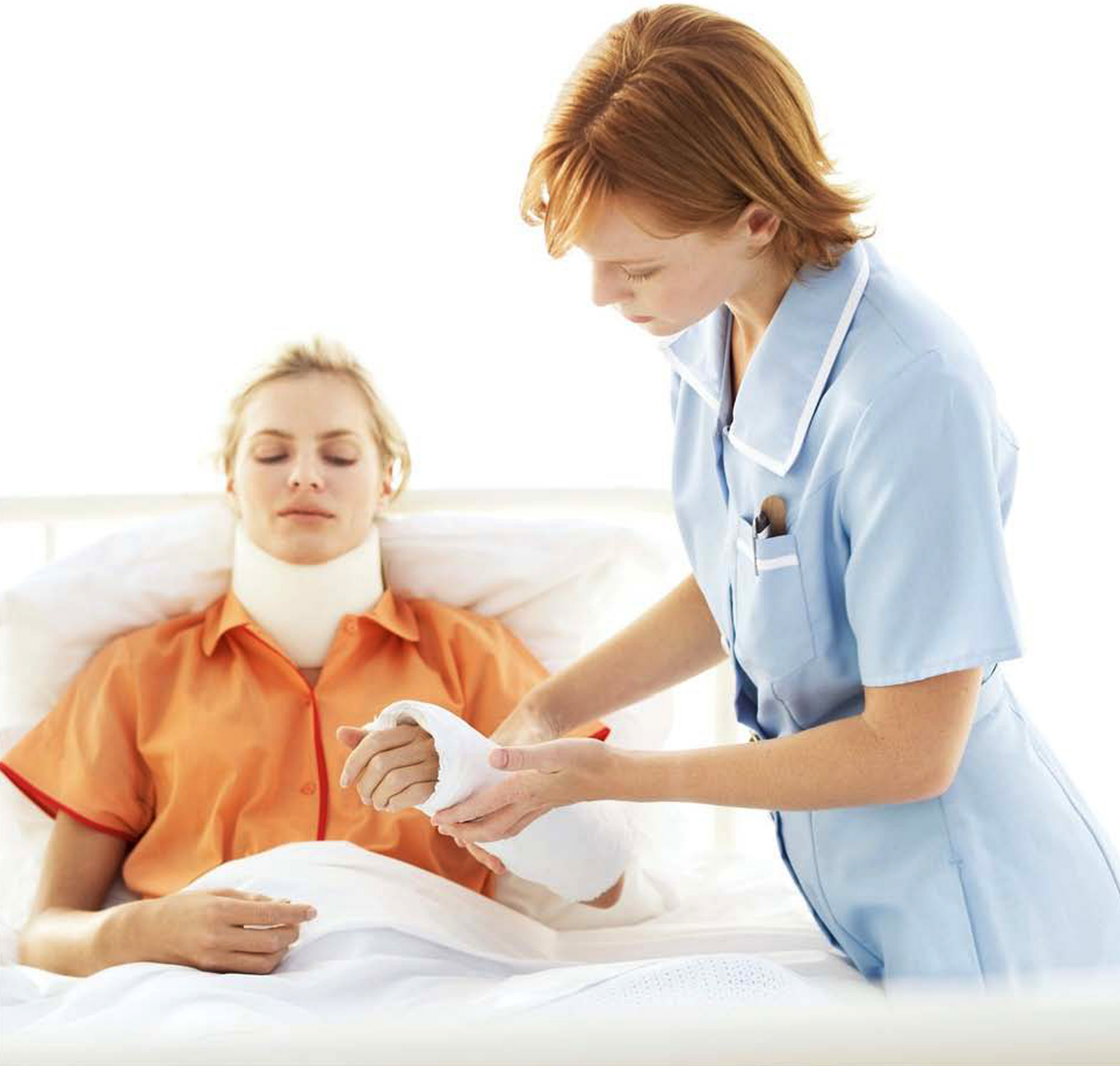
Nursing and Health Care Management

Miguel Horton



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Nursing and Health Care Management
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www.bibliotex.com

Ebook ISBN: 9781984664587

Published by:
Bibliotex
Canada
Website: www.bibliotex.com

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Chapter 1

Generalists

Nurse education

Nurse education consists of the theoretical and practical training provided to nurses with the purpose to prepare them for their duties as nursing care professionals. This education is provided to **student nurses** by experienced nurses and other medical professionals who have qualified or experienced for educational tasks. Most countries offer nurse education courses that can be relevant to general nursing or to specialized areas including mental health nursing, pediatric nursing and post-operatory nursing. Courses leading to autonomous registration as a nurse typically last four years. Nurse education also provides post-qualification courses in specialist subjects within nursing.

A nursing student can be enrolled in a program that leads to a diploma, an associate degree or a Bachelor of Science in nursing.

Historical background

During past decades, the changes in education have replaced the more practically focused, but often ritualistic, training structure of conventional preparation. Nurse education integrates today a broader awareness of other disciplines allied to medicine, often involving inter-professional education, and the utilization of research when making clinical and

managerial decisions. Orthodox training can be argued to have offered a more intense practical skills base, but emphasized the handmaiden relationship with the physician. This is now outmoded, and the impact of nurse education is to develop a confident, inquiring graduate who contributes to the care team as an equal. In some countries, not all qualification courses have graduate status.

Traditionally, from the times prior to Florence Nightingale, nursing was seen as an apprenticeship, often undertaken in religious institutes such as convents by young women, although there has always been a proportion of male nurses, especially in mental health services. In 1860 Nightingale set up the first nurse training school at St Thomas' Hospital, London. Nightingale's curriculum was largely based around nursing practice, with instruction focused upon the need for hygiene and task competence. Her methods are reflected in her *Notes on Nursing* (1898).

Some other nurses at that time, notably Ethel Gordon Fenwick, were in favor of formalized nursing registration and curricula that were formally based in higher education and not within the confines of hospitals.

Nurse education in the United States is conducted within university schools, although it is unclear who offered the first degree level program. So far as known Yale School of Nursing became the first autonomous school of nursing in the United States in 1923.

In November 1955, a World Health Organization (WHO) study group on the education of nurses met in Brussels and made several recommendations, including that "At least one

experimental school of nursing be set up in each country." In the UK, the first department of Nursing Studies at the University of Edinburgh was established in 1956, with a five-year integrated degree programme introduced in 1960. Several other universities across the UK during the 1960s. In 1974 La Trobe University commenced the very first nursing course in Australia.

Nursing qualifications

There are multiple entry levels into nursing. This has led to confusion for the public, as well as other healthcare professionals. The earliest schools of nursing offered a Diploma in Nursing and not an actual academic degree. Community colleges began offering an Associate of Science in Nursing degree, and some diploma programs switched to this model. Universities then began to offer Bachelor of Science in Nursing and Bachelor of Nursing degrees, followed by Master of Science in Nursing degrees, and Doctor of Nursing Practice degrees. A Doctor of Philosophy Degree in Nursing (PhD) is also available, although this degree tends to focuses more on research than hands-on patient care.

Nursing degrees in the UK

Pre-registration nurse training and education in the UK is now via a bachelor's degree (a UK Level 6 qualification) following the phasing-out of the Diploma of Higher Education (a UK Level 5 qualification) in Nursing which was previously offered at universities and colleges.

To become a student nurse, individuals must apply through the university and Colleges Admissions Service (commonly referred to as "UCAS") to their nursing degree choices, choosing from one of the four nursing fields: Adult, Children, Mental Health and Learning Disabilities. Requirements for entry to a pre-reg nursing degree are usually five GCSEs (including mathematics, English language and at least one science subject) at Grade C or above, along with three A-Level subjects (preferably but not essentially science-based) at Grade C or above, although the majority of universities will seek higher grades due to the competition for places. Key Skills courses are generally no-longer accepted as an alternative to GCSEs, however science or healthcare-based BTEC Level 3 Extended Diplomas and Access courses are most oftem accepted in lieu of A-Level qualifications.

If successful following interview, the student will study a "core" first year, learning basic nursing competencies essential to all four of the above fields. It is then from second year and onwards that the degree will begin to focus on the student's chosen field. Following completion of the degree, the applicant will be registered with the Nursing and Midwifery Council (NMC) as a Registered Nurse in their field of practice, using the post-nominal RNA, RNC, RNMH or RNLD as appropriate to their degree qualification.

Nursing degrees in Western Australia

There are two specific pathways individuals can take if they wish to become a nurse in Western Australia (WA). They can decide to study at university to become a registered nurse (RN), alternatively they can study at Technical and Further

Education (TAFE) to become an enrolled nurse (EN). Both pathways require a variety of entry requirements whether it be passing year 12 Maths, English and Human Biology along with receiving a specific Australian Tertiary Admission Rank (ATAR) also known as a score for university or providing prior learning experiences and legal clearances for TAFE. Either way individuals need to be aware these requirements can vary year to year and that is why they are recommended to contact each university or institute to find out entry requirements.

In WA there are four universities where individuals can choose to attend if they are wanting to complete a nursing degree.

Edith Cowan University (ECU) is located at Joondalup and South West (Bunbury) campus. ECU offers the Bachelor of Science (Nursing) degree which individuals can choose to study for three years full time or six years part time both on campus.

Curtin University is located in Bently, WA. This university offers an Undergraduate Nursing degree additionally referred to as Bachelor of Science (Nursing). This degree runs on campus for three and a half years full time however, students can request to study this degree part time.

Murdoch University also offers offer a Bachelor of Nursing degree with a three-year completion date. The university offers this degree at Peel or South Street campus in Murdoch, WA.

The final university that offers a nursing degree in WA is located throughout Fremantle and is known as the University of Notre Dame. This university offer a Bachelor of Nursing degree which will take three years to achieve.

When students graduate from one of the four universities listed above they will be fully qualified as an RN and have a wide variety of job opportunities available. However, if individuals discover that university is not for them or can not gain entry into university, it is not the end of the world because there are alternative pathways available.

Attending TAFE is an alternative career pathway for individuals that still wish to pursue this profession. There are six institutes spread across WA which offer a Diploma of Nursing (Enrolled-Division 2 Nursing). These institutes include C.Y.O'Connor Institute, Great Southern Institute of Technology, Goldfields Institute of Technology, Pilbara Institute, South West Institute of Technology and West Coast Institute of Training. All institutes in WA roughly take eighteen months to complete the diploma when studying full time. Once a student successfully graduates from the Diploma of Nursing (Enrolled-Division 2 Nursing) they will be qualified as an EN.

