nurse - Nurse Practitioner that was very challenging for me. Because there was nothing, there was nothing very specific that said study this, do that. So basically I just read everything I could get my hands on. Anytime I saw anything that was offered, the ANNA has been, actually that was a very important resource. I stumbled across that kinda accidently when I was on the internet searching for how to learn about this and I asked the dialysis nurses. And they said, “Oh yeah, we forgot to tell you about that.” It was just like Oh Thanks! I did not find out about them until about 1 ½ years ago, and I have now been in nephrology for about 3 years and 8 months. And literally I have been just kinda, and somebody just thought to mention it to me. Yeah you are right, I have not had any of the formal, I would have liked.

I: Are you currently certified as a CNN-NP? If yes, how long did you practice in nephrology before you obtained your certification?

P: As of Monday, Yes. I can honestly speak to the educational preparation. I have been in nephrology now for 3 years and 9 months.

I: In your initial practice area in nephrology, you’ve already described training that you received; did you receive any mentorship from nurses or others that you perceived as important to your role as a nephrology nurse practitioner? If yes, describe that mentorship.

P: When I initially trained with the nephrologist as a DNP student in the NP role, I got to work with the nephrology NP he had at the time. She did not have certification in the field, at the time I did not even know that there was certification. She had been a dialysis nurse who had returned to school to get her nurse practitioner. She had worked within in the role for 5 years. So I was very fortunate to get to go with her in the student role. To kind of observe what she did and her interactions with,... the facility which I work at we do both outpatient and
we do hemodialysis rounds. We have peritoneal dialysis that we do. She would go to the hospital and see patients. That is not a role that he has wanted for myself to pursue. Simply because I think the worry that is two-fold. The first one is that when he has had nurse practitioners in that role they seem to get hired by other nephrologists. He does not like that very well. I work in the capital city of West Virginia, there is not a lot of nephrologists. So, when you get somebody with high skills it is not unusual for them to move around or be approached to move around. So when I started with him as an actual nurse practitioner, being paid, not the student role. She had left. And I was the only nurse practitioner there, so I did not have anybody, when I was actually in the role to guide or help me. I did not know any other nurse practitioners in the area. There really aren’t that many, I think that there is one other nephrologist who has a NP, but they do not stay long. They are only with him for a few months and they are gone.

I: Oh

P): Yeah, there is no consistency there at all. The dialysis nurses were probably my biggest help and support. The facility that I work at, at the time we owned the dialysis units. We were one of the few, free standing independent. He owned 2 units, 1 in the capital city and another about 1 hour away in a rural area. And our outpatient clinic is on the 2nd floor of that building. So I could run down stairs and interact with the dialysis nurses. They were very very helpful in showing me and explaining things. So we had both peritoneal and hemodialysis there but I really did not have anybody who was precepting me or mentoring me through this other than the nephrologist I worked for, we do have several nephrologists in our practice now. At that time we only had 3, when I first started. Now we are up to 6, but I still am the only nurse practitioner. So we grew.

I: What kinds of things would you have liked to know during your first 6 months to one year of practice in nephrology as a nurse practitioner?

P: The key things that would have been so helpful and the thing I even notice with taking the national certification. There is a, it seems that there is a wide varieties of roles in the field, whether you are working with dialysis, whether it is hemo, home hemo, inpatient or outpatient setting or the peritoneal dialysis. Then you get into the outpatient and the anemia, I could not find what I found were useful references or training for somebody very new to the field. Specifically regarding the kidneys. I think the thing that helped me the most and when I talk to other nurse practitioners now. Is that I came from a family nurse practitioner practice background where I had worked primarily in rural practices. Rural practices especially in West Virginia, you do not have access to specialty care. A lot of times patients cannot afford it or it is not available. So you are literally forced to learn very specialized techniques very rapidly. So kidneys we really don’t have that kind of background or education. So that would have been so helpful if I would have something to say, almost like if it was a self-study course. When I worked in ophthalmology many years ago they had great references like that. It was a home study thing, you took it in part and you got continuing education credits for it. And it was a really great learning resource. Here is the basics and here is what you need to know. Because a lot of what I ran into was stuff that was
focused for pure nephrologists, and that was wonderful but you are also looking at it from the nursing side, where you want that true life practical advice. You know what I am trying to say with that. When I was studying for the CNN-NP exam is what I consider the blend of both worlds where you get the medical side with the nursing side. Those very important details of how best to take medications, when should be take what should our next step be in this clinical situation be. And that I am finding to be missing in a lot of things. I think the other thing I would to add to that is the one thing I have noticed is even the nephrologists I am working with now, we have so many new ones, they don’t even know where to tell people to go and look. I am finding they are even asking me. What would you recommend as a review, where should I be looking at it. So there seems to be a lack of knowledge of where the even obtain these resources.

I: How do you think that these initial knowledge needs could have optimally been met?

P: The one thing I have found useful is basically like I said. I noticed the kidney foundation has had this, and when I went back and looked I noticed it seemed that it had disappeared off their web page. This is an introduction, specifically for nurse practitioners with a focus on the outpatient role. It is that where, and I don’t have a lot of experience with other nephrology np’s but from most them that I talk to, it seems that a lot of them are in mixed roles, in the outpatient role, in the hemo unit, working with transplants and having that key breakdown of here is the key things with this, here is the basic pathophysiology, here is the drugs that we use, here is why we use them Here is why we do the test that we do. And if it was perhaps broke down into segments. And then you had CME’s and it wasn’t very expensive, it seems that it is a driving force. People at our practice is how expensive is it. The majority of the materials I paid for out of my pocket.

I: If you were to break those down into segments is what you are talking about, and the key indicators in each segment. What is it that you envision in those segments, is it roles?

P: Yeah, I can see that, not only what the expected roles would be, but it would be helpful for patient situation. I think a lot of the teaching that I had found that was helpful. Is when you are listen to a CME and they are talking about. Like I listened to one recently about renal transplants and CMV. And the guy was like, let me give you a case, “a 32 year old and” and he is explaining it. Because that is how we actually practice. We practice dealing with patients in situations. It is very different when you are reading a book that states, CMV and this is what you look for and this is what you do. That is not how we practice. We practice in actual patient situations. Being able, here is the situation, what would you do, what is your next step. Kind of forcing the thought process. That next step, I have in practice that for me makes me much better. Because that is how real life actually works.

