



# Role of the Clinical Nurse Specialist in Radiology

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## 2.1 Introduction

Clinical Nurse Specialists (CNS) have been educated at the master's degree level since the specialty began in the 1960s, about the same time as the nurse practitioner (NP) programs began. The practice of the CNS is within the domain of nursing and does not usually overlap the domain of medicine, except for the psychiatric CNS, who provides diagnostic counseling and psychiatric services, which sometimes do overlap with the services of treatment provided by physician psychiatrists [1–4]. Many CNSs by virtue of extensive experience and position requirements become proficient at performing comprehensive physical assessments and diagnosing disease states occurring in patients; thus, they may provide medical care, albeit usually under the direction and guidance of a physician.

Table 2.1 provides a historical overview of the CNS in the United States (US) [5–16]. The CNS role was created: (1) to provide direct care to patients with complex disease states or conditions; (2) to improve outcomes by developing the clinical skills and judgements of staff nurses; and (3) to retain nurses who were experts to clinical practice [17]. Psychiatric CNSs became more

autonomous, and independent in their practice. As nursing practices expanded such as with cardiology and oncology, the need for expert nurses continued to grow. Typically, the CNS was hospital based, but as the role expanded the CNSs moved into clinics and community settings [4].

In the 1990s, the term “advance practice registered nurse” (APRN) became commonly used in the USA. State nurse practice acts (NPAs) collectively adopted the term to delineate nurse anesthetist (CRNA), nurse midwife (CNM), NP, and CNS. The professional and regulatory influences of the NPAs served to unite the advance practice specialty roles conceptually and legislatively, thereby promoting collaboration and cohesion among APRNs.

In the Statement on Clinical Nurse Specialist Practice and Education, the National Association of Clinical Nurse Specialists (NACNS) defined the CNS as an APRN who manages the care of complex and vulnerable populations, educates and supports nursing and nursing staff, and provides the clinical expertise to facilitate change and innovation in health care systems [18]. Advanced practice nursing is the primary distinguishing feature of CNS practice.

In 2008 the APRN Consensus Model was developed to help take APRN practice to the next level. Over 40 nursing organizations participated to address the inconsistency in APRN regulatory requirements throughout the USA. The result was the Consensus Model for APRN Regulation: Licensure, Accreditation,

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**Table 2.1** The history of CNS development in the United States (US) following World War II

- The 1946 Mental Health Act was passed into law by President Harry S. Truman. It provided federal research and funds for undergraduate and graduate nursing education; for a time, graduates whose education was supported by federal funds formed the largest cadre of master's-degree prepared nurses in the US [5]
- There was a proliferation of medical, surgical, pediatric and neonatal intensive care units, cardiac surgery, and special needs of physically, mentally and severely ill patients in hospitals
- In 1954 Hildegard Peplau developed the first master's degree program in psychiatric nursing at Rutgers University, New Jersey, USA. Her book, *Interpersonal Relations in Nursing: A Conceptual Frame of Reference for Psychodynamic Nursing*, provided their basic practice for the specialty [6, 7]
- Nurse educator's credit Peplau's work as the driving force for education of the CNS and the development of master's programs, aided in large part by federal funds through the GI bill, and for construction of nursing schools to meet the growing demand and evident need for highly educated nurses
- In 1963, expansion of the US federal government's Professional Nurse Training Act, administered through the Division of Nursing of the Department of Health, Education and Welfare (DHEW), to include CNS education added a major impetus for the development of more master's degree programs to prepare CNSs in all major specialties [8]
- During the 1960s and 1970s CNSs became, the single largest group of nurse experts because there was a shortage of physicians [9]
- The American Nurses Association (ANA) officially recognized the CNS role in the mid 1970's, defining the CNS as an expert practitioner and change agent. The ANA's definition specified a master's degree as a requirement for the CNS (ANA Congress of Nursing Practice, 1974) [10]
- By 1984, National League for Nursing (NLN) had 129 accredited master's degree programs preparing CNSs [11]
- The National Association of Clinical Nurse Specialists (NACNS) was founded in 1995 [12]
- In 1997, The Balanced Budget Act, specifically identified CNS's as eligible for Medicare reimbursement. The law, providing Medicare Part B direct payment to NPs and CNSs regardless of their geographic area practice, allowing both types of APRN's to be paid 85% of the fee paid to physicians for the same services. The law's inclusion and definition of the CNS corrected the previous omission of this group from reimbursement [13]
- In 2010-NACNS published core competencies and criteria for the evaluation of CNS graduate programs and certificates. A new document entitled "*CNS Statement for Clinical Nurse Specialist Practice and Education*" is expected out in the summer of 2019 that will include updated information on core competencies [14]
- In 2004 the Doctorate of Nursing Practice (DNP) degree, was introduced by the American Association of Colleges of Nursing (AACN), aimed at ensuring education preparation for the Advanced Practice Registered Nurse (APRN). In 2015 the DNP would standardize practice entry requirements [15]
- In 2015 NACNS endorsed the DNP as entry into practice for the CNS by 2030. The NACNS Board elected to provide a 15-year transition to the DNP as entry-level for the CNS. The NACNS Board believes that this timeline allows schools, universities and individuals to plan for implementation of the DNP as entry level for CNS practice [16]