Overall, there are alternative pathways available however an RN holds higher qualifications than an EN. There are key similarities of an RN and an EN as they both desire to fulfil their dreams of becoming a nurse and they must be registered with the Nursing and Midwifery Board of Australia, by complying with the Board's registration standards.

Continuing education

After the Nursing student becomes a Registered nurse, he or she is required to participate in continuing education to retain their licensing and registration. In 2010, it was projected that by 2018, there would be a 22% job growth in the nursing field;

at the time it was the United States' fastest growing occupation.

Scope

Nursing education includes instruction in topic areas. These are nursing assessment, nursing diagnosis, and nursing care planning. In the United States, nursing students learn through traditional classroom and lab instruction. Nursing education also involves clinical rotations and simulation, throughout their schooling, to develop care planning and clinical reasoning. At the end of schooling, nursing students in the US and Canada, must take and pass the NCLEX, National Council of Licensure Examination to practice.

Nursing specialties

There are a variety of areas where nurses can specialise in and they may decide they want to be qualified in one or several specialities over the course of their career. Here are an array of some of the nursing specialty fields available:

- Burn Care Nurse
- Cardiology (heart) Nurse
- Clinical Nurse
- Community Health Nurse
- Continence Nurse
- Diabetes Education Nurse
- District Nurse
- Dialysis Nurse
- Education

- Emergency Nurse
- Family Health Nurse
- Fertility Nurse
- Gerontology (aged care) Nurse
- Infection control
- Intensive Care
- Management
- Medical Nurse
- Mental Health Nurse
- Midwife
- Neonatal Intensive Care Nurse
- Nurse Educator
- Nurse Manager
- Nurse Practitioner
- Occupational Health Nurse
- Oncology Nurse
- Paediatric Nurse
- Peri-operative Nurse
- Plastic Surgery Nurse
- Practice Nurse (Medical Clinic)
- Rehabilitation Nurse
- Remote Area Nurse
- Research
- Rural Nurse
- School Nurse
- Sexual Health Nurse
- Surgical Nurse
- Wound Management

Present aims

Among nurse educators, arguments continue about the ideal balance of practical preparation and the need to educate the future practitioner to manage healthcare and to have a broader view of the practice. To meet both requirements, nurse education aims to develop a lifelong learner who can adapt effectively to changes in both the theory and practice of nursing.

While it is clear that the use of Medical simulation in nursing education is important for improving practice, patient safety, and interprofessional team skills, the balance of simulation to clinical time remains in the hands of the institutions.

Clinical nurse leader

Clinical Nurse Leader (**CNL**) is a relatively new nursing role that was developed in the United States to prepare highly skilled nurses focused on the improvement of quality and safety outcomes for patients or patient populations. The CNL is a registered nurse, with a Master of Science in Nursing who has completed advanced nursing coursework, including classes in pathophysiology, clinical assessment, finance management, epidemiology, healthcare systems leadership, clinical informatics, and pharmacology. CNLs are healthcare systems specialists that oversee patient care coordination, assess health risks, develop quality improvement strategies, facilitate team communication, and implement evidence-based solutions at the unit (microsystem) level. CNLs often work with clinical

nurse specialists to help plan and coordinate complex patient care.

Curriculum and certification

The American Association of the Colleges of Nursing (AACN) delineates revised and updated competencies, curriculum development, and required clinical experiences expected of every graduate of a CNL master's education program, along with the minimum set of clinical experiences required to attain the end of program competencies. The Commission on Nurse Certification (CNC), an autonomous arm of the AACN, provides certification for the Clinical Nurse Leader.

The AACN, along with nurse executives and nurse educators designed the Clinical Nurse Leader role (the first new role in nursing in 35 years) in response to the Institute of Medicine's (IOM) comprehensive report on medical errors, *To Err is Human: Building a Safer Health System*, released in November 1999. The report, extrapolating data from two previous studies, estimates that somewhere between 44,000 and 98,000 Americans die each year as a result of medical errors.

History

Joint participation by education and practice leaders was instrumental in the successful creation of the CNL role. Among stakeholders joining the AACN on the Implementation Task Force (ITF) were the American Organization of Nurse Executives (AONE) and the Department of Veteran Affairs (DVA). Within the healthcare system, the need for nurses with the skill and knowledge set of the CNL had already been

identified and nurses were completing both academic and clinical work without receiving recognition for the advanced competencies being acquired. The first CNL certification exam was held in April and May 2007. In July 2007, AACN Board of Directors approved the revised white paper on the Education and Role of the Clinical Nurse Leader. Currently, 2500 CNLs have been certified and are able to use the credential and title of CNL.

Licensed practical nurse

A **licensed practical nurse** (**LPN**), in much of the United States and Canada, is a nurse who cares for people who are sick, injured, convalescent, or disabled. In the United States, LPNs work under the direction of physicians, mid-level practitioners, and may work under the direction of registered nurses depending on their jurisdiction.

In Canada, LPNs/RPNs work autonomously similar to the registered nurse in providing care and are responsible for their individual actions and practice.

Another title provided is "**registered practical nurse**" (**RPN**) in the Canadian province of Ontario. In California and Texas, such a nurse is referred to as a **licensed vocational nurse** (**LVN**).

In the United States, LPN training programs are one to two years in duration. All U.S. state and territorial boards also require passage of the NCLEX-PN exam. In Canada (except for Québec), the education program is two years of full-time post-secondary and students must pass the Canadian Practical

Nurse Registration Exam (CPNRE), administered by the for-profit Yardstick Assessment Strategies. In 2022, Ontario and British Columbia plan to discontinue CPNRE in favour of the REx-PN, administered by the National Council of State Boards of Nursing (NCSBN).

United States

According to the 2010–2011 *Occupational Outlook Handbook* published by the Department of Labor's Bureau of Labor Statistics, licensed practical nurses care for patients in many ways:

Often, they provide basic bedside care. Many LPNs measure and record patients' vital signs such as weight, height, temperature, blood pressure, pulse, and respiratory rate. A licensed practical nurse (LPN) in much of the United States and most Canadian provinces is a nurse who cares for people who are sick, injured, convalescent, or disabled. LPNs work under the direction of registered nurses or physicians. They also prepare and give injections and enemas, monitor and also perform placement of catheters, dress wounds, and give alcohol rubs and massages. To help keep patients comfortable, they assist with bathing, dressing, and personal hygiene, moving in bed, standing, and walking. They might also feed patients who need help eating. Experienced LPNs may supervise nursing assistants and aides, and other LPNs.

As part of their work, LPNs collect samples for testing, perform routine laboratory tests, and record food and fluid intake and output. They clean and monitor medical equipment. Sometimes, they help physicians and registered nurses perform

tests and procedures. Some LPNs help to deliver, care for, and feed infants. LPNs also monitor their patients and report adverse reactions to medications or treatments. LPNs gather information from patients, including their health history and how they are currently feeling. They may use this information to complete insurance forms, pre-authorizations, and referrals, and they share information with registered nurses and doctors to help determine the best course of care for a patient. LPNs often teach family members how to care for a relative or teach patients about good health habits.

According to the *Occupational Outlook Handbook*, while most LPNs are generalists and will work in any area of health care, some LPNs work in specialized settings, such as nursing homes, doctor's offices, or in home care. In some American states, LPNs are permitted to administer prescribed medicines, start intravenous fluids, and provide care to ventilator-dependent patients. While about 18 percent of LPNs/LVNs in the United States worked part-time in 2008, most work a 40-hour week. The *Occupational Outlook Handbook* states that LPNs may have to work nights, weekends, and holidays; often stand for long periods and help patients move in bed, stand, or walk; and may face occupational hazards which include exposure to caustic chemicals, radiation, and infectious diseases; back injuries from moving patients; workplace stress; and sometimes confused, agitated, or uncooperative patients."

In California, licensed vocational nurses (LVNs) empty bedpans, commodes and clean and change incontinent adults. Licensed vocational nurses read vital signs such as pulse, temperature, blood pressure and respiration. They administer injections and enemas, monitor catheters and give massages or

alcohol rubs. They may apply dressings, hot water bottles and ice packs. They help patients bathe and dress, treat bedsores and change soiled bed sheets. LVNs feed patients and record their food consumption, while monitoring the fluids they take in and excrete.

According to the *Occupational Outlook Handbook*, in 2008 there were some 753,600 jobs held by LPNs/LVNs in the United States, with about 25 percent working in hospitals, 28 percent in nursing care facilities, and 12 percent in physicians' offices. Other LPNs/LVN worked for home health care services; employment services; residential care facilities; community care facilities; outpatient care centers; and federal, state, and local government agencies. In the United States, employment of LPNs is projected to grow by 21 percent between 2008 and 2018, much faster than average. The growth is expected to be driven by the "long-term care needs of an increasing elderly population and the general increase in demand for healthcare services". By contrast hospitals are phasing out licensed practical nurses. While LPN jobs were expected to decline, in 2010 the Bureau of Labor Statistics reported the job growth rate of Licensed Practical Nurses as 22%, far above the national average of 14%. Median annual salary was reported as $44,090 per year, and hourly salary was reported as $19.42.

In the United States, training programs to become a LPN/LVN last about one year and are offered by vocational/technical schools and by community colleges. The *Occupational Outlook Handbook* states that in order to be eligible for licensure, LPNs must complete a state-approved training program. A high school diploma or equivalent usually is required for acceptance into a training program, but some programs accept candidates

without a diploma and some programs are part of a high school curriculum. According to the *Occupational Outlook Handbook* states that most programs include both classroom study (covering basic nursing concepts and subjects related to patient care, including anatomy, physiology, medical-surgical nursing, pediatrics, obstetrics nursing, pharmacology, nutrition, and first aid) and supervised clinical practice (usually in a hospital setting, but sometimes elsewhere).

The National Council Licensure Examination-Practical Nurse (NCLEX-PN), a computer-based national licensing exam developed and administered by the National Council of State Boards of Nursing, is the exam required to obtain licensure as a LPN/LVN. In many states, LPNs/LVNs are required to obtain continuing education credits throughout their career.

Advancement

In some settings, LPNs/LVNs have opportunities for advancement, including the possibility of becoming credentialed in a certain area (such as IV therapy, gerontology, long-term care and pharmacology) or of becoming a charge nurse, responsible for overseeing the work of other LPNs and various unlicensed assistive personnel, such as nursing assistants. Some LPNs/LVNs choose to undergo further education and become registered nurses. LPN-to-RN training programs ("bridge programs") exist for this purpose. These include further classroom study to obtain at least an Associate of Science in Nursing (ASN) and clinical practice followed by another exam, the National Council Licensure Examination-Registered Nurse (NCLEX-RN).