I: What educational or professional resources did you use the first 6 months in nephrology practice? For example, did you access nephrology textbooks or videos? What were the strengths or weakness of that approach (or those approaches)?
P: The big resources that I used were obviously text books. At that time I did not have some of the resource I use lately. But the major ones was the National Kidney Foundation’s, Primer on Kidney Disease. That was the one I was referred to. The National Kidney Website was another one that I utilized quite heavily because of the access to the CME’s, unfortunately we really don’t have a budget to be able to send me to a lot of these conferences I would say. Which I would have loved to have done. So being able to find this stuff very inexpensively on my own was very helpful. So that, video’s I did not really find any or was exposed to any of that. It was mostly the internet, the Kidney Foundation I did use the NIDDK website. At the time I did not know about ANNA at all.

I: That you did not discover that one until about a year and a half ago?

P: About a year and a half ago yes.

I: Ok, about ½ way through your practice right.

P: Yes about ½ way through my practice right. West Virginia does not have a chapter

I: What were the strengths or weakness of these types of approaches that you used?

P: The major thing I found is that it was kind of hard to correlate the things I saw taking place with actual practice. And in discussing this with the nephrologist that I worked for, they all practice slightly different. The nephrologist that I work with the most is the owner of the practice. The other nephrologists are not owners they are employees, and he has some very strong ideas about certain medications and certain treatment options. They all work quite well but a little different than what you see, the major one being, he is a big proponent of optimization of vitamin D levels in an attempt to avoid using the vitamin D analogs. Which for a majority of our patients does work quite well. And we don’t see hypercalcemia with that, so that was a bit of a difference between what you see in real life and what you see recommended in the books. It was a little bit of a struggle particularly when you are trying to learn. The other thing you see a lot in nephrology there is so much advancement taking place that what you see recommended and touted one year and the next year they were shifting to something else. Which is part of the evolution, of, I enjoy that now, I enjoy it because we are always getting smarter. That is what I am always telling patients, we are always evolving and learning. It makes it very difficult for somebody new, trying to establish a body of knowledge when things are not always so clear cut.

I: What are the 4 to 5 most critical types of information do you think that novice nephrology nurse practitioners need to have as they begin practice? Be specific as you can.

P: In the outpatient setting.

I. Very very quickly you have to know what those GFR’s mean, you basically have to know what the labs are, what are they, when do you need to react. You have to have that absolutely figured out right off the bat. Sometimes I see that now even with my nurses, they don’t recognize sometimes that some of these numbers means something very important.
2. Recognizing some of the medications that the patients are taking, the interaction they are going to have on the kidney.

3. The impact of certain tests. We still get patients coming in with people putting them on NSAIDS, these are CKD stage 4 patients. Immediately recognizing looking at the med list and saying what a minute or somebody calls or says something, not just medications but herbs. Specifically what is going to be nephrotoxic? You have to know the labs, what medications or herbs are going to hurt their kidneys.

4. Learning how to communicate the complexity of the patient’s care to the patient. This is something I have worked very hard in my own practice. And probably one of my biggest sources of joy as a clinician is when a patient is saying to me is thank you, now I understand what is going on me. We recognize many times with kidney patients as their condition advances you are going to see the anemias, the secondary parathyroid kicking in and being able to sit down in a concise, clear manner, have the patient at least get a grasp of what is going on so they can participate better in their care. That is something, sometimes they have me see certain patients because as a nurse practitioner, I think that is something we are better at. I will sit down with the patient and I would say “what do you understand about your kidney disease”, and a lot of them are very confused. They don’t understand why they are receiving an aranesp shot, they don’t understand why they are on venofer, and they don’t understand why they are on calcitriol. And to me that is not good. They should have at least somewhat of an idea other than because my physician told me so. Having that understanding very very important.

5. Coming back to labs again, recognizing of when we need to re-test something or re-look at something. It kind of the same thing of knowing what the next step is. That is always a challenge. That is something they don’t teach us in school, and that is always the case. They teach us, here is what you do and the problem is they never tell you what to do when you get past that step. You have a patient with hypercalcemia, you run this test and what if it comes back normal? Now what do you do? And learning that next part what is steps 3, 4 and 5 is. Not just dealing with the obvious but the more complex cases. And that is, that one particularly, I thing for new practitioners where you get a little concerned because you say I know what to do in this situation and the patient comes back and the problem does not get resolved. And you go, what do I do now. That is a really hard skill to learn.

I: When considering a nephrology specific curriculum for novice nurse practitioners what the 4 to 5 content areas that should be covered to meet the needs for practice in this area?

P: 1. Understand the function and jobs of the kidney - that will provide you a strong foundation
2. I think you really need to understand the effect of medication, herbal supplements, tobacco intake, and alcohol intake on the kidney. So anything that could negatively impact the kidney.
3. You have to know what testing we should do regarding kidney function. This is a big problem in our area. For example today I had 2 patients where I ordered for example the parathyroid and if these are done in a non-nephrology setting it is not unusual for them to accidentally not be ordered. Or perhaps you are ordering the micro albumin/creatinine ratio and people aren’t always ordering those. If they are going to the family practitioner and they may not know what this is, or “we really don’t need that” and these test aren’t done. So recognizing yes we do need, this is the testing and why we do it. And taking a look at it. The of course then we got all of the components the more advanced kidney patients, looking at the dialysis components, looking at how to keep patients from advancing to end stage. But then when they do, what do we need to do. As you know dialysis is very complicated. And the complexity of that care, almost I think you could spend a whole curriculum in just training someone in that because that is such an important field. That is really complex. But also really getting down this is why nephrology care is different. You got to get those basics down, why do we do a MDRD, why do we do a Epi, why do we do a 24hr urine and should we do these tests. What is the problem with that and at the end of it also coming back to things we sometimes forget about. Which is, how to effectively communicate with the patients. Of course we think about the financial issues and other ramifications with that. I find that when I talk to a lot of people who are nurse practitioners who are not in nephrology I get a lot of really great questions like, “what is the parathyroid and why are you looking at that?” What is a phosphorous you are looking at, should they drink a pop? So that brings up a key thing that I think we should have in our education is the dietary considerations, which is very labile depending on the kidney patient. I hope that this is helping

I: Is there anything else that you would like to add?