Certification, and Education (LACE). The Consensus Model seeks to improve patient access to APRNs, support nurses to work more easily across different states, and enhance the American Nurses Credentialing Center (ANCC) certification process by preserving the highest standards of nursing excellence [19]. Through consistency and clarity of the APRN Consensus Model criteria, APRNs were empowered to work together to improve health care for all [20].

The necessary coordination among licensure, accreditation, certification, and education bodies required by the APRN Consensus Model called for an incremental implementation process. Although the model was completed in 2008, the target date for full implementation of the uniform

APRN regulations across the four essential elements for licensure, accreditation, certification, and education was 2015. The National Council of State Boards of Nursing (NCSBN) has a map of the USA with the consensus model implementation status as of April 23, 2018 (see <https://www.ncsbn.org>) [20].

## 2.2 Educational Preparation for this Role

The NACNS recognizes that there are two routes for completing a clinical doctorate in nursing: post-baccalaureate (i.e., post-BSN) and post-masters. Post-BSN programs must use validated

CNS competencies and education standards to guide the curriculum and ensure that graduates are prepared to practice in the CNS role. NACNS has developed and published nationally vetted CNS competencies [14]. In addition, graduate programs must use the Criteria for the Evaluation of Clinical Nurse Specialist Master's, Practice Doctorate, and Post-Graduate Certificate Educational Programs (2012) for guidance during CNS education program evaluation and/or development. Completion of the CNS specialty didactic and clinical courses in a population of interest, along with completion of the doctorate of nursing practice (DNP) role/practicum hours, will enable graduates to meet or exceed the 1000 clinical hour requirement and to sit for national certification. Post master's of science in nursing (MSN) students who hold current advanced practice certification with verified specialty clinical hours will be required to complete the DNP role/practicum to meet the DNP essentials competencies and the remaining clinical hour requirement [16, 21].

While NACNS supports the DNP as the appropriate degree for future clinical practice as a CNS, the organization supports the right of CNSs who pursued other graduate education to retain their ability to practice within the CNS role without having to obtain the DNP for future practice as an APRN after 2030 [16].

With the APRN Consensus Model CNS education had to shift from an emphasis on role and specialty to a model that includes population and role. CNS programs had to develop curriculums that balanced the requirements for education on population, role and specialty education which is unique to the CNS within the mandated clinical hours [21].

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### 2.3 Certification and Licensure

While education, accreditation, and certification are necessary components of an overall approach to preparing an APRN for practice, the licensing boards—governed by state regulations and statutes—are the final arbiters of who is recognized to practice within a given state. Currently, there

is no uniform model of regulation of APRNs across the states. Each state independently determines the APRN legal scope of practice, the roles that are recognized, the criteria for entry into advanced practice, and the certification examinations accepted for entry level competence assessment. This has created a significant barrier for APRNs to easily move from state to state and has decreased access to care for patients.