The origins of the practical/vocational nurse can be traced back to the practice of self-taught individuals who worked in home care in the past, assisting with basic care (ADLs such as bathing) and light housekeeping duties (such as cooking). Licensing standards for practical nurses came later than those for professional nurses; by 1945, 19 states and one territory had licensure laws, but only one state law covered practical nursing. By 1955, however, every state had licensing laws for practical nurses. Practical nurses who had been functioning as such at the time new standards were adopted usually granted a license by waiver, and exempt from new training requirements.

The first formal training program for practical nurses was developed at the Young Women's Christian Association (YWCA) in New York City in 1892. The following year this became the Ballard School of Practical Nursing (after Lucinda Ballard, an early benefactor) and was a three-month-long course of study concerned with the care of infants, children and the elderly and disabled. The curriculum included instruction in cooking and nutrition as well as basic science and nursing. The school closed in 1949 after the YWCA was reorganized. Other early practical nursing education program include the Thompson Practical Nursing School, established in 1907 in Brattleboro, Vermont, (still in operation today) and the Household Nursing School (later the Shepard-Gill School of Practical Nursing), established in 1918 in Boston. In 1930, there were still just 11 schools of practical nursing, but between 1948 and 1954, 260 more opened. The Association of Practical Nurse Schools (APNS) as founded in 1942, and the next year the name of the organization was changed to National Association for Practical Nurse Education and Service (NAPNAS), and the first planned curriculum for practical nurses as developed.

Canada

In Canada, nursing, as with all other health care professions and trades, is regulated by the respective province or territory, through an enabling statute legal scheme where an act of the relevant legislature grants delegated authority to a non-sovereign entity such as a college of nurses with powers to regulate the profession within specific parameters and also grants to the respective minister of the Crown oversight and the powers to write regulations through a Ministerial Order in Council.

As an example, the Canadian province of British Columbia's enabling act is the *Health Professions Act*, RSBC 1996, c. 183, and the resulting nursing-specific regulation is incorporated into one Regulation together with a number of other practitioners such as audiologists and naturopaths in the *Health Professions Designation Regulation*, BC Reg 270/2008.

While the act and the regulation outline basic organizational architecture, each professional organization creates its own bylaws and codes of conduct and practice subject to ministerial and judicial review and must be in compliance with accepted norms of administrative law such as transparency and accountability in governance, fundamental principles of natural justice, an internal appeal process and compliance with the Canadian Charter of Rights and Freedoms.

Such legal schemes enable self-governance and save costs to governments by delegating regulatory responsibilities to a self-funded and self-administered professional entity, but are also known to engage in protectionist practices since the delegation

also grants a monopoly for the provision of services to only one body, as widely studied by the late economist

A nurse who is entitled to practice in one jurisdiction cannot work in another without applying to and being granted a license by the local regulatory body. Educational, legal and practice requirements are similar, so mobility is possible, however the nurse still has to fulfill requirements, such as writing exams and paying fees, in each location they wish to practice. This is akin to all other regulated professions where the provincial government holds exclusive jurisdiction.

Practical nurse compensation

The average hourly practical nursing salary at the entry level is 24.00 CAD an hour. The highest practical nursing salary at the experienced level is 36.00 CAD. However, some practical nurses may make upwards of 40.00 CAD an hour. Many nurses also receive overtime compensation for the long hours and understaffing of many institutions.

Ontario

Ontario uses the designation Registered Practical Nurse to refer to a role known as License Practical Nurse in the rest of Canada and elsewhere. This should not be confused with Registered *Psychiatric* Nurse, a title used in certain other Canadian jurisdictions.

All nurses in the province of Ontario are regulated by the College of Nurses of Ontario (CNO), to which they must apply for and maintain membership. "College" in this case is used similarly to the word "board"; they are not a school or training

provider themselves. To apply for membership, an applicant must satisfy requirements including completion of an approved two year post secondary training program, evidence of recent practice as a nurse, pass both an entrance and jurisprudence examination, be proficient in either English or French, have legal authorization to be employed in Canada, disclosure of certain past or ongoing legal proceedings, disclosure of certain proceedings involving practice of nursing in other jurisdictions and disclosure of certain kinds of health conditions and disabilities.

In 2008, there were 27,432 RPNs registered as practicing with the CNO. By 2017, this has increased to 48,748.

By comparison to other classes of nursing in Ontario, there were 104,483 RNs and 3,083 NPs. 90.9% of the 2017 RPNs were female and the average age was 40.8 years. 89.9% attended a nursing school in Ontario; however members who previously attended nursing schools outside Ontario which were not accepted as valid by the CNO at the time of their registration are not reflected in that number.

The CNO's definition for a nurse's scope of practice is: "The practice of nursing is the promotion of health and the assessment of, the provision of care for, and the treatment of health conditions by supportive, preventive, therapeutic, palliative, and rehabilitative means in order to attain or maintain optimal function".

The College of Nurses of Ontario (CNO) outlines 13 controlled acts, 4 of which can be performed by RPNs and RNs.The 4 Controlled Acts available to be performed by RNs and RPNs are:

- Performing a prescribed procedure below the dermis or mucous membrane
- Administering a substance by injection or inhalation
- Putting an instrument, hand, or finger:
- Beyond the external ear canal
- Beyond the point in the nasal passages where they normally narrow
- Beyond the larynx
- Beyond the opening of the urethra
- Beyond the labia majora
- Beyond the anal verge or
- Into an artificial opening in the body
- Dispensing a drug

The College of Nurses of Ontario (CNO) has 4 principal roles in the regulation of Ontario nurses:

- Articulating and Promoting Practice Standards
- Establishing Requirements for Entry to Practice
- Administering a Quality Assurance Program
- Enforcing Standards of Practice and Conduct

The CNO has set 7 standards of practice for all nurses in Ontario:

- Accountability
- Continuing Competence
- Ethics
- Relationships (Therapeutic Nurse-Client Relationships and Professional Relationships)
- Knowledge
- Knowledge Application

- Leadership

Registered Nurses are expected to have a higher level of competency in the last three of these standards of practice than RPNs. In Alberta, LPN's have a greater scope of practice than most provinces. They can perform most tasks that an RN can do, however, the complexity of the patient's condition determines if the LPN is in charge of care, or collaborating on care with an RN. In Ontario, RPNs are actively expanding their roles and scope of practice, modelling similarly to Alberta, with the exception that in Ontario, both RNs and RPNs are regulated by the same regulatory body. This model allows for both categories of nurses to be practising under the same guidelines and accountability models. In Canada, in home-care settings LPNs sometimes act as the liaison between the care provider and the local health authority, coordinating care.

United Kingdom

The state enrolled nursing qualification can no longer be gained in Britain. Prior to the implementation of Project 2000 which radically altered the face of nurse education in the mid 1990s, SEN students used to be trained within two years. Their course was a simplified version of the longer training offered to state registered nurses (SRNs, later to be renamed RGNs, registered general nurses and now known as level-one nurses). Some auxiliary nurses with many years of experience were selected to progress to enrollment as a SEN. People training to be SRNs who failed their exams at the third attempt were also able to enter the nursing register as a SEN. No new SENs are trained in the UK today. The Nursing and Midwifery Council (the regulatory body for nurses in the UK) previously used to

allow people to be added to the register as level two nurses if they are moving from a similar position from within the European Union, however this has now stopped. Level-two nurses from the EU wishing to gain entry to the Register in the UK must be willing to train as a first level (staff) nurse. This is by two different means: starting their training from scratch as a pre-registration student nurse, or by joining an existing cohort of student nurses starting their second year of training, and completing years 2 and 3 with them

Formerly, there was a large segregation between the "green" SENs and "blue" SRNs, which were the colour of uniform typically worn. SENs were very much complementary to the nursing team, however did not have the status of SRNs and were ineligible to be promoted, e.g., to ward sister. Many SENs sat or re-sat the SRN exams, however a large number did not and were quite content being a SEN. Nowadays, the divide between level one and two nurses is diminishing due to the small number of SENs still in practice. The demise of the SEN is lamented by many who saw it as a balanced way to staff a ward. However, the divide also meant that potentially, the gap in clinical excellence could be too wide. In many areas, ENs and SENs are being replaced with lesser qualified healthcare assistants educated to S/NVQ Level 3 or 4, being awarded titles such as Senior Healthcare Assistant, Senior Auxiliary Nurse, Senior Clinical Support Worker, Care Team Leader or Senior Care Assistant.

Although originally viewed as a less qualified nurse, ENs and SENs are now able to hold the rank of Deputy Charge Nurse in the NHS and Deputy Home Manager in the private sector, as well as unit manager, both within the NHS and the private

sector, and in some instances higher, technically out-ranking a staff nurse (first-level RN).

Auxiliary nurses draw blood samples, change bandages, and record ECGs. At present, they work under the direct supervision of a registered nurse.

Australia

The national Australian Health Practitioner Regulation Agency (AHPRA) issues permission to practise. Endorsed Enrolled nurses (EN), or Division 2 nurses, in Australia must now complete the Diploma of Nursing and usually spend 18 months training, consisting of 36 weeks theoretical component at TAFE colleges, some universities or private institutions, followed by practical experience in hospital wards for the remainder of the time. The majority of EENs eventually move on to attend university and become registered nurses, although a substantial number remain as EENs in public and private hospitals, and nursing homes. Trainee enrolled nurses (TENs) become employees of the hospital for the twelve-month training period, meaning that, as well as gaining practical experience on the wards, they are paid for hours worked. This attracts a substantial number of applicants, who may wish to pursue nursing as a career, but are unable to afford to become full-time university students. As of 2009, however, the government has stopped working with the NSW Department of Health, and those wishing to become enrolled nurses are not being paid. The enrolled nurse programme also allows people to ascertain whether or not they are suited to nursing before they make the decision to study it at university level.

The role of enrolled nurses in Australia has greatly increased in recent years in response to the continuing shortage of registered nurses in the Australian public health care system. In 2004, a medication endorsement certificate was introduced, allowing ENs to administer some oral medication (excluding schedule 8 drugs of addiction) upon completion. Although medication endorsement is now included in the diploma. Endorsement also permits the administration of some intravenous (IV) medications and fluids (intravenous therapy or IVT), as well as intramuscular (IM) and subcutaneous (SC) injections. Endorsed enrolled nurses (EENs) are also permitted to check & give S4D and S8 medications with a registered nurse. Most enrolled nurses working in public hospitals are permitted to conduct ECGs, collect pathology specimens, and routinely take a patient load under the direct supervision of a registered nurse.