P: That is an excellent question, without a doubt in my mind, particularly having in particular preparing for the nephrology NP. There is so much that I wished we had better. I am finding that nurse practitioners and even physicians are very skittish about kidneys and CKD and the care of these patients. It is almost like a sense of dread and fear, when it comes to these patients. And I also had that fear and dread before I had the great honor of working with them in nephrology. Going, oh my gosh, this is so amazing what we can do and the complexity of the care. This is really an amazing thing. I would love to see that spread more. People really getting a chance to see the role of the nephrology nurse practitioners and what can be accomplish. I think that nurse practitioners are underutilized in this field. At least in my area, there is so much we can do in terms of CKD clinics, and anemia clinics. I work a lot with metabolic bone disease, as you know my background was osteoporosis. So, I work a lot with that, in our field. So, I have offered to do lectures for our local universities when they have events. I always get that people are not really interested chronic kidney disease. I go why not it is really, it is such an interesting field, a complicated field. They go, just send them to the nephrologist. I would love to see that excitement and passion, because family practice people are busy and they are seeing kidney patients.
Helping them understand about how better to take care of them. WVU, my alma mater, actually did a really nice 1 day CME, of course it was not really well attended. But the point of it was “kidney basics for the busy practitioner”. It was this great lecture - here is how we diagnose it, here is the tests that we do, don’t panic over a simple renal cyst. The broke it down to the nuts and bolts, here is what you need to do, don’t prescribe this and think about this. I love to see that passion come out more and people focus more on kidneys. Thank you for doing this, I think what you are doing is a really great and wonderful thing.

Length 36.26 minutes
APPENDIX I

LEARNING MODULES

Kidney Anatomy, Physiology, and Pathophysiology
Learning Module 1

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module is a study of the normal renal anatomy and physiology, both in structure and function, which will create a foundation for understanding abnormal pathology. This will provide a foundation for clinical assessment, as well as laboratory and radiologic findings.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

- state the history of nephrology and kidney replacement therapies
- describe normal renal structure and function
- compare and contrast normal renal function labs with abnormal
- define at least three abnormal pathologies of the nephrons
- discuss three abnormal renal pathology, the associated symptoms and therapies

3. Content
A. Introduction
   1. Normal anatomy of the renal system
   2. Physiology of the kidney
   3. Normal functions of the kidney

B. Pathology
   1. Acute kidney injury
   2. Chronic kidney disease
   3. Kidney failure

C. Pathophysiology
   1. Acute versus chronic kidney failure
   2. Types of acute kidney failure
   3. Diabetes and hypertension affects
   4. Congenital abnormalities
   5. Glomerulopathies
   6. Auto-immune diseases, systemic lupus erythematosus, Goodpastures syndrome, and amyloidosis
D. Assessment
   1. Laboratory findings
   2. Radiologic findings

4. Learning Strategies
   A. PowerPoint slide presentation: Normal and abnormal structure, gross anatomy and tissue slides
   B. Case study: Small-group discussion and presentation of results from each group
   C. Reading: Counts & Russell - chapters 1, 2 & 3; Wiener & Gilbert - sections 1, 2, 3, 4 & 5.

5. Learning Resources
   A. Normal renal and glomerular function YouTube video clip, available for reference on line at: https://www.youtube.com/watch?v=hiNEShg6JTI
   B. Kidney biopsy slides available on line for histology reference at: http://www.slideshare.net/biswajeeta007/interpretation-of-renal-biopsy

6. Texts


   Additional References:


7. Evaluation Strategies
   A. Written examination: multiple choice with matching
   B. Histology slide quiz: projected images with 4 minutes per image to answer the multiple choice questions
Chronic Kidney Disease (CKD)
CKD Introduction, and Stages 2 and 3
Learning Module 2

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module is a progressive study of chronic kidney disease (CKD) from introduction and identification through stages 2 and 3. Co-morbid diseases associated with CKD are introduced along with common complications associated with stages 2 and 3. Other learning points include: management and therapeutic interventions to slow or prevent progression of CKD; common medications utilized at these stages of kidney disease, with special emphasis on the clinical implications and patient education; and teaching strategies that empower the patient and their family/significant others.

2. Objectives
At the completion of this module, the novice nephrology nurse practitioner will be able to:

- compare and contrast the stages of chronic kidney disease and the associated findings and therapies
- discuss the pathophysiology associated with common co-morbid diseases that place patients at risk for CKD
- describe the rationale for the long- and short-term treatment plans for patients with Stage 2 or Stage 3 CKD
- describe the common medications utilized for Stages 2 and 3, their dosages, routes of administration, contraindications, and effects
- develop a teaching plan for the patient and their family/significant others that includes the four basic strategies for teaching and learning as well as empowerment principles

3. Content
A. Introduction to CKD
   1. Definition of CKD, per the National Kidney Foundation
   2. Frequency, internationally and nationally
   3. Risk factors associated with CKD
      a. Diabetes
      b. Hypertension
      c. Obesity
      d. Other underlying conditions
   4. Stages of CKD, per the Kidney Disease Outcomes Quality Initiative (KDOQI)
      a. Glomerular filtration rate (GFR)
      b. Proteinuria
      c. Classification by diagnosis
5. Introduction of diseases co-morbid with CKD
   a. Diabetes Mellitus
   b. Hypertension
   c. Other underlying conditions: kidney mass, exposure to toxic drugs/environment, autoimmune diseases, and family history

B. CKD Stage 2
   1. Definition of Stage 2 and diagnostic procedures for identification
   2. Management and interventions to slow progression
      a. History and physical examination with associated signs and symptoms for Stage 2
      b. Laboratory screening and monitoring, standard labs for the co-morbid diseases, including renal specific
      c. Diagnostic tests, ultrasounds, and biopsies
      d. Control of co-morbid diseases at Stage 2 CKD
      e. Lifestyle changes at this stage of CKD, including co-morbid conditions
      f. Common complications and management strategies associated with Stage 2 CKD
      g. Medication review and management at each visit with dose appropriate for CKD stage
      h. Detection and avoidance of nephrotoxic medications, herbal/natural substances, and other agents, such as chemicals
   3. Ongoing monitoring and assessment for progression of CKD, as well as co-morbid disease management
   4. Teaching strategies for the patient, family, and significant others at Stage 2 CKD