For example, the author graduated in 1995 with an MS in nursing. The author chose to become certified in 1997 although it was not mandated for the author to keep her position. However, having the certification did allow the employer to change the author's position class from nurse clinician to CNS. The author received certification through ANCC by taking the medical surgical nursing examination [19]. This certification has to be renewed every 5 years and has been "re-labeled" and the author is now called a CNS certified in Adult Health. The ANCC has now retired this examination but as long as the author keeps renewing she can continue to be certified, otherwise the author will have to find a new examination to take.

The author chose to take the radiology nursing examination which is accredited by the ABSNC [22]. The author chose to take this exam as validation for her practice as a radiology nurse. This examination is not required for the author's position or to keep her state license. Certification showed validation of knowledge.

When certification first became mandatory, many CNSs in the state of Minnesota where the author lives did not have a specialty examination that matched their area of specialty. Nurses were granted waivers for years; however, as certification exams have become available this was no longer an option.

In 2015, statutory barriers were removed in Minnesota for APRN practice. The creation of a formal infrastructure (Minnesota APRN Coalition) was developed to manage financial and communication strategies, provide cohesion among all four roles of APRNs, and encourage engagement of strong legislative authors and bipartisan support, and valuable partnerships among the coalition and external stakeholders.

The Minnesota Board of Nursing was key to the passage of legislation [23].

In 2016, the Minnesota State Board of Nursing issued a license number for the CNS license. Then in 2018 when this author renewed a basic Minnesota registered nurse license, the author also had to pay a given fee for a separate license to practice as a CNS. The author is allowed to practice independently; however, her employer insists that she still have a collaborative practice agreement with a physician.

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## 2.4 The Future of the CNS Role

It is believed there are over 72,000 CNSs in the USA. The US Bureau of Labor Statistics has separate classifications for CRNAs, CNMs, and NPs in their standard Occupational Classification listing, so some data is collected when the Bureau does routine surveys. The CNS, however, ends up under the general RN classification, so it is not known how many CNSs are there in the USA [21].

In a US survey of CNSs, conducted by NACNS in 2016, it was found that 3 in 4 clinical nurse specialists specialize in adult health or gerontology, most CNSs work in acute care hospitals that have or are seeking ANCC's Magnet™ Recognition, and more than half have nursing clinical-related responsibility for an entire health system, but only 1 in 5 CNSs are authorized to prescribe medications [24].

As a group, the NACNS survey found that 22% provide direct patient care, 20% teach nurses and staff, 20% consult with nurses, staff, and others, 14% lead evidence-based practice projects, and 12% assist other nurses and staff with direct patient care [24].

### 2.4.1 Title Protection and Prescriptive Authority

Prescriptive authority is a matter of state law in the USA. A 2015 analysis of states, completed by NACNS in collaboration with the NCSBN, indicates that CNSs have independent authority to prescribe in 19 states. The CNS needs a collab-

orative agreement with a physician to legally prescribe in another 19 states. The total number of states where a CNS may be eligible to prescribe is 38. Although the CNS has the education, competence, skills, and expertise to practice, if she/he moves from one state to another state, it is the nurse practice act of the new state that will determine what the CNS can do [25].

In the state of Minnesota where the author lives and is licensed, many CNSs completed their degrees before prescriptive authority was a part of a degree. As part of the 2016 legislation in Minnesota, CNSs who did not already have prescriptive authority, must practice for 2080 h within the context of a collaborative agreement within a hospital or integrated care setting with a Minnesota-licensed certified NP, certified CNS, or physician who has experience providing care to patients with similar medical problems before she/he can prescribe independently. The CNS in Minnesota can write for controlled substances and a collaborative agreement is not required [26].