Despite the fact that the role of the EN in Australia has been greatly expanded in recent years, opportunities for career progression remain somewhat limited, and for this reason, many choose to go on and study to become registered nurses. In terms of financial remuneration, the earning capacity of an enrolled nurse is capped at five years of service, whereas registered nurses continue to eight years before salary capping is applied.

Registered nurse

A **registered nurse** (**RN**) is a nurse who has graduated from a nursing program and met the requirements outlined by a country, state, province or similar government-authorized licensing body to obtain a nursing license. An RN's scope of

practice is determined by legislation, and is regulated by a professional body or council.

Registered nurses are employed in a wide variety of professional settings, and often specialize in a field of practice. They may be responsible for supervising care delivered by other healthcare workers, including student nurses, licensed practical nurses (except in Canada), unlicensed assistive personnel, and less-experienced RNs.

Registered nurses must usually meet a minimum practice hours requirement and undertake continuing education to maintain their license. Furthermore, there is often a requirement that an RN remain free from serious criminal convictions.

History

The registration of nurses by nursing councils or boards began in the early twentieth century. New Zealand registered the first nurse in 1901 with the establishment of the Nurses Registration Act. Nurses were required to complete three years of training and pass a state-administered examination. Registration ensured a degree of consistency in the education of new nurses, and the title was usually protected by law. After 1905 in California, for example, it became a misdemeanour to claim to be an RN without a certificate of registration. Now typical requirements for an RN licence in the United States include earning either an associate degree (community college) or a baccalaureate degree (college or university) in nursing and passing an examination.

Registration acts allowed authorities a degree of control over who was admitted to the profession. Requirements varied by location, but often included a stipulation that the applicant must be "of good moral character" and must not have mental or physical conditions that rendered them unable to practice.

Before the 1870s, most people were cared for at home by family members. The view on nursing began to change as more medical advances were made during the end of the 19th century and leading into the beginning of the 20th century.

As nursing became more of an international profession, with RNs traveling to find work or improved working conditions and wages, some countries began implementing standardized language tests (notably the International English Language Testing System).

Benefits of nursing

When obtaining a nursing degree there are personal benefits that come with it. One personal benefit is that nursing is a highly respected position. Another personal advantage is the availability of jobs; nurses are in high demand. Nursing also provides many different possibilities of employment, because with a nursing degree, there are many positions that fall under this category. Being able to explore multiple options gives someone the chance to find the most suitable job for themselves.

Patients benefit from having a sufficient number of nurses to meet the clinic's or hospital's needs. As the number of nurses increases, the quality of life for the patients increases as well.

By nation

Australia

Nursing registration in Australia has been at a national level since 2010, since the inception of the Nursing and Midwifery Board of Australia (NMBA), which forms part of the Australian Health Practitioners Regulation Agency (AHPRA). Prior to 2010, Nursing registration in Australia was administered individually by each state and territory.

The title 'Registered Nurse' (also known in the state of Victoria as a 'Division 1 Nurse') is granted to a nurse who has successfully completed a board-approved course in the field of nursing, as outlined by education and registration standards defined by the NMBA. Registered Nurses are also required to meet certain other standards to fulfil registration standards as outlined by the NMBA, and these can include continuing professional development, recency of practice, criminal history checks and competency in the English language. A nurse who is registered with the NMBA, and as such AHPRA, is free to practice in any state or territory in Australia, providing they meet the governing boards requirements and the indvidual state/territory legislative requirements, such as working with children checks and individual police checks for that state or territory.

Educational requirements for an entry-level Registered Nurse are at the level of bachelor's degree in Australia, and can range in two to four years in length with three years being the national average. Some universities offer a two-year 'fast track'

bachelor's degree, whereby a students study three years worth of coursework compressed in a two-year period. This is made possible by reducing summer and winter semester breaks and utilising three semesters per year compared to two. Some universities also offer combined degrees which allow the graduate to exit the program with a Masters in Nursing, e.g.: Bachelor of Science/Master of Nursing, and these are generally offered over a four-year period.

Postgraduate nursing education is widespread in Australia and is encouraged by employing bodies such as state health services (e.g. New South Wales Health). There are many varying courses and scholarships available which provide a bachelor-level Registered Nurse the opportunity to 'up-skill' and assume an extended scope of practice. Such courses are offered at all levels of the post graduate spectrum and range from graduate certificate to master's degree and provide a theoretical framework for a bachelor level Registered nurse to take up an advanced practice position such as Clinical Nurse Specialist (CNS), Clinical Nurse Consultant (CNC) and Nurse Practitioner (NP).

Rural and Remote nursing is an important sub-speeciality within Australia and Registered Nurses with advanced practice skills and of which have undertaken further training, such as Pharmacotherapeutics for Remote Area Nurses (RAN's), ImmunisationCerticate, Remote Emergency Care / Remote Pre Hospital Trauma Certification and Midwifery Emergency Care Coures, permit a generalist Registered Nurse to undertake a advanced scope of practice to operate autonomously within certain clincial situations under the guidance of a 'standard treatment manual' such as the Central Australian Remote

Practitioners Association (CARPA) manuals as opposed to the direct order of a medical practioner whilst practising in an remote/isolated setting. A Registered Nurse at this level would be professionally referrered to as a 'Remote Area Nurse' or 'Clinical Nurse Specialist - Speciality'.

Canada

In all Canadian provinces except Quebec, newly registered nurses are required to have a Bachelor of Science in Nursing. This is either achieved through a four-year university (or collaborative) program or through a bridging program for registered practical nurses or licensed practical nurses. Some universities also offer compressed programs for applicants already holding a bachelor's degree in another field.

Prior to 2015, initial licensure as an RN required passing the Canadian Registered Nurse Examination (CRNE) offered by the Canadian Nurses Association. As of 2015, for initial licensure, Canadian RNs must pass the NCLEX-RN exam offered by the National Council of State Boards of Nursing. In Quebec, the 'Ordre des infirmièresetinfirmiers du Québec' (Quebec Order of Nurses) administers their own licensing exam for registration within the province.

In British Columbia, due to cuts to education funding made by the BC Liberal government, funding for foreign students in the clinical parts of nursing programs was eliminated, and as a consequence, all public institutions no longer admitted foreign students to their undergraduate nursing programs.

Denmark

In Denmark, nurses are certified by the Danish Ministry of Health. It is also the ministry that keeps track of violations and can retract individual authorization.

Hong Kong

In Hong Kong, applicants must complete a pre-registration nursing program lasting not less than 3 years to enroll as registered nurses. Applicants trained outside Hong Kong must have a practicing certificate recognized by the Nursing Council of Hong Kong and pass the Licensing Examination for Registration.

India

In the Republic of India nursing is regulated by the Indian Nursing Council.

Malaysia

In Malaysia, nursing is regulated by the Ministry of Health Malaysia Nursing Division.

United States

In the US, a registered nurse is a professional clinician who has completed at least an associate degree in nursing or a hospital-based diploma program, followed by successfully completing the NCLEX-RN examination for initial licensure. Other requirements vary by state. More information about the

NCLEX-RN examination and specific state nursing boards is provided by the National Council of State Boards of Nursing.

Although associate degree programs are often two years, Associate of Science in Nursing (ASN) degrees frequently take three years to complete because of the increased volume of undergraduate coursework related to the profession of nursing, sometimes as part of the program itself and sometimes as prerequisites for admission. Bachelor of Science in Nursing (BSN) degrees include more thorough coursework in leadership and community health, as well as more clinical hours, and can be completed as an extension of an Associate program or standalone. Accelerated versions of both exist, and are considered particularly challenging due to the increased course-load necessary to complete the program in a short time. Some employers, especially hospitals, may require a bachelor's degree even for entry-level positions, however it is also increasingly common for hospitals to hire ASN-licensed individuals for limited practice, under the condition that the individual complete a BSN within a designated time-frame, typically 2–3 years.

Specialty certification is available through organizations such as the American Nurses Credentialing Center, a subsidiary of the American Nurses Association. After meeting the eligibility requirements and passing the appropriate specialty certification exam, the designation of Registered Nurse – Board Certified (RN-BC) credential is granted.

Registered Nurses can work in a variety of settings including hospitals, physicians' offices, nursing homes, and home health care services. The median pay for a registered nurse in 2016,

according to the Bureau of Labor Statistics, was $68,450.00 per year with a bachelor's degree. In some states, the law allows nurses with higher-level degrees, such as Masters of Science in Nursing (MSN) or Doctor of Nursing Practice (DNP) to work with increased autonomy, permitting them to practice limited medicine including sometimes even the prescription of medication without the official supervision of a licensed physician (MD or DO). However, a number of advanced nursing degree programs are sufficiently specialized for work within a hospital setting (for example, Nurse Anesthetist) that it is uncommon for such nurses to run their own medical practice.

Nurses in the United States follow the Nurse Practice Act (NPA) which are laws that protect the public's health and welfare by outlining the safe practices of nursing. All states and territories in the U.S. have a nurse practice act. The rules and regulations may vary from state to state. It is important to know the current laws governing nursing practices in their state.

Typical requirements to get into a nursing school: High School diploma, required GPA for school of choice, admissions application, personal essay, personal interview, teacher recommendations, volunteer experience (preferably in healthcare), application fee, test of English as a Foreign Language (TOEFL) if applicable, minimum SAT scores or TEAS.

Economics

As of 2011, there are 2.24 million registered nurses in China. In 2014, the United States had approximately 2,751,000 registered nurses and Canada had just over 250,000. In the US

and Canada this works out to approximately eight nurses per 1,000 people. According to the Bureau of Labor Statistics, registered nursing jobs are projected to grow by 15% between 2016 and 2026, which is much faster than the average overall rate. The growth rate in the United States is due to a number of reasons, including an increased interest in preventative care, an increase in chronic illnesses, and the demands of services required by the baby boom generation. The highest-paid registered nurses in the United States are in California. California cities often comprise the top five highest-paying metropolitan areas for registered nurses in the country. Most registered nurses start working with competitive salaries. The median annual salary for registered nurses was $80,000 per year as of June 2020, according to the Bureau of Labor Statistics (BLS.) The lowest 10 percent of RN's earned less than $70,000, and the highest 10 percent earned more than $101,360 for 2015.