C. CKD Stage 3
   1. Definition of Stage 3 and diagnostic procedures for identification
   2. Management and interventions to slow progression and associated complications
      a. History and physical examination with associated signs and symptoms for Stage 3
      b. Laboratory screening and monitoring, standard labs for co-morbid diseases, including renal specific
      c. Diagnostic tests, ultrasound, and biopsies
      d. Control of co-morbid diseases at Stage 3 CKD
      e. Lifestyle changes at Stage 3 CKD, including co-morbid conditions
      f. Common complications and management strategies associated with Stage 3 CKD
      g. Medication review and management at all visits with dose appropriate for CKD stage
      h. Detection and avoidance of nephrotoxic medications, herbal/natural substances, and other agents such as chemicals
   3. Ongoing monitoring and assessment for progression of CKD, as well as co-morbid disease management
4. Teaching strategies for the patient, family, and significant others at Stage 3 CKD

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapters 4, 5, 6, 23, 15 through 21, 31 through 35, 38, 42, 43 & 44; Gomez- sections 1 & 2; Wiener & Gilbert - chapters 38, 39 & 53
   C. Panel discussion on successful teaching strategies related to CKD stage 2 and 3
   D. Case Study: Small-group discussion and presentation of results from each group

5. Texts


Additional References:


6. Evaluation Strategies
   A. Written examination: multiple choice and matching
   B. Written paper: teaching plan for both Stage 2 and Stage 3 CKD
Chronic Kidney Disease (CKD)
CKD Stage 4
Learning Module 3

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module is a systematic study of stage 4 chronic kidney disease (CKD). Foundational theories related to the recognition of early and late stage 4 CKD and its associated complications and management strategies are analyzed. Other key principles of care related to the following points are presented: co-morbid diseases associated with stage 4 CKD that require modification of standard therapies; management and therapeutic interventions to slow or prevent progression of stage 4 CKD; common medications utilized at this stage of kidney disease with special emphasis on the clinical implications and patient education; patient preparation for kidney replacement therapies (KRT), including end of life (EOL) in late stage 4 CKD; and teaching strategies to empower the patient and their family/significant others.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

• describe the early and late stage 4 CKD as to symptomatology and its treatment
• list three common complications associated with Stage 4 CKD and their associated treatments
• discuss the rationale for long- and short-term treatment plans for patients with early stage 4 and late stage 4 CKD
• list the common medications utilized for Stage 4, their dosages, routes of administration, contraindications, and effects
• develop a teaching plan for the patient and their family/significant other that includes the four basic strategies for teaching and learning as well as empowerment principles

3. Content
A. Introduction to CKD Stage 4
   1. Definition of CKD per the National Kidney Foundation
   2. Introduction of co-morbid diseases associated with CKD
      a. Diabetes Mellitus
      b. Hypertension
      c. Other underlying conditions: kidney mass, exposure to toxic drugs/environment, autoimmune diseases, and family history
B. CKD Stage 4
1. Management and interventions to slow the progression
   a. History and physical examination with associated signs and symptoms for early Stage 4 and late Stage 4 CKD
   b. Laboratory screening for the co-morbid diseases, including renal specific
   c. Diagnostic tests, ultrasounds, and biopsies
   d. Control of co-morbid diseases at Stage 4 CKD
   e. Lifestyle changes at this stage of CKD, including co-morbid conditions
   f. Common complications and management strategies associated with Stage 4 CKD
   g. Medication review and management at all visits with dose appropriate for CKD stage
   h. Detection and avoidance of nephrotoxic medications, herbal/natural substances, and other agents, such as chemicals
2. Ongoing monitoring and assessment for progression of CKD, as well as co-morbid disease management
3. Teaching strategies for the patient, family, and significant others at early Stage 4 and late Stage 4 CKD

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapters 6, 7, 24, 31 through 33; Gomez - pages 57 through 68; Wiener & Gilbert - chapters 57 through 61
   C. Panel discussion on successful teaching strategies content focused on early and late stage 4 CKD
   D. Case Study: Early and late stage 4 management considerations, small-group discussion and presentation of results from each group

5. Texts


   Additional References:


6. Evaluation Strategies
   A. Written examination: multiple choice and matching
   B. Written paper: Teaching plan for early and late Stage 4 CKD
Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module covers identification and therapeutic management of Stage 5 chronic kidney disease (CKD). Advanced concepts related to assessment and management of its complications, uremic symptoms, associated co-morbid diseases, modification of therapies, preparation for transition into kidney replacement therapy (KRT) or the conservative therapy choice and understanding end of life (EOL) with palliative and hospice care are introduced. Common medications utilized at this stage of kidney disease, with special emphasis on clinical implications and patient education. Teaching strategies that empower the patient and their family/significant others for a collaborative care approach are presented.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

- describe stage 5 CKD including its symptoms, co-morbidities, laboratory findings, and management
- recognize common complications associated with stage 5 CKD when given clinical scenarios and case studies
- discuss the key determinants that need to be considered in decision related to initiating a therapeutic treatment plan for the transition to KRT versus the conservative therapy choice
- compare and contrast the key components of palliative care, hospice care, EOL care and advance care planning
- describe the common medications utilized for Stage 5, their dosages, routes of administration, contraindications, and effects
- develop a teaching plan for patients and their family/significant others that includes the for basic strategies for teaching and learning as well as empowerment principles
- demonstrate ability to perform an accurate assessment of dialysis vascular accesses site based on clinical practice guidelines/standards

3. Content
   A. Introduction of CKD Stage 5
      1. Definition of CKD as defined by the National Kidney Foundation
      2. Therapeutic management of co-morbid diseases with stage 5 CKD
         a. Diabetes Mellitus
         b. Hypertension
c. Other underlying conditions: kidney mass, exposure to toxic
drugs/environment, autoimmune diseases and family history.

B. Chronic kidney disease Stage 5
1. Management and interventions to slow progression
   a. History and physical examination with associated signs and symptoms for
      Stage 5 CKD
   b. Laboratory screening for co-morbid diseases, including renal specific
   c. Diagnostic tests, ultrasounds, and biopsies
   d. Control of co-morbid diseases at Stage 5 CKD
   e. Lifestyle changes at this stage of CKD, including co-morbid conditions
   f. Common complications and management strategies associated with Stage
      5 CKD
   g. Medication review and management at all visits with dose appropriate for
      CKD Stage 5
   h. Detection and avoidance of nephrotoxic medications, herbal/natural
      substances, and other agents, such as chemicals
2. Preparation and management for transition to KRT or no-KRT treatment
   choice
3. Discussion and guidance on palliative care, hospice care, advance care
   planning, EOL
4. Referral to kidney transplant team for evaluation, education, and initiation of
   transplant work-up and listing
5. Referral for and management of dialysis access prior to the initiation of KRT
6. Teaching strategies for the patient, family, and significant others for a
   collaborative care approach, with transition to KRT or EOL for Stage 5 CKD

4. Learning Strategies
   A. Lecture with Power Point to give a foundation of information
   B. Reading: Counts & Russell - chapters 8, 25 & 58; Gomez - pages 76 through 79,
      Daugirdas, Blake & Ing - chapter 2; Wiener & Gilbert - chapter 39.
   C. Panel discussion on successful teaching strategies content related to CKD stage 5
      and KRT
   D. Case Study: Small group discussion and presentation of results from each group
   E. Video on dialysis access assessment sounds
   F. Demonstration with re-turn demonstration on a type 1 simulator for hemodialysis
      access assessment

5. Texts

   Philadelphia, PA: Lippincott Williams & Wilkins.