### 2.4.2 Reimbursement

One issue highlighted by the NACNS survey findings is reimbursement. CNSs in independent ambulatory care practice, or who have hospital medical board privileges, are able to bill insurance companies directly for their services, rather than through a third party, reducing insurance costs. According to the survey findings, only 6% of CNSs bill directly to a third-party payer, like a private insurance company, Medicare or Medicaid, or an individual patient for the services they provide [24].

Medicare prohibits all APRNs from admitting patients to skilled nursing facilities and certifying for hospice or home care despite the fact that they may serve as the patient's primary care provider. There have been bills placed before the US Congress to amend the Society Security Title XVIII for APRNs to certify for hospice and home care. The Home Health Care Planning Improvement Act (S. 445) to allow APRNs to certify eligibility and make changes to home

health plans of care has also been proposed. The bills have not been passed into law [17].

## 2.5 The CNS in the Radiology Department

The CNS has a unique APRN role to integrate care across the continuum and through three spheres of influence: patient, nurse, and system. The three spheres are overlapping and interrelated, but each sphere possesses a distinctive focus. In each of the spheres of influence, the primary goal of the CNS is continuous improvement of patient outcomes and nursing care. Key elements of CNS practice are to create environments through mentoring and system changes that empower nurses to develop caring, evidence-based practices to alleviate patient distress, facilitate ethical decision-making, and respond to diversity. The CNS is responsible and accountable for diagnosis and treatment of health/illness states, disease management, health promotion, and prevention of illness and risky behaviors among individuals, families, groups, and communities [21].

To be successful, a CNS must understand and apply the seven competencies (see below) of advanced practice nursing across the three spheres of influence regardless of setting or specialty. Implementing competencies across the three spheres can result in improvement in clinical outcomes, patient safety, patient/family satisfaction, resource allocation, professional nursing staff knowledge and skills, advancement of clinical practice, health care team collaboration, and organizational efficiency [17].

### 2.5.1 Direct Clinical Practice

This core competency is central to and influences all the other competencies. It is important to note that the “3 Ps” that form the core courses in all APRN programs (pathophysiology, pharmacology, and physical assessment) are not separate competences in this understanding, but provide baseline knowledge and skills to support the direct clinical practice competency. Providing

regular and consistent direct patient care is essential and has been shown to improve patient outcomes and reduce health care costs when CNSs and other APRNs are directly involved with patient care, including assessing, teaching, counseling, and navigating systems [17].

The author spends the majority of her time in the outpatient clinic setting. My job description can be found in Table 2.2. Below are some examples from the author’s practice.

- Evaluate patients for potential biopsies. A consult is sent by the referring service, the chart is reviewed, and the case is presented to the interventional radiologist (IR). The images are reviewed, and the biopsy is either approved or not approved. Most patients are brought into clinic for consultation prior to having the biopsy. They are complex, with multiple health issues and many medications, some of which need to be held for a period of time

**Table 2.2** Sample CNS job description

<i>Core privileges in adult clinical nurse specialist</i>
<ul style="list-style-type: none"> <li>• Perform health histories and physical exams, order and interpret diagnostic tests within protocol guidelines within context of collaborative management</li> <li>• Care of indwelling vascular catheters, chest tubes, gastrostomy tubes, gastrojejunostomy tubes, cecostomy tubes, sclerotherapy tubes, and abscess drainage tubes</li> <li>• Discharge patients</li> <li>• Initial and ongoing assessment of the medical, physical and psychosocial status of patients who are young adult or older</li> <li>• Initiate admitting starting orders for collaborating physician</li> <li>• Order and interpret appropriate laboratory studies within protocol guidelines and within context of collaborative management, recording findings</li> <li>• Order restraints per hospital policy</li> <li>• Work in specific disease related areas (such as diabetes) assessing and managing symptoms, patient education and assisting with lifestyle changes</li> </ul>
<i>Core privileges in prescriptive core</i>
<ul style="list-style-type: none"> <li>• Prescriptive core</li> </ul>
<i>Special request privileges: level II clinical nurse specialist</i>
<ul style="list-style-type: none"> <li>• Enteric tube (non-percutaneous) placement and removal</li> </ul>

prior to the biopsy, and then the biopsy is scheduled.