Graduate nurse

The **Graduate Nurse (GN)** is a nurse who has completed his or her academic studies but not completed the requirements to become a Registered Nurse (RN). Depending on the country, state, province or similar licensing body, the graduate nurse may be granted provisional nursing licensure. A Graduate nurse has not yet passed the National Council Licensure Examination (NCLEX-RN) to become a Registered Nurse (RN).

In the US, the Graduate nurse can practice nursing under a Registered nurse. To practice as a Graduate nurse, he or she must have been authorized by the examination provider to sit for the licensed examination and have been provided

documentation for their eligibility to take the examination. Those who have been recognized and approved by the State board of Nursing may use the "G.N." status as part of their identification. In Canada and Texas, a student who has successfully completed his or her nursing education can obtain a distinct licensure as a Graduate Nurse (GN). This designation remains until the GN successfully passes the RN examinination.

Chapter 2

APNs by Role

Clinical nurse specialist

A **clinical nurse specialist** (**CNS**) is an advanced practice nurse who can provide advice related to specific conditions or treatment pathways. According to the International Council of Nurses (ICN), an Advanced Practice Nurse is a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. Clinical Nurse Specialists are registered nurses, who have graduate level nursing preparation at the master's or doctoral level as a CNS. They are clinical experts in evidence-based nursing practice within a specialty area, treating and managing the health concerns of patients and populations. The CNS specialty may be focused on individuals, populations, settings, type of care, type of problem, or diagnostic systems subspecialty. CNSs practice autonomously and integrate knowledge of disease and medical treatments into the assessment, diagnosis, and treatment of patients' illnesses. These nurses design, implement, and evaluate both patient–specific and population-based programs of care. CNSs provide leadership in the advanced practice of nursing to achieve quality and cost-effective patient outcomes as well as provide leadership of multidisciplinary groups in designing and implementing innovative alternative solutions that address system problems and/or patient care issues. In many

jurisdictions, CNSs, as direct care providers, perform comprehensive health assessments, develop differential diagnoses, and may have prescriptive authority. Prescriptive authority allows them to provide pharmacologic and nonpharmacologic treatments and order diagnostic and laboratory tests in addressing and managing specialty health problems of patients and populations. CNSs serve as patient advocates, consultants, and researchers in various settings [American Nurses Association (ANA) Scope and Standards of Practice (2004), p. 15].

United States

In the United States a CNS is an advanced practice registered nurse (APRN), with graduate preparation (earned master's or doctorate) from a program that prepares CNSs. The National Association of Clinical Nurse Specialists (NACNS) announced in July 2015 its endorsement of proposals for the Doctor of Nursing Practice (DNP) as the required degree for CNS entry into practice by 2030. According to the Consensus Model for APRN Regulation (2008), "The CNS has a unique APRN role to integrate care across the continuum and through three spheres of influence: patient, nurse, 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 (p. 8) 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 risk behaviors among individuals, families, groups, and communities." (p. 9). CNSs are clinical experts in a specialized area of nursing practice and in the delivery of evidence-based nursing interventions.

A systematic review published in 2011 identified 11 studies from the US (four RCTs and seven observational) that had looked at the possible effect of having CNS as part of the healthcare team. The reviewers found some evidence of reduced length of stay and costs of care for teams which included a CNS.

Overview

CNSs work with other nurses to advance their nursing practices, improve outcomes, and provide clinical expertise to effect system-wide changes to improve programs of care. CNSs work in specialties that are defined by one of the following categories:

- Population (e.g. pediatrics, geriatrics, women's health)
- Setting (e.g. critical care, emergency department, long-term care)
- Disease or medical subspecialty (e.g. diabetes, oncology, palliative)
- Type of care (e.g. psychiatric, rehabilitation)
- Type of problem (e.g. pain, wounds, palliative)

Spheres of influence

There are three domains of CNS practice, known as the *three spheres of influence* (Mayo, et al,2017; NACNS 2004):

- Patient
- Nursing personnel
- System (healthcare 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.

Core competencies

Within the three spheres of CNS practice, Sparacino (2005) identified seven core competencies:

- Direct clinical practice includes expertise in advanced assessment, implementing nursing care, and evaluating outcomes.
- Expert coaching and guidance encompasses modeling clinical expertise while helping nurses integrate new evidence into practice. It also means providing education or teaching skills to patients and family.
- Collaboration focuses on multidisciplinary team building.
- Consultation involves reviewing alternative approaches and implementing planned change.
- Research involves interpreting and using research, evaluating practice, and collaborating in research.

- Clinical and professional leadership involves responsibility for innovation and change in the patient care system.
- Ethical decision-making involves influence in negotiating moral dilemmas, allocating resources, directing patient care and access to care.

Although these core competencies have been described in the literature they are not validated through a review process that is objective and decisive. They are the opinion of some within the profession. A set of core competencies has now been described and validated through a consensus process (2008) that clearly defines the spheres of influence, the synergy model and the competencies as defined by Sparacino (2005). These core competencies are now expected to be used in all educational programs and will be revised in the coming years in order to be maintained as current and reflective of practice. The 2010 Adult-Gerontology Clinical Nurse Specialist Core Competencies revision reflect the work of a national Expert Panel, representing the array of both adult and gerontology clinical nurse specialist education and practice. In collaboration with colleagues from the Hartford Geriatric Nursing Institute at New York University and the National Association of Clinical Nurse Specialists (NACNS), the American Association of Colleges of Nursing (AACN) facilitated the process to develop these consensus-based competencies, including the work of the national Expert Panel and the external validation process. Pivotal to the full practice authority of CNSs in the United States as intended by the APRN Consensus Model implementation is the inclusion in the core competencies of the Clinical Nurse Specialists the crucial role of prescribing medications and durable medical

equipment. The authoritative 2010 CNS core competencies document states that the clinical nurse specialist prescribes nursing therapeutics, pharmacologic and non-pharmacologic interventions, diagnostic measures, equipment, procedures, and treatments to meet the needs of patients, families and groups, in accordance with professional preparation, institutional privileges, state and federal laws and practice acts.

International perspectives

Historically, in North America, the CNS role developed within the acute care (hospital) setting. Currently, in addition to the traditional acute care setting, CNSs practice in a variety of non-acute care settings.

In the Australian health system, however, a **clinical nurse specialist** refers to a promotional position, rather than a qualification.

Nurse anesthetist

A **nurse anesthetist** (also **CRNA** or **nurse anesthesiologist**) is an advanced practice nurse who administers anesthesia for surgery or other medical procedures. They are involved in the administration of anesthesia in a majority of countries, with varying levels of autonomy.

A survey published in 1996 reported that there were 107 countries where nurses administer anesthesia in some form, and a further nine countries where nurses act as assistants in

the administration of anesthesia. Depending on the local system of healthcare, they participate only during the operation itself, or may also be involved before and after (for preanesthetic assessment and immediate postoperative management). In some localities, nurse anesthetists provide anesthesia to patients independently; in others they do so under the supervision of anesthesiologists.

The International Federation of Nurse Anesthetists was established in 1989 as a forum for developing standards of education, practice, and a code of ethics. Delegates from 35 member countries participate in a World Congress every few years.

In the United States

In the United States, nurse anesthetists are called Certified Registered Nurse Anesthetists (CRNAs) or nurse anesthesiologists. CRNAs account for approximately half of the anesthesia providers in the United States and are the main providers of anesthesia in rural America. Historically, nurse anesthetists in the United States have been providing anesthesia care to patients since the American Civil War and the CRNA credential came into existence in 1956. CRNA schools issue a master's or doctorate degree to nurses who have completed a program in anesthesia, which ranges from 2-3 years in length. By 2025 the Council on Accreditation, the organization which accredits Nurse Anesthesiology programs requires all graduating CRNA to be doctorate prepared.

Scope of practice limitations and practitioner oversight requirements vary between healthcare facility and state, with

20 states and Guam granting complete autonomy as of 2021. In states that have opted out of supervision, the Joint Commission and CMS recognize CRNAs as licensed independent practitioners. In states requiring supervision, CRNAs have liability separate from supervising practitioners and are able to administer anesthesia independently of anesthesiologists.

Over 92% of CRNAs in the US are represented by the professional association The American Association of Nurse Anesthesiology (AANA). The AANA recommends that CRNAs use the titles "nurse anesthesiologist" and "Certified Registered Nurse Anesthesiologist" as synonyms for "nurse anesthetist" and CRNA.. Groups representing anesthesiologists and other medical doctors, such as the American Medical Association and American Society of Anesthesiologists, oppose the use of this phrase to describe CRNAs and call it misleading.

Nurse practitioner

A **nurse practitioner** (**NP**) is an advanced practice registered nurse and a type of mid-level practitioner. NPs are trained to assess patient needs, order and interpret diagnostic and laboratory tests, diagnose disease, formulate and prescribe treatment plans. NP training covers basic disease prevention, coordination of care, and health promotion, but does not provide the depth of expertise needed to recognize more complex conditions.

The scope of practice for a NP is defined by legal jurisdiction. In some places, NPs are required to work under the supervision

of a physician, and in other places they can practice independently.

History

United States

The present day concept of advanced practice nursing as a primary care provider was created in the mid-1960s, spurred on by a national shortage of physicians. The first formal graduate certificate program for NPs was created by Henry Silver, a physician, and Loretta Ford, a nurse, in 1965. In 1971, The U.S. Secretary of Health, Education and Welfare, Elliot Richardson, made a formal recommendation in expanding the scope of nursing practice to be able to serve as primary care providers. In 2012, discussions have risen between accreditation agencies, national certifying bodies, and state boards of nursing about the possibility of making the Doctorate of Nursing Practice (DNP) as the new minimum standard of education for NP certification and licensure by 2015.

Canada

Advanced practice nursing first appeared in the 1990s in Ontario. These nurses practiced in neonatal intensive care units within tertiary care hospitals in collaboration with pediatricians and neonatologists. Although the role of these nurses initially resembled a blended version of clinical nurse specialists and NPs, today the distinction has been more formally established.

Nurse Practitioners in the United States

Education requirements

Becoming an nurse practitioner requires as little as 1.5 years of post-baccalaureate training. During their studies, nurse practitioners are required to receive at least 500 hours of clinical training.