**Additional References:**


6. **Evaluation Strategies**
   A. Written examination: multiple choice and matching
   B. Written paper: Teaching plan for Stage 5 CKD
Chronic Kidney Disease (CKD)  
Co-Morbid Disease Management  
Hypertension, Diabetes  
Learning Module 5

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This module is a systematic study on the management of hypertension and diabetes in the chronic kidney disease CKD patient. Concepts related to therapeutic treatments of non-dialysis and dialysis CKD patients including the post kidney transplantation are covered. The pharmacological and therapeutic classifications, modes of action, dosages, routes of administration, contraindications, and toxic effects of medications used for hypertension and diabetes during different stages of CKD are reviewed. Teaching strategies to empower the patient and their family/significant others for a collaborative care approach are identified.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

- analysis to determine whether the 8th Joint National Committee (JNC8) target goals for hypertension control are being used in the management of their CKD patients
- determine through case study reviews whether the therapeutic treatment plans for hypertension management in a non-dialysis, dialysis and kidney transplant patient, met the standard of care guidelines
- list four common complications associated with diabetes and CKD
- determine through case study reviews whether the therapeutic treatment plans for diabetes control in a non-dialysis, dialysis and kidney transplant patient, met standard of care guidelines
- compare and contrast the common medications utilized for hypertension and diabetes in CKD, dosages, routes of administration, contraindications, and affects
- develop an education plan that includes four basic teaching strategies for patients and their family/significant others

3. Content
A. Hypertension
   1. Definition of hypertension per JNC 8
   2. Recommended guidelines for hypertension management in diabetic, non-diabetic, dialysis, non-dialysis, and kidney transplant patients
   3. Management and therapeutic interventions for hypertension control and risk reduction
a. History and physical examination with associated signs and symptoms for hypertension in the diabetic, non-diabetic, dialysis, non-dialysis CKD, and kidney transplant patient
b. Laboratory screening for hypertension diabetic, non-diabetic, non-dialysis dialysis, CKD, and kidney transplant patients
c. Diagnostic tests, ultrasounds, and biopsies
d. Lifestyle modifications and changes for the hypertensive diabetic, non-diabetic, non-dialysis, dialysis CKD, and kidney transplant patient
e. Risk reduction and management strategies associated with hypertension control in the diabetic, non-dialysis, dialysis CKD, and kidney transplant patient
f. Medication review and management at each visit with dose appropriate for CKD stage

4. Common medications utilized for the hypertensive, diabetic, dialysis, non-dialysis CKD, or kidney transplant patient; modes of action, dosages, routes of administration, contraindications, and toxic effects
   a. Angiotensin-converting enzyme inhibitors (ACE)
   b. Angiotensin II receptor blockers (ARBs)
   c. Beta, alpha/beta, and alpha-adrenergic blockers
d. Calcium channel blockers
e. Sympatholytic
f. Vasodilators

5. Teaching strategies for patient, family, and significant others for a collaborative care approach in the management of hypertension

B. Diabetes Mellitus
   1. Definition of diabetes mellitus Type 1 and Type 2
   2. Recommended guidelines for diabetes management in the Type 1 and Type 2, dialysis, non-dialysis CKD, and kidney transplant patient
   3. Management and interventions to improve diabetes control
      a. History and physical examination with associated signs and symptoms for Type 1 and Type 2 diabetic, dialysis, non-dialysis CKD, and kidney transplant patient
      b. Laboratory screening for the diabetic dialysis, non-dialysis CKD, and kidney transplant patient
      c. Lifestyle changes and modifications for diabetic dialysis, non-dialysis CKD, and kidney transplant patients
d. Common complications and management strategies associated with diabetic dialysis, non-dialysis CKD, and kidney patients
e. Medication review and management at each visit, with dose appropriate for CKD stage and diabetes type

4. Detection, avoidance, and management of hyperglycemic and hypoglycemic events
   5. Effects of uremia, hemodialysis, peritoneal dialysis, and transplantation on glycemic control
6. Common medications utilized in the dialysis, non-dialysis CKD, and kidney transplant patient with diabetes mellitus; modes of action, dosages, routes of administration, contraindications, and toxic effects
   a. Oral glycemic control medications
   b. Injectable glycemic control medications
   c. Hypoglycemic medications
7. Teaching strategies for the patient, family, and significant others for a collaborative care approach in the management of diabetes mellitus

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapters 5, 29, 30, 42, 43 & 46; Gomez - page 64 through 76; Daugirdas, Blake & Ing - chapters 32, 33 & 39; KDIGO clinical practice guidelines for blood pressure control; KDOQI clinical guidelines for diabetes and CKD
   C. Case Study: Small-group discussion and presentation of results from each group

5. Texts


Additional References:


6. Evaluation Strategies
   A. Written examination: multiple choice and matching
   B. PowerPoint presentation by small groups on management of hypertension, or diabetes mellitus in the non-dialysis, dialysis CKD, or kidney transplant patient


**Kidney Replacement Therapy (KRT)**  
**Hemodialysis, Part A**  
**Learning Module 6A**

**Duration:** 3 hours

**Participants:** Nephrology novice nurse practitioners at entry-level practice

1. **Description**
   This module is part A of a two-part series that methodically studies care for an adult hemodialysis patient in a chronic outpatient dialysis unit. Module A introduces the history of modern hemodialysis procedure. Other learning points include: the mechanics of hemodialysis machine, associated equipment; individualized hemodialysis prescription by using standard guidelines; infection control and risk reduction; and teaching strategies that empower the patient and their family/significant others for a collaborative care approach with end stage renal disease (ESRD) and hemodialysis.