- Evaluate patients for venous access when undergoing workup for bone marrow transplant. Some have never had access before, some have had previous venous blood clots and require assessment, and some come with a tunneled central line in place that also must be assessed for adequacy and appropriate placement.
- Evaluate adult cystic fibrosis (CF) population for port-a-cath placement. Some have had multiple intravenous access, previous venous blood clots, and need long-term venous access most frequently for antibiotics.
- Consult with patients who are quite anxious and want more information on gastrostomy tube placement, percutaneous nephrostomy tube placement, etc.
- Follow-up with patients after gastrostomy tube placement, perform button changes once the initial change has occurred and remove gastrostomy tubes when no longer needed.
- Assume responsibility for patients who are referred from outside the system directly to IR for biopsy, to make sure all biopsy results are reported to the referring physician and aid the provider should they require assistance in making further referrals for their patient.
- Work two half days a week in the Women's Specialty Clinic to consult with women who have symptomatic fibroids and are interested in the uterine fibroid embolization (UFE) procedure. Assist patients in completing their workup, undergoing the UFE procedure and the recovery period, providing for and/or arranging additional follow-up.

### 2.5.2 Consultation

This core competency is both a skill and an art, and requires knowledge, experience, and an integration of the essential aspects of the CNS role that are brought into clinical practice. The word consultation has also been interchanged with the words clinical consultation, comanagement, referral, supervision, and collaboration.

Examples of consultation could include APRN to APRN, APRN to physician, APRN to staff nurse, or APRN to committee [17].

A few years ago, the hospitalists brought to IR a change they wanted to see happen. At that time all of the outpatients who had gastrostomy tubes placed in IR were staying overnight following their procedure. The hospitalists wanted to see changes for many reasons: (1) patients seemed low risk and the hospitalists assessment was that they could be done as outpatients, (2) patients were not using intravenous pain medication overnight, (3) some were getting their tubes at the start of radiation therapy and so did not need to start tube feeding, and (4) beds were not easy to obtain and this population needed to be evaluated as a possibly to be done on an outpatient basis.

The author reviewed the literature and found that there was scant IR literature about performing this procedure on outpatients. The author went on the Society of Interventional Radiology (SIR) listserv and asked the IR physicians who were performing the gastrostomy tube placement on an outpatient basis about their protocols. A small number of IRs responded and sent the author their protocols. The same amount responded who were not performing this procedure. The author's IR group then developed a protocol and guidelines for the outpatient clinics to follow to get the patients ready for this procedure. Pre- and post-order sets were developed and the procedure moved forward as an outpatient procedure. The amyotrophic lateral sclerosis (ALS) patient population was excluded due to concerns for their airway after the procedure and/or refeeding syndrome. The process has been successful thus far. The author then gave a lecture at a nursing conference in 2017 about the retrospective review and the process we went through to change to the outpatient program. This is just one example of the value of a CNS.

### 2.5.3 System Leadership

The CNS has the ability to manage change and empower others to influence clinical practice and political processes within and across systems [17].

The author developed order sets for the more common procedures, i.e., angiograms, thrombolysis, gastrostomy tube placement, and transjugular intrahepatic portosystemic shunt (TIPS), when she first started in the role in the late 1990s. When a second nurse clinician was hired for IR, one of her responsibilities was to develop order sets for all of the procedures.

Eventually, the order sets became a part of the electronic medical record and now we have over 100 order sets between pre- and post-procedures. This was a time-consuming project and took a couple of years to complete. The author was part of a work group that met with the radiology nurse manager, information technology (IT) manager who is also a nurse, a nurse clinician from a sister hospital in our health care system, and a representative from pharmacy. This work group built upon the existing order sets that had anticoagulation algorithms and antibiotic guidelines. The radiologists then approved the order sets. Because the work group had only developed adult order sets, the author then developed pediatric order sets; these were approved by the pediatric radiologist.