Although nurse practitioners are required to be licensed as registered nurses prior to obtaining their advanced practice registered nurse certification, there are several programs that combine a nursing undergraduate degree with nurse practitioner training. Other nurse practitioner programs have 100% acceptance rates. Therefore, experience as a registered nurse is not required to become a nurse practitioner.

Controversies and criticism

The amount and quality of education required to be a nurse practitioner has been the subject of controversy in the United States. Medical professionals concerned about patient safety have argued that nurse practitioner education can consist of online coursework with few hours of actual patient contact. Nearly one in 10 nursing master's programs with at least 10 applicants in the fall of 2019 admitted all applicants, according to a *U.S. News and World Report* article.

The quality of education and of applicants for nurse practitioner schools has been cited as a reason to not allow

nurse practitioners to practice medicine autonomously. The minimum requirement set by the accrediting organizations is 500 clinical hours for nurse practitioner programs, whereas physicians are required to complete around 6,000 clinical hours in school and then an additional minimum three years of residency that equate to over 10,000 additional clinical hours.

A student filed a complaint against D'Youville College in 2019 with the New York State Department of Education, the Federal Department of Education Office of Civil Rights and D'Youville's accrediting agency, the Commission on Collegiate Nursing Education, regarding substandard academic and clinical training. Another student, Cristina Naslund, also recounted the quality of education at Maryville University as she was surprised to receive PowerPoints slides as lecture material to read instead of live or pre-recorded lectures by professors. "All of the classes are just a joke," she said.

Training pathways

There are many types of nurse practitioner programs in the United States with the vast majority being in the specialty of a Family Nurse Practitioner (FNP). There are also Psychiatric, Adult Geriatric Acute Care, Adult Geriatric Primary Care, Pediatric, and Neonatal nurse practitioner programs. Many of these programs have their pre-clinical or didactic courses taught online with proctored examinations. Once the students start their clinical courses they have online material, but are required to perform clinical hours at an approved facility under the guidance of an NP or Physician. Each clinical course has specific requirements that vary on their program's degree/eligibility for certification. For instance FNPs are

required to see patients across the lifespan whereas Adult Geriatric NPs do not see anyone below the Age of 13.

Quality of care

A review of studies comparing outcomes of care by NPs and physicians in primary care and urgent care settings were generally comparable, although the strength of the evidence was generally low, with virtually all of the studies sponsored by nursing organizations. A recent study showed nurse practitioners practicing in states with independent prescription authority were > 20 times more likely to overprescribe opioids than nurse practitioners in prescription-restricted states. Nurse practitioners and physician assistants were also associated with more unnecessary imaging services than primary care physicians, which may have ramifications on care and overall costs.

One systematic review suggests "that the implementation of advanced practice nursing roles in the emergency and critical care settings improves patient outcomes in emergency and critical care settings".

Scope of practice

Australia

In Australia, a Nurse Practitioner-endorsed Registered Nurse has an expanded scope of practice, allowing them to practice certain advanced clinical skills within their endorsed field. As a nurse practitioner, they can: complete an advanced health assessments, diagnose and treat diseases, order diagnostic

testing such as imaging and pathology, and prescribe medications and therapeutics. Nurse Practitioners can, unlike non-endorsed Registered Nurses, access Medicare (universal healthcare system) payments for the services they provide to patients. A Nurse Practitioner is not responsible for delegating care tasks to Registered Nurses in the same way a Registered Nurse delegates some care tasks to Enrolled Nurses.

Canada

In Canada, an NP is a registered nurse (RN) with a graduate degree in nursing. Canada recognizes them in primary care and acute care practice. NPs diagnose illnesses and medical conditions, prescribe Schedule 1 medications, order and interpret diagnostic tests, and perform procedures, within their scope of practice, and may build their own panel of patients at the same level as physicians. Primary care NPs work in places like primary care and community healthcare centers, as well as long-term care institutions.

The main focus of primary care NPs includes health promotion, preventative care, diagnosis and treatment of acute and chronic diseases and conditions. Acute care NPs serve a specific population of patients. They generally work in in-patient facilities that include neonatology, nephrology, and cardiology units. There are currently three specialties for Nurse Practitioners in Canada: Family Practice, Pediatrics, and Adult Care. NPs who specialize in Family Practice work at the same level and offer the same services as Family Physicians with the exclusion of Quebec, where only Physicians are allowed to formulate a medical diagnosis.

Ireland

The Health Service Executive has the advanced nurse practitioner (ANP) grade. ANPs may prescribe medications.

United Kingdom

In the United Kingdom nurse practitioners carry out care at an advanced practice level. They commonly work in primary care (e.g. GP surgeries) or A&E departments, although they are increasingly being seen in other areas of practice.

United States

Because the profession is state-regulated, the scope of practice varies by state. Some states allow NPs to have full practice authority, however, in other states, a written collaborative or supervisory agreement with a physician is legally required for practice. Autonomous practice was introduced in the 1980s, mostly in states facing a physician shortage or that struggled to find enough healthcare providers to work in rural areas. The extent of this collaborative agreement, and the role, duties, responsibilities, nursing treatments, and pharmacologic recommendations again varies widely between states. NPs can legally examine patients, diagnose illness, prescribe some medications, and provide treatments. In 2017, twenty-two states gave full practice authority to NPs and do not require the supervision of a physician. Thirty-eight states require NPs to have a written agreement with a physician in order to provide care. Twelve of those states require NPs to be supervised or delegated by a physician, this physician may not be on site.

Licensing and board certification

Australia

In Australia, nursing registration including endorsement of a RN as a Nurse Practitioner is overseen by the Nursing and Midwifery Board of Australia (NMBA) and the Australian Health Practitioner Regulation Agency (Ahpra). Registered Nurses working in rural and isolated communities can apply for scheduled medicine prescriber endorsement if clinically necessary and trained, and instead become a prescribing Registered Nurse rather than a Nurse Practitioner to better meet the need of less-resourced communities. Nurse Practitioners are professionally represented by the Australian College of Nurse Practitioners, as well as the Australian College of Nursing. Endorsement as a Nurse Practitioner in either Australia or New Zealand is recognised by both countries as part of the Trans-Tasman Mutual Recognition Scheme.

For a RN to apply to the NMBA for Nurse Practitioner endorsement, they must be able to demonstrate they have completed at least 5000 hours (three years, full-time equivalent) at an "advanced nursing practice" level. Advanced nursing practice is loosely defined, and not a specific role, but rather a recognised process of higher-level clinical practice within a nurse's existing scope of practice. The RN must also complete an approved Nurse Practitioner postgraduate master's degree, or demonstrate they have gained qualifications to an equivalent level in advanced health assessment, pharmacology, therapeutics, diagnostics, and research. Nurses applying

through the latter pathway must also demonstrate the equivalent training is clinically relevant to the field for which they wish to apply for Nurse Practitioner endorsement in.

Canada

In Canada, the educational standard is a graduate degree in nursing. The Canadian Nursing Association (CNA) notes that advanced practice nurses must have a combination of a graduate level education and the clinical experience that prepare them to practice at an advanced level. Their education alone does not give them the ability to practice at an advanced level. Two national frameworks have been developed in order to provide further guidance for the development of educational courses and requirements, research concepts, and government position statements regarding advanced practice nursing: the CNA's *Advanced Nursing Practice: A National Framework* and the *Canadian Nurse Practitioner Core Competency Framework.* All educational programs for NPs must achieve formal approval by provincial and territorial regulating nurse agencies due to the fact that the NP is considered a legislated role in Canada. As such, it is common to see differences among approved educational programs between territories and provinces. Specifically, inconsistencies can be found in core graduate courses, clinical experiences, and length of programs. Canada does not have a national curriculum or consistent standards regarding advanced practice nurses. All advanced practice nurses must meet individual requirements set by their provincial or territorial regulatory nursing body.

Israel

As of November 2013, NPs were recognized legally in Israel.

United States

The path to becoming an NP in the U.S. begins by earning an undergraduate degree in nursing and requires licensure and experience as an RN. One must then complete graduate or doctoral studies with additional medical training before taking national board certification testing in their specialty field.

Salary

The salary of an NP generally depends on the area of specialization, location, years of experience, and level of education. In 2015, the American Association of Nurse Practitioners (AANP) conducted its 4th annual NP salary survey. The results revealed the salary range to be between $98,760 to $108,643 reported income among full-time NPs. According to the U.S. Bureau of Labor Statistics, NPs in the top 10% earned an average salary of $135,800. The median salary was $98,190. According to a report published by Merritt Hawkins, starting salaries for NPs increased in dramatic fashion between 2015 and 2016. The highest average starting salary reached $197,000 in 2016. The primary factor in the dramatic increase in starting salaries is skyrocketing demand for NPs, recognizing them as the 5th most highly sought after advanced health professional in 2016.

Chapter 3

NPs by Population

Family nurse practitioner

A **family nurse practitioner** (FNP) provides continuing and comprehensive healthcare for the individual and family across all ages, genders, diseases, and body systems. Primary care emphasizes the holistic nature of health and it is based on knowledge of the patient in the context of the family and the community, emphasizing disease prevention and health promotion.

This history of this role began in the 1960s when health care planners and legislators determined that primary health care was not meeting the immediate demands of the United States' citizens. Medical schools were given money to start family practice programs to meet this need, and the practice movement began to grow.

Education and board certification

Following educational preparation at the master's or doctoral level, FNPs must become board certified by an approved certification body. Board certification must be maintained by obtaining continuing nursing education credits. In the US, board certification is provided either through the American Nurses Credentialing Center (awards the FNP-BC credential) or through the American Association of Nurse Practitioners certification program (awards the NP-C credential).

Becoming a family nurse practitioner

Before becoming a family nurse practitioner, a person must graduate from a four-year college or university nursing program that is accredited by American Associated of Colleges of Nursing (AACN) or the National League for Nursing (NLN). This would result in a Bachelor of Science in Nursing from the college or university. Next, a person would need to pass the RN licensing exam, which is the NCLEX (National Council Licensure Examination). After passing this exam, the person is a Registered Nurse and is able to enter the work force. Most nurses work for a few years in the field before pursuing further education. After completion of this prior work, a person can apply to and obtain a Master's or Doctoral degree from a family nurse practitioner program. The program should be accredited by the Commission of Collegiate Nursing Education (CCNE) or the Accreditation Commission for Education in Nursing (ACEN). A family nurse practitioner may also select a sub-specialty. The following are some possibilities: Medical-Surgical, Cardiac, Endocrine/Diabetes, Renal/Urology, Perinatal, Long-Term Care, Orthopedics, Rehabilitation, Pulmonary, Pediatrics, Gerontology, ER/Trauma, Post-Partum, Psychiatric, and Critical Care.