2. **Objectives**
   At the completion of this module, the nephrology novice nurse practitioner will be able to:
   - describe the hemodialysis machine settings and the clinical implications
   - compare and contrast the three most common dialyzer types and identify re-use or single-use capability
   - describe the process of diffusion and factors affecting the rate as it relates to hemodialysis
   - demonstrate the individualized hemodialysis prescription appropriate for the simulation activity
   - discuss management strategies for improvement of dialysis adequacy
   - discuss the different dialysate baths and the standards of care for clinical implications

3. **Content**
   A. **History of hemodialysis**
      1. Development of dialysis from the initial recorded to the present day
      2. Changes in and development of the modern hemodialysis machine
      3. Development of the dialyzer: types, functionality, and indications for use

   B. **The hemodialysis machine and dialysate bath**
      1. The components of the hemodialysis machine
         a. The blood pump
         b. The dialysate settings
         c. Monitoring systems and safety
            a. Machine options
            b. Infection control
2. The principles of the hemodialysis process
   a. Solute removal
   b. Water removal
   c. Dialyzers
   d. Urea kinetic modeling
3. Water treatment and dialysate bath
   a. The principles of water treatment
   b. Quality and testing required
   c. Local water supply
   d. Components of water treatment systems

C. Hemodialysis patient care
1. Assessment
   a. Pre and post hemodialysis history and physical assessment
   b. Assessment of vital signs including pre-treatment and post-treatment weights
   c. Laboratory results management, additional diagnostic tests, ultrasounds, or other testing as appropriate
   d. Review dialysis adequacy laboratory results and make the appropriate changes to the dialysis prescription
   e. Management and therapeutic interventions for any common complication or adverse event related to the dialysis procedure
   f. Management and therapeutic interventions for co-morbid diseases
   g. Medication monitoring and management with each visit.
2. Management and intervention
   a. Monitoring and management of dialysis adequacy
   b. Hemodialysis prescription - components and therapeutic implications
   c. Definition and significance of total dry weight (TDW)
   d. Therapeutic interventions and management to obtain and maintain TDW

D. Teaching strategies for the patient and their family/significant others for a collaborative care approach with the ESRD hemodialysis patient

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapters 45, 51, 52, 53, 54, 56 & 57; Daugirdas, Blake & Ing - chapters 3 through 5, & 11,13,14,17 &19; Gomez - pages 123 through 144.
   C. Case Study: Small-group discussion and presentation of results from each group
   D. Demonstration and return demonstration of an in-center hemodialysis machine set-up and function
   E. Video: for visual imagery of the dialysis process, used to support the didactic information
5. Texts


Additional References:


6. Evaluation Strategies

A. Written examination: multiple choice and matching
B. Demonstration of an appropriate initial hemodialysis prescription
Kidney Replacement Therapy (KRT)  
Hemodialysis, Part B  
Hemodialysis: Common Complications  
Learning Module 6B

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This module is the continuation from 6A with focused study of the in-center adult hemodialysis patient, the common interdialytic complications, and management strategies. Other learning points include: problem solving mechanical dysfunction; nondialysis vascular access infection control considerations and recommendations; end of life (EOL) with palliative or hospice care in end stage renal disease (ESRD). Common medications used in the adult hemodialysis patient, with special emphasis on the clinical effect of hemodialysis. Teaching strategies that empower the patient and significant others for a collaborative care approach with ESRD and hemodialysis.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:
• compare four examples of intradialytic complications and two recommended interventions
• describe three ongoing management needs for the chronic adult hemodialysis patient
• discuss three common clinical problems and the associated therapeutic management for the ESRD patient
• list four common medications used for the adult hemodialysis patient including modes of action, dosages, routes of administration, contraindications and toxic effects
• define the differences and relationships of palliative care, hospice care, EOL and advance care planning
• compare four current recommendations for infection control for the in-center adult hemodialysis patient
• define four basic objectives in a teaching plan for in-center adult hemodialysis patients and their family/significant others
3. Content
   A. Common complications and management strategies associated with the dialysis CKD patient
      1. Treatment complications
      2. Infections
      3. Vascular access
      4. Dialysis disequilibrium
      5. Equipment dialyzer or tubing malfunction
      6. Power failure/emergencies
   
   B. Associated clinical complications with ESRD
      1. Anemia associated with ESRD
      2. Bone disease
      3. Hematologic abnormalities
      4. Fluid balance and congestive heart failure
      5. Peripheral vascular disease
      6. Dyslipidemia and cardiovascular risk
      7. Malnutrition
      8. Depression and coping
      9. Sexuality
      10. Sleep disturbance
   
   C. Control of co-morbid diseases in the dialysis CKD patient
      1. Diabetes Mellitus management and glycemic control
      2. Hypertension and hypotension management
   
   D. Medication review and management, with dose appropriate for dialysis CKD patient
      1. Detection and avoidance of nephrotoxic medications, herbal/natural substances, and other agents, such as chemicals
      2. Dialyzability of the medication
      3. Renal clearance of the medication
      4. Commonly used medications and dosing requirements
         a. Antibiotics
         b. Antihypertensive
         c. Anticoagulants
         d. Renal specific
   
   E. Infection control considerations; non-dialysis access
      1. Risk factors and epidemiology
      2. Precautions and treatment considerations
      3. Immunizations: regulations and recommendations
F. Discussion and guidance on palliative care, hospice care, advance care planning, EOL
   1. Involvement of the patient, family, significant others, advocate with the care team for planning and guidance

G. Teaching strategies for patient and significant others for a collaborative approach to hemodialysis

4. Learning Strategies

   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapters 25, 29, 39, 45, 53 & 55; Daugirdas, Blake & Ing - chapters 8, 9, 30 through 36; Gomez - pages 79 through 104 & 115 through 122; Kinzbrunner & Policzer - chapter 1
   C. Case Study: Small-group discussion and presentation of results from each group

5. Texts


   Additional References:


6. Evaluation Strategies

   A. Written examination: multiple choice and matching
   B. In-class presentation on one of the following: infection control, EOL, medications, dialysis procedure complications, and associated ESRD clinical complications
Kidney Replacement Therapy (KRT)
Dialysis Vascular Accesses
Learning Module 7

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This module is a comprehensive review of the dialysis vascular access. It is the lifeline for hemodialysis patients, a crucial element in provision of adequate dialysis treatment. The types of vascular accesses, indications of the use and the associated complications. Partnership with the patients and their family/significant others is important for the maintenance of the vascular access. Focus on the application of nurse practitioner assessment, interventions and patient education skills.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