Developing order sets is a task that will never be completed. As processes change, the order sets are updated. The order sets must be reviewed on a regular basis. We fortunately have maintained the same IT manager, a nurse, over the years. This resource has been invaluable to keep the process flowing smoothly.

### 2.5.4 Collaboration

It is working jointly with others to optimize clinical outcomes. The CNS collaborates at an advanced level by committing to authentic engagement and constructive patient, family, system, and population focused problem solving [17].

The hospital system where the author works at has a large cystic fibrosis (CF) population. The CF physicians approached the author because they wanted IR to place gastrostomy tubes as MIC KEY™ buttons at the time of initial placement. This was a change in practice for IR. The author reviewed the literature and found articles for the radiologists to review in support of this

change, and in this population they have agreed to perform this procedure. There is also an inpatient CNS for the CF population that the author works with on a regular basis to consult on patients with that are having issues with their buttons. In the outpatient setting there are also resource nurses that the author utilizes regularly.

The author participates in tumor board conferences to discuss patients that are in need of various biopsies. The lung tumor board meets weekly to discuss lung nodules. We review the patient's history—smoking, health issues, previous scans, size of the nodule, how easy is it to biopsy, etc. [27]. If the biopsy is approved, then the author will see the patient in imaging consult clinic to discuss the procedure, prep the patient, and schedule the biopsy. There are two CNSs that work with the pulmonologists and thoracic surgeons, and we manage the patients between tumor board, biopsy, and return of the results.

### 2.5.5 Guidance and Coaching

This core competency is an effective means to engage patients in change leading to healthier lifestyles [17].

One of the populations that frequently need a biopsy are patients that are smokers and they have a lung lesion. The pulmonary CNSs have already coached the patients about quitting. Tools have already been provided to the patients. They are offered pharmacological agents. My role is to inform the patients that a potential complication of lung biopsy is pneumothorax, they may need a chest tube and be admitted to the hospital where they won't be allowed to smoke. The patient needs to be prepared for this scenario and use the tools that the pulmonary CNSs have given them.

### 2.5.6 Research/Evidence-Based Practice

This includes the search for, interpretation of, and use of evidence in clinical practice and quality improvement, as well as active participation in the conduct of research [17].

The author has worked with pharmacy, IT, the radiologists, and a nurse clinician from a sister hospital in our health care system to update and expand algorithms for holding of anticoagulants for various procedures. This was a several month project. We had to review the literature, and found our list of drugs was much more detailed than the list published by SIR. We compared our list to other hospital lists that we found available on-line, brought the lists back to the two different radiology groups, came up with compromises and then agreed on the compromises to develop “the list.” This effort will be an ongoing process as new drugs come on the market, new procedures are developed, and new guidelines are published in the literature [28].

The author developed antibiotic guidelines as pre-procedure medications. The guidelines were based upon surgical guidelines and available radiology guidelines. The guidelines are reviewed yearly.

### 2.5.7 Ethical Decision-Making

Identifying, articulating, and taking action on ethical concerns at the patient, family, health care provider, system, community, and public policy levels are concerns for the CNS [17].

In 1996, when the UFE procedure was introduced into the USA, insurance companies in the state of Minnesota did not want to pay for the procedure, stating it was experimental. The lead physician, David Hunter, MD, who the author worked with wrote the state attorney general pleading our case as to why insurance companies should cover this procedure. Patients also wrote the attorney general. After many months, slowly we were able to gain approval. We performed our first case in July 1997. The radiologists and the author have partnered closely with the Women’s Health Specialty Clinic to have a formal fibroid program.

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## 2.6 The Author’s Role

The author has been in her current position for 25 years and over time her responsibilities have changed. The radiologists knew they needed an

advanced practice nurse, but they were not sure what to do with one, so the author did not delay in establishing a new role. In the beginning the author strictly had an inpatient presence and made daily rounds.