Scope of practice

FNPs deliver a range of acute, chronic and preventive healthcare services. In addition to diagnosing and treating illness, they also provide preventive care, including routine

checkups, health-risk assessments, immunization and screening tests, and personalized counseling on maintaining a healthy lifestyle. FNPs also manage chronic illness, often coordinating care provided by specialty physicians.

Adult-gerontology nurse practitioner

An **adult-gerontology nurse practitioner** (AGNP) is a nurse practitioner that specializes in continuing and comprehensive healthcare for adults across the lifespan from adolescence to old age.

Education and board certification

Following educational preparation at the master's or doctoral level, AGNPs must become board certified by an approved certification body. Board certification must be maintained by obtaining nursing continuing education credits.

To align with the Consensus Model for APRN Regulation developed by the National Council of State Boards of Nursing, certification exams and credentials are in transition. Prior to the consensus statement, adult health nurse practitioners (NPs) and gerontological NPs were educated and certified separately. The consensus model combined these into a single population focus. The specialty is further divided into primary care and acute care. In the US, board certification is provided through the American Association of Critical-Care Nurses (awards the ACNPC-AG credential for acute care), or the American Nurses Credentialing Center (awards the AGACNP-BC credential for acute care and the AGPCNP-BC credential for

primary care), through the American Association of Nurse Practitioners certification program (awards the NP-C credential for primary care.

Scope of practice

AGNPs deliver a range of acute, chronic and preventive healthcare services. In addition to diagnosing and treating illness, they also provide preventive care, including routine checkups, health-risk assessments, immunization and screening tests, and personalized counseling on maintaining a healthy lifestyle. AGNPs also manage chronic illness, often coordinating care provided by specialty physicians. AGNPs that work in acute care settings often care for hospitalized patients in collaboration with physicians and other providers. AGNPs can be found practicing in a variety of medical facilities including hospices, long-term care facilities, hospitals, home-based care, correctional institutes and primary practices. The scope of practice varies from state to state because nurse practice laws and regulations are specific to the state the nurse practitioner practices in.

Pediatric nurse practitioner

A **pediatric nurse practitioner** (PNP) is a nurse practitioner that specializes in care to newborns, infants, toddlers, pre-schoolers, school-aged children, adolescents, and young adults. The pediatric nurse practitioner is a specialist in the care of children from birth through young adult with an in-depth knowledge and experience in pediatric primary health care including well child care and prevention/management of

common pediatric acute illnesses and chronic conditions. This care is provided to support optimal health of children within the context of their family, community, and environmental setting.

Education and board certification

Following educational preparation at the master's or doctoral level, PNPs must become board certified by an approved certification body. Board certification must be maintained by obtaining continuing nursing education credits. In the US, board certification is provided through either the American Nurses Credentialing Center (awards the PPCNP-BC credential), or through the Pediatric Nursing Certification Board (awards the CPNP-AC and the CPNP-PC credentials).

Scope of practice

PNPs deliver a range of acute, chronic, and preventive healthcare services. To align with the Consensus Model for APRN Regulation developed by the National Council of State Boards of Nursing, PNPs are typically classified by whether they practice in an acute care or primary care setting.

Women's health nurse practitioner

A **women's health nurse practitioner** (**WHNP**) is a nurse practitioner that specializes in continuing and comprehensive healthcare for women across the lifespan with emphasis on

conditions unique to women from menarche through the remainder of their life cycle.

Education and board certification

Following educational preparation at the master's or doctoral level, WHNPs must become board certified by an approved certification body. Board certification must be maintained by obtaining continuing nursing education credits. In the US, board certification is provided through the National Certification Corporation (awards the WHNP-BC credential).

Scope of practice

WHNPs deliver a range of acute, chronic, and preventive healthcare services:

- Obtaining a relevant health history, including a comprehensive obstetric and gynecologic history, with emphasis on gender-based differences.
- Performing a complete, system, or symptom-directed physical examinations on women, including obstetric and gynecologic conditions/needs that include, pregnancy, benign and malignant gynecologic conditions, contraception, sexually transmitted infections, infertility, perimenopause/ menopause/ postmenopause and other gender-specific illnesses.
- Assessing, diagnosing, and treating for maternal and fetal well-being, high-risk pregnancies, depression, and pregnancy/postpartum complications.

- Assessing, diagnosing, and treating disease risk factors specific to women.
- Distinguishing female gender differences in presentation and progression of health problems and responses to pharmacological agents and other therapies.
- Assessing social and physical environmental health risks, including teratogens, that impact childbearing.
- Assessing for evidence of intimate partner violence, sexual abuse, and substance abuse.
- Assessing, diagnosing, and treating issues related to sexuality.
- Assessing parental behavior and skills and promotes smooth transition to role changes.
- Assessing, diagnosing, and treating selected reproductive health needs or problems in male partners, such as sexually transmitted infections, contraception, and infertility.
- Assessing genetic risks and refers, as needed, for testing and counseling.
- Collaborating with other health care providers for management or referral of high-risk pregnancies.
- Performing primary care procedures, including pap smears, microscopy, post-coital tests, intrauterine device (IUD) insertion, and endometrial biopsies.
- Providing management and education for women and men in need of family planning and fertility control.

Neonatal nurse practitioner

- A **neonatal nurse practitioner** (NNP) is an advanced practice registered nurse (APRN) with at least 2 years experience as a beside registered nurse in a level III NICU, who is prepared to practice across the continuum, providing primary, acute, chronic, and critical care to neonates, infants, and toddlers through age 2. Primarily working in neonatal intensive care unit (NICU) settings, NNPs select and perform clinically indicated advanced diagnostic and therapeutic invasive procedures. In the United States, a board certified neonatal nurse practitioner (NNP-BC) is an APRN who has acquired Graduate education at the master's or doctoral level and has a board certification in neonatology. The National Association of Neonatal Nurse Practitioners (NANNP) is the national association that represents neonatal nurse practitioners in the United States. Certification is governed by the National Certification Corporation for Obstetrics, Gynecologic and Neonatal Nursing Specialties (NCC).

History

The first modern day NICU opened in 1960 at Yale-New Haven Hospital under the auspices of Louis Gluck, a pioneer in the emerging pediatric specialty, neonatology. Dr. Gluck's NICU concept demonstrated improved outcomes of sick and preterm infants and led to the emergence of NICUs across the country by the late 1960s. Most NICUs were located in large, university

settings with patient management provided by medical interns and residents supervised by a neonatologist. To meet the needs of this vulnerable population, nursing roles expanded to include tasks previously relegated to physicians, such as initiating intravenous access and phlebotomy.

In 1965, the first nurse practitioner program in the United States was developed at the University of Colorado to prepare pediatric nurse practitioners for primary care. By the 1970s, neonatal intensive care was an integrated medical service in many large teaching hospitals across the country, providing successful management of the preterm and sick newborn and reducing the neonatal mortality rate. Neonatal transport services were established to move newborns from their birth facility to the nearest NICU, enabling expansion of the NICU nursing role as nurses filled these new positions. Guidelines published by the American Nurses Association (ANA) in 1975 set the NNP program standards until NANN published *Education Standards and Guidelines for NNP Programs* in 2002. These ANA standards led to the proliferation of hospital-based, certificate programs to train nurses as NNPs.

National certification for NNPs began in 1983 by the NAACOG Certification Corporation, now the National Certification Corporation (NCC) for Obstetrics, Gynecologic and Neonatal Nursing Specialties (NCC). NANN was established in 1984, providing support to foster the neonatal advanced practice nursing movement.

In the 1990s, states began requiring national certification or master's degree as entry into practice for the NNP. In the early 2000s, nurse practitioners lobbied for prescribing privileges to

make their provider status fully operational. In 2007, NANNP, a division of the National Association of Neonatal Nurses (NANN), was founded as the only national association dedicated solely to NNPs.

Today, neonatal APRNs are recognized as professional providers, and they have become an integral part of the neonatal health team at all levels of care. According to the NCC, there are presently approximately 5,200 NNPs with national certification. Fifty-two states and jurisdictions already require advanced certification for APRNs.

Adapted from NANN's Position Statement #3059, "Advanced Practice Registered Nurse: Role, Preparation, and Scope of Practice."

Education

An NNP may have a Master's and/or Doctoral degree from an accredited nursing school with a specialty in neonatology. Most states require a national certification through the National Certification Corporation (NCC) and must participate in continuing education to maintain the certification.

Board Certification

Following educational preparation at the master's or doctoral level, most states require NNPs to be certified board certified by an approved certification body. Board certification must be maintained by obtaining continuing nursing education credits.

In the US, board certification is provided through the National Certification Corporation (awards the NNP-BC credential).

Scope of practice

The neonatal nurse practitioner provides specialized care for newborns with a wide range of acuity (level of illness) and conditions from prematurity, infections, genetic conditions, heart disease, surgical diagnoses, respiratory problems, and other disorders. NNPs primarily work in the hospital setting in well-baby nurseries, special care nurseries, neonatal intensive care units and the delivery room. Their specialized training allows them to provide individualized care to infants from the moment of delivery and from well babies to critically ill newborns . NNPs typically work in collaboration with Neonatologists and/or Pediatricians but (in most states) are licensed, independent providers who can diagnose and treat patients. NNPs have prescriptive authority and can prescribe medications as needed for the neonatal population (in most states).

Psychiatric-mental health nurse practitioner

In the United States, a **psychiatric-mental health nurse practitioner** (**PMHNP**) is an advanced practice registered nurse trained to provide a wide range of mental health services to patients and families in a variety of settings. PMHNPs diagnose, conduct therapy, and prescribe medications for patients who have psychiatric disorders, medical organic brain

disorders or substance abuse problems. They are licensed to provide emergency psychiatric services, psychosocial and physical assessment of their patients, treatment plans, and manage patient care. They may also serve as consultants or as educators for families and staff. The PMHNP has a focus on psychiatric diagnosis, including the differential diagnosis of medical disorders with psychiatric symptoms, and on medication treatment for psychiatric disorders.

A PMHNP is trained to practice autonomously. In 25 states, nurse practitioners (NPs) already diagnose and treat without supervision of a Psychiatrist. This is in contrast to 2008, when nurse practitioners could autonomously diagnose and treat in 23 states, and could only prescribe in 12 states. In other states, PMHNPs have reduced or restricted practice, requiring a collaborative agreement with a physician expert, a standard scope of practice signed by a physician, or other limits on practice or prescribing. In these states, they still practice independently to diagnose disorders, provide therapy and prescribe medications. Titles and functions vary by state, but usually *NP*, *CRNP*, "APRN," or *ARNP* are used.

Education

After completing a four-year Bachelor of Science in Nursing (BSN), a Psychiatric Mental Health Nurse Practitioner degree requires two to five additional years of training. At minimum, the candidate must complete an approved Master's of Science in Nursing (MSN) or Doctor of Nursing Practice (DNP) advanced nursing education program.

Individuals who already have a bachelor's degree in another field can attend one of many accelerated BSN programs before entering an approved MSN or DNP program. Accelerated BSN programs typically take one and a half to two years after completion of prerequisite coursework. A new training modality is the Master's entry/graduate entry to practice nursing program model, which is specifically designed for those with bachelor's degrees in non-nursing fields. Entrants to these programs typically spend one to two years completing Bachelor's level nursing classes to allow them to sit for the nursing board exam NCLEX-RN, and then go straight into an additional 2–3 years of graduate level coursework. This is followed by clinical rotations of at least 600 hours to complete a MSN degree, 1000 hours for the DNP. Students must then successfully pass a Board examination to practice as a Psychiatric Mental Health Nurse Practitioner (PMHNP). PMHNP-BC is the ANCC American Nurses Credentialing Center designated title for a board certified Advanced Practice Psychiatric Mental Health Nurse Practitioner.

The Doctorate in Nursing Practice (DNP) degree is the planned entry level degree for advanced practice registered nurses according to the ANCC. However, no state has actually initiated any laws regarding the DNP as the minimum degree. It is expected that current Master's-prepared nurses will be "grandfathered' into the new system and as long as they keep their certification current, they will not be required to pursue further education except the required continuing education.

There are many schools that offer the graduate education required for this profession. Notable schools with Psychiatric-Mental Health Nurse practitioner programs are Vanderbilt

University School of Nursing, Yale School of Nursing, Saint Louis University, University of California-San Francisco, University of Pennsylvania, and Columbia University School of Nursing. A listing of PMHNP programs by state can be found online at the American Nurses Credentialing Center (ANCC) and American Psychiatric Nurses Association (APNA).

The cost of education can vary greatly. Programs at public universities are typically less expensive for state residents than out-of-state-residents. For example, at UCSF the cost for the Masters program with in-state tuition is approximately $12,245 a year; for an out-of-state student the tuition is $24,798. In addition, programs at public universities tend to be less expensive than programs at private universities.

Chapter 4

Specialties and Areas of Practice: Part I

Ambulatory care nursing

Ambulatory care nursing is the nursing care of patients who receive treatment on an outpatient basis, ie they do not require admission to a hospital for an overnight stay. Ambulatory care includes those clinical, organizational and professional activities engaged in by registered nurses with and for individuals, groups, and populations who seek assistance with improving health and/or seek care for health-related problems. The American Academy of Ambulatory Care Nursing (AAACN) describes ambulatory care nursing as a comprehensive practice which is built on a broad knowledge base of nursing and health sciences, and applies clinical expertise rooted in the nursing process.

Ambulatory care nurses use evidence based information across a variety of outpatient health care settings to achieve and ensure patient safety and quality of care while improving patient outcomes. Contact with patients in ambulatory care is often relatively brief, and in the context of a high volume of patients. Nurses in this setting require sound assessment skills and the ability to guide patients in making informed health choices. Quality ambulatory care nursing has been associated with fewer emergency department visits, hospital visits and readmissions.

Defining characteristics

- Ambulatory nursing care requires critical reasoning and astute clinical judgment in order to expedite appropriate care and treatment, especially given that the patient may present with complex problems or potentially life threatening conditions.
- Ambulatory care registered nurses provide care across the life span to individuals, families, caregivers, groups, populations, and communities.
- Ambulatory care nursing occurs across the continuum of care in a variety of settings, which include but are not limited to hospital-based clinic/centers, solo or group medical practices, ambulatory surgery & diagnostic procedure centers, telehealth service environments, university and community hospital clinics, military and veterans administration settings, nurse-managed clinics, managed care organizations, colleges and educational institutions, free standing community facilities, care coordination organizations, and patient homes.
- Ambulatory care registered nurses interact with patients during face-to-face encounters or through a variety of telecommunication strategies, often establishing long term relationships.
- Telehealth nursing is an integral component of professional ambulatory care nursing that utilizes a variety of telecommunications' technologies during encounters to assess, triage, provide nursing

consultation, and perform follow up and surveillance of patients' status and outcomes.

- During each encounter, the ambulatory care registered nurse focuses on patient safety and the quality of nursing care by applying appropriate nursing interventions, such as identifying and clarifying patient needs, performing procedures, conducting health education, promoting patient advocacy, coordinating nursing and other health services, assisting the patient to navigate the health care system, and evaluating patient outcomes.
- Nurse/patient encounters can occur once or as a series of occurrences, are usually less than 24 hours in length at any one time, and occur singly or in-group settings.
- Ambulatory care registered nurses, acting as partners and advisers, assist and support patients and families to optimally manage their health care, respecting their culture and values, individual needs, health goals and treatment preferences.
- Ambulatory care registered nurses facilitate continuity of care using the nursing process, multidisciplinary collaboration, and coordination of appropriate health care services and community resources across the care continuum.
- Ambulatory care registered nurses are knowledgeable about and provide leadership in the clinical and managerial operations of the organization.
- Ambulatory care registered nurses design, administer, and evaluate nursing services within the organization in accord with relevant federal requirements, state laws and nurse practice acts,

regulatory standards, and institutional policies and procedures.

- Ambulatory care registered nurses provide operational accountability for and coordination of nursing services, including the appropriate skill mix and delegation of roles and responsibilities for licensed and unlicensed nursing personnel.
- Ambulatory care registered nurses apply the provisions of the American Nurses Association Code of Ethics for Nurses to their own professional obligations and for the patients entrusted to their care.
- Ambulatory care registered nurses pursue lifelong learning that updates and expands their clinical, organizational, and professional roles and responsibilities.
- Ambulatory care registered nurses in the emergency care setting are increasingly called upon to implement evidence based practices (EBP), such as filling empty E.D. beds with unregistered and not-yet-triaged patients to increase the efficiency of patient throughput, decrease the 'left without being seen' rate, and decrease the 'door to physician' time.
- Ambulatory care registered nurses roles have expanded with team-based care. Team RNs work with specific teams of providers to assist with their patients' clinical and health educational needs at office visits and as needed by phone. RN care managers focus on the sicker patients on all providers' patient panels and make regular contact with them at and in between office visits to check on

their status and assist as needed with managing their chronic illnesses.

Cardiac nursing

Cardiac nursing is a nursing specialty that works with patients who suffer from various conditions of the cardiovascular system. Cardiac nurses help treat conditions such as unstable angina, cardiomyopathy, coronary artery disease, congestive heart failure, myocardial infarction and cardiac dysrhythmia under the direction of a cardiologist.

Cardiac nurses perform postoperative care on a surgical unit, stress test evaluations, cardiac monitoring, vascular monitoring, and health assessments. Cardiac nurses must have Basic Life Support and Advanced Cardiac Life Support certification. In addition, cardiac nurses must possess specialized skills including electrocardiogram monitoring, defibrillation, and medication administration by continuous intravenous drip. Cardiac nurses work in many different environments, including coronary care units (CCU), cardiac catheterization, intensive care units (ICU), operating theatres, cardiac rehabilitation centers, clinical research, cardiac surgery wards, cardiovascular intensive care units (CVICU), and cardiac medical wards.

Certification for cardiac nurses

All cardiac nurses are registered nurses. In the past, the American Nurses Credentialing Center (ANCC) offered certification in Cardiac Rehabilitation Nursing. However, ANCC

has retired that exam, and the certification is no longer available, except to nurses who already have the certification and want to renew it. the American Nurses Credentialing Center (ANCC) did not discontinue Cardiac certification. The ANCC replaced it with the Cardiac-Vascular Nursing exam to earn Cardiac certification. Cardiac-Vascular Nursing RN-BC Certified Vascular Nurse (retired exam) RN-BC

Correctional nursing

Correctional nursing, sometimes called **forensic nursing**, is a specialized field of nursing that involves caring for the medical and mental health needs of detainees and inmates. These nurses work in a variety of settings such as jails, prisons, and juvenile detention centers. In these correctional settings, nurses are the primary healthcare providers. These nurses also work with victims and assist in expert witness testimonies and are involved in a variety of legal cases including paternity disputes and workplace injuries.

Roles

Correctional facilities vary widely in size and population. Correspondingly, there is a wide range of roles which correctional nurses fill. Some facilities are as large as small cities and include an in-house hospital with inpatient and emergency facilities. Most correctional nurses fall into four categories: Reception Screening, Chronic Care Clinicians, Medication Administration, and Ambulatory Care (often called, "sick call").

Intake Screening

Intake Screening is often called, "R&R Screening" for, "Reception and Release". Generally, all inmate new to the institution are evaluated by a nurse prior to being installed into their housing unit. This process has nurses screen inmates for a variety of immediate medical and mental health needs such as alcohol or drug withdrawal, suicide potential, trauma, infectious diseases, and necessity for chronic medications. Custodial officers uses this information in order to decide which part of the facility is appropriate for housing, sometimes initiating movement to another facility if the inmate's medical or mental health needs cannot be met at the initial placement. The nurse performing intake screening generally schedules the inmate for an appointment with a healthcare provider for a detailed history and physical depending on the inmate's needs and presence of chronic diseases.

Chronic Care Clinicians

Inmates with chronic health care concerns (asthma, diabetes, high blood pressure, etc.) generally have regularly scheduled appointments in chronic care clinics. Nurses here provide patient assessments and education about chronic health concerns. Generally, these clinics are overseen by a physician or other mid level provider such as a nurse practitioner.

Medication Administration

Medications, even over-the-counter ones, can be misused in a correctional environment. Most frequently, medications are

administered to patients via a medication pass or pill line process. At set, scheduled times during the day, inmates requiring medication either report to a nurse located centrally in a medical unit or receive their doses in their housing unit. In higher security areas, where patients are largely confined to cells and movement is more restricted, the medications are administered at cell front.

Nursing Sick Call

Inmates requiring episodic health care generally follow a