- discuss the different types of hemodialysis vascular accesses with the clinical indications of each type
- compare and consider the variance in the sounds auscultated with each type of vascular access and the clinical indications
- demonstrate ability to perform an accurate assessment of dialysis vascular access site based on clinical practice guidelines/standards
- describe the common complications associated with the three most common types of hemodialysis vascular accesses, when given clinical scenarios and case studies
- develop a teaching plan for the patient and their family/significant other that includes the care and management of the hemodialysis vascular access

3. Content
A. Introduction to the types of hemodialysis vascular accesses
   1. History and development of vascular access types
   2. Vascular accesses currently utilized
      a. Acute vascular access
      b. Long-term vascular accesses

B. Management of the vascular access
   1. Acute vascular access
      a. Duration of use, management, and complications associated with access type
   2. Long-term vascular accesses
      a. Duration of use, management, and complications associated with access type
      * Arteriovenous fistulas
• Arteriovenous grafts
• Tunneled catheters
• Other types of accesses

3. Teaching strategies for the patient, family, and significant others for a collaborative care approach, with hemodialysis vascular accesses

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information on the hemodialysis vascular access types, assessment, and management
   B. Reading: Counts & Russell - chapters 58, 59 & 60; Daugirdas, Blake & Ing - chapter 2; Gomez - pages 123 through 128
   C. Case studies for each type of vascular access identification of type, abnormalities, and management
   D. Virtual assessment: Use of audio recordings to identify normal and abnormal access sounds
   E. Live models: Assessment and identification of vascular access types: normal and abnormal

5. Texts


   Additional References:


6. Evaluation Strategies
   A. Written examination: multiple choice and matching
   B. Demonstration of accurate assessment of dialysis vascular access
Kidney Replacement Therapy (KRT)
Kidney Transplant
Conservative Care
Learning Module 8

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module is divided into two sections. The first section is an introduction to kidney transplant for the nephrology novice nurse practitioner. Other learning points include: history of kidney transplantation; referral process for evaluation; maintenance on the transplant list; management considerations of a failed kidney transplant transition back to dialysis; chronic kidney disease (CKD) and end stage renal disease (ESRD) management considerations for heart and liver transplant patients. The pharmacological and therapeutic classifications, modes of action, dosages, routes of administration, contraindications, and toxic effects of common immunosuppressant medications used for kidney and solid organ during different stages of CKD are reviewed.
The second section is a focused study of the conservative care for the ESRD patient who decides not to choose a kidney replacement therapy (KRT). Discussion and understanding of the importance for timely referral and the referral procedures related to end of life (EOL), palliative, hospice care and advance planning.
Both sections of this module include teaching strategies that empower the patient and their family/significant others for a collaborative care approach with kidney transplant, transplant rejection, ESRD as a complication of solid organ transplants, and conservative care.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

- discuss the history of kidney transplantation, therapeutic considerations and current guidelines/protocols
- compare and contrast the patient survival statistics at 1 year and 5 years for living and cadaveric donor kidneys
- discuss three of the universally common acceptance criteria for kidney transplant
- outline the general kidney transplant referral process to be evaluated for the non-dialysis and dialysis patient
- list three immunosuppressive medications, the standard dose, route of administration, management requirements and common side effects
- compare and contrast the KRT management of patients with cardiac and liver transplant versus without
- describe three common complications associated with conservative management of ESRD and the therapeutic interventions
- define differences and relationships of palliative care, hospice care, and advance care planning
3. Content
   A. Kidney Transplant
      1. History of kidney transplantation
      2. Statistics related to kidney transplantation
      3. The stages of the transplant process
         a. Pre-transplant
         b. Maintenance on the list
         c. Transplant
         d. Post-transplant
      4. Types of transplants
         a. Autograft
         b. Isograft
         c. Allograft
         d. Xenograft
      5. Referral and evaluation of transplant candidate
         a. Early referral prior to KRT is encouraged
         b. Referrals from nephrologist, NP, nurse, social worker or self-referral.
         c. Pre-transplant evaluation by transplant team: Transplant team members
         d. Pre-transplant education
         e. Pre-transplant work-up evaluation and selection
      6. Communication between the referring provider and the transplant center
      7. Immunosuppressive medications, actions, route of administration, dose, and side effects
         a. Glucocorticoids
         b. Mycophenolate mofetil, mycophenolic acid
         c. Sirolimus
         d. Azathioprine
         e. Cyclosporine
         f. Tracrolimus
         g. Polyclonal
         h. Monoclonal
         i. Interleukin-2 receptor antagonists
      8. Nursing considerations with immunosuppressive medications
      9. Teaching strategies for the patient, family and their significant others for a collaborative care approach in the referral process for kidney transplantation and subsequent post-transplant management

   B. CKD with other solid organ transplants
      1. Cardiac transplant
      2. Liver transplant
C. Conservative care
   1. Assessment and management of co-morbid conditions
   2. Assessment of signs and symptoms of uremia
   3. Management of complications of ESRD
   4. Discussion and guidance on palliative care, hospice care, advance care planning, and EOL
      a. Involvement of the patient, family, significant others, and advocates on the care team for planning and guidance
      b. Referral for palliative and hospice care as indicated

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapter 22, 27, 47 & 50; Danovitch - chapters 1, 5 & 7; Gomez - pages 203 through 227; Kinzbrunner & Policzer - chapters 2, 3, 4, 31 & 32
   C. Case Study: Small-group discussion and presentation of results from each group

5. Texts

   Additional References:
6. Evaluation Strategies
   A. Written examination: multiple choice and matching
Kidney Replacement Therapy (KRT)
Peritoneal Dialysis
Learning Module 9

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module is an organized study of the Peritoneal Dialysis (PD) kidney replacement therapy (KRT) for End Stage Renal Disease (ESRD). Other learning points include: history of PD treatment modality; anatomy and physiology of the peritoneal membrane; the function of the peritoneum during PD; PD access catheters types and clinical considerations for use; location and management of PD catheter exit sites; common PD complications and therapeutic management. Common medications used in the adult PD patient, with special emphasis on the dialyzability, modes of action, route of administration, contraindications and the potential toxic effects. Teaching strategies to empower the patient and their family/significant others for a collaborative care approach with PD therapy.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:

- describe the function of the peritoneum during therapy
- define the concepts of kinetic modeling and adequacy with the clinical implications of the PD therapy
- discuss two absolute contraindications and two relative contraindications for PD and the justification for each
- describe the clinical applications and differences of chronic and acute PD catheters
- demonstrate the clinical management and locations of the PD catheter exit site
- compare and contrast two types of PD treatments, including advantages and disadvantages
- demonstrate the set-up for both types of PD treatments
- distinguish three complications associated with PD and the clinical management of each
- discuss medication management for the PD patient
- describe EOL as it relates to the PD patient and the clinical considerations
- List four learning content objectives in a teaching plan for patients and their family/significant others with PD therapy

3. Content
A. History of PD

B. Anatomy and physiology of the peritoneum
C. Kinetic modeling and adequacy

D. Pressure
   1. Intra-abdominal
   2. Hydrostatic

E. Dialysis solutions

F. Contraindications for PD
   1. Absolute contraindications
   2. Relative contraindications

G. PD access
   1. Catheters
      a. Acute
      b. Chronic
   2. Insertion considerations
   3. Exit site selection, assessment and management
   4. Catheter complication
      a. Infection
      b. Malfunction
      c. Pain
      d. Damage
      e. Catheter cuff extrusion

H. Types of PD therapy
   1. Acute
   2. Chronic
      a. Process of PD
      b. Intermittent
      c. Continuous

I. PD prescription
   1. Adequacy
   2. Residual renal function
   3. Laboratory monitoring, peritoneal membrane test, urea clearance (Kt/V)
   4. Exchanges and dwell management

J. Management and therapeutic intervention
   1. Co-morbid diseases
      a. Diabetes Mellitus management and glycemic control
      b. Hypertension and hypotension management
   2. Associated clinical complications with PD/ESRD
      a. Anemia associated with ESRD
      b. Bone disease
      c. Hematologic abnormalities
d. Fluid balance and congestive heart failure
e. Peripheral vascular disease
f. Dyslipidemia and cardiovascular risk
g. Malnutrition
h. Depression and Coping
i. Sexuality
j. Sleep disturbance

3. Preservation of peritoneal membrane

K. Complications of PD

L. Medication review and management, with dose appropriate for PD patient
   1. Detection and avoidance of nephrotoxic medications, herbal/natural substances, and other agents, such as chemicals
   2. Dialyzability of the medication
   3. Renal clearance of the medication
   4. Commonly used medications and dosing requirements
      a. Antibiotics
      b. Antihypertensive
      c. Anticoagulants
      d. Renal specific

M. Teaching strategies for the patient, family, and significant others for a collaborative care approach with the ESRD hemodialysis patient

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapters 61 through 66; Gomez - page 145 through 64; Guest - chapter 3, 4
   C. Case Study: Small-group discussion and presentation of results from each group
   D. Demonstration and return demonstration of a PD set-up for CAPD and APD
   E. Video on peritoneal dialysis access management

5. Texts


Additional References:


6. Evaluation Strategies
   A. Written examination: multiple choice and matching
   B. Demonstration of accurate set-up for one type of PD therapy, either CAPD or APD
Kidney Replacement Therapy (KRT)
Acute Kidney Injury (AKI)
Learning Module 10

Duration: 3 hours

Participants: Nephrology novice nurse practitioners at entry-level practice

1. Description
This learning module emphasizes the etiology and management strategies for the Acute Kidney Injury (AKI) patient post hospital discharge. This concentration is focused on the care provided in the outpatient dialysis clinic. A review of dialysis prescription on the transition from acute facility to the outpatient clinic. Other learning points include: differences in AKI and end stage renal disease (ESRD); changes in the dialysis prescription from ESRD; diagnostic and laboratory monitoring for the AKI patient. Medications in the AKI patient on dialysis will be reviewed for the modes of action, routes of administration, contraindications, and toxic effects. Teaching strategies that empower the patient and their family/significant others for a collaborative care approach with the goals of dialysis for AKI and the potential for renal recovery.

2. Objectives
At the completion of this module, the nephrology novice nurse practitioner will be able to:
- describe three types of AKI and the corresponding etiologies
- compare and contrast the clinical management of AKI versus ESRD in outpatient hemodialysis
- discuss the diagnostic studies associated with ongoing management of AKI and the clinical implications
- demonstrate the appropriate dialysis prescription for AKI versus ESRD hemodialysis patient

3. Content
A. Types of AKI
   1. Pre-renal
      a. Hypoperfusion
   2. Intra-renal (intrinsic renal)
      a. Vascular
      b. Tubular
      c. Glomerular
      d. Interstitial - Acute tubular necrosis (ATN)
   3. Post-renal
      a. Obstruction
      b. Intra-abdominal hypertension
      c. Renal vein thrombosis
B. Treatment options for AKI
   1. Hemodialysis
   2. Peritoneal dialysis

C. General Management of AKI in outpatient hemodialysis
   1. History, physical, review of hospital records
   2. Assessment of vital signs, including pre-treatment and post-treatment weights
   3. Avoidance of intradialytic hypotension in AKI
   4. Maintain adequate hydration, no aggressive ultrafiltration
   5. Laboratory results management, additional diagnostic tests, ultrasounds, or other testing as appropriate to monitor recovery of renal function
   6. Review dialysis adequacy and laboratory results to make appropriate changes to the dialysis prescription
   7. Management and therapeutic interventions for any common complication or adverse event related to the dialysis procedure
   8. Management and therapeutic interventions for co-morbid diseases
   9. Medication monitoring and management with each visit, avoidance of nephrotoxic agents
   10. Preparation for permanent dialysis vascular access

D. Medication review and management, with dose appropriate for dialysis AKI patient
   1. Detection and avoidance of nephrotoxic medications, herbal/natural substances, and other agents, such as chemicals
   2. Dialyzability of the medication
   3. Renal clearance of the medication
   4. Commonly used medications and dosing requirements
      a. Antibiotics
      b. Antihypertensive
      c. Anticoagulants
      d. Renal specific

E. Teaching strategies for the patient and family/significant others for a collaborative care approach, in the outpatient dialysis unit for AKI

4. Learning Strategies
   A. Lecture with PowerPoint to give a foundation of information
   B. Reading: Counts & Russell - chapter 10; Daugirdas, Blake & Ing - chapter 10; Gomez - page 146; KDIGO clinical practice guidelines for acute kidney injury
   C. Case Study: Small-group discussion and presentation of results from each group
5. Texts


Additional References:


6. Evaluation Strategies
A. Written examination: multiple choice and matching
B. Demonstrate an appropriate outpatient hemodialysis prescription for AKI