Nurses have been in the radiology department at the University of Minnesota since 1974 and when the author started in 1994 there were 11 working in radiology, the majority practicing in IR for sedation purposes. There was no formal pre- or post-procedure area. One nurse had developed simple teaching pamphlets for every test. There were no order sets. No patients were called to prepare them for their tests. The author worked in IR for 10 years before the pre/post-sedation unit opened. It was a painful process to get patients ready and recover them until this happened. A pre-call nurse was added about the same time the pre/post-sedation unit opened.

The author developed more in-depth teaching booklets for the more complex procedures, i.e., angiograms, vascular stents, inferior vena cava (IVC) filters, venograms, drainage tubes, gastrostomy tubes, TIPS, port-a-cath, and tunneled central lines. When the hospital opened their own patient learning center, they took over the maintenance of the teaching booklets, eventually putting them all on line.

IR placed internal ureteral stents in women who were undergoing treatment for gynecological cancers. The radiologists dictated in their reports that the patient should be seen every 3 months to follow up on these stents and that the stents should be changed every 9 months. As long as the patients care remained at the University of Minnesota the patients maintained their appointments. However, what the author discovered was that many patients were not getting appropriate follow-up. One of the author’s first quality assurance projects was to find the “lost to follow-up” patients and get follow-up care organized. The concern was that the longer the stents are left in place, they could become occluded and/or infected. The author also developed a patient teaching booklet that the patients received at the time of placement to help with



education and the author personally followed up with the patients. The author eventually educated the gynecologic oncology inpatient unit and outpatient clinic staff to have support in the follow-up with the patients [29].

The author was the first clinical nurse specialist hired and the first to bill for patients in her organization. The person who was in the billing department was very meticulous with the author about what elements I needed to include in my notes for reimbursement. The author knows billing still scrutinizes the notes that are written for thoroughness.

For many years the author also supported the radiologists in the startup of their consult clinics. We saw patients with vascular malformations, venous and arterial disease, oncology, and lymphedema. Now there are two nurse clinicians who support the radiologists in their practices.

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## 2.7 CNS in Other IR Settings

The author has had personal communications with CNSs in the state of Minnesota who have been trained in other facilities to perform venous sclerotherapy procedures by their attending radiologists; they also assist with the laser procedures. Still other CNSs have been trained to perform thoracentesis and paracentesis.

CNSs can be trained to do sinograms and abscess drainage catheter injections and follow-up; chest tube checks and removal; placement of central venous lines, arterial lines, and peripherally inserted central catheters (PICC); arterial catheter removal and achievement of hemostasis; and image-guided procedures including spinal injections, joint infections, aspirations, arthrography, fluid collection/aspiration/drainage procedures, bone/soft tissue biopsy, and chest tube insertion. To obtain privileges, the CNS would need a letter or certification from a training course specific to the procedure or letter from collaborating/sponsoring physician indicating training specific to the procedure has successfully been completed and documentation of 25 cases within the past 24 months for each privilege requested.

## 2.8 CNS in the International Setting

The CNS role was introduced in Canada and the United Kingdom at the same time as in the USA in response to rising complexity and specialization of health care and the need for clinical expertise, education, and leadership to improve care delivery and patient outcomes, develop nursing practice, and support nurses at the point of care. In the 1990s and 2000s the CNS role has been introduced in China, Japan, Hong Kong, New Zealand, Australia, the Republic of Korea, Taiwan, and Thailand. CNS education varies among the countries; titling is inconsistent making it difficult to tell if the nurse is specialized or truly an advanced practice nurse. Like in the US, CNSs provide care in a variety of settings [30].

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## 2.9 Conclusion

The author feels that the CNS role in radiology has been enriched by her involvement in the Association for Radiologic and Imaging Nursing (ARIN) [31]. The yearly conferences that the author has attended have allowed her to network with other advanced practice nurses, keep up to date on practice, give lectures, and present posters. The physicians that the author has worked with over the years have been encouraging and supportive when the author was on the ARIN Board of Directors. The CNSs role is very unique in radiology and one has to actively seek out a support system and mentors.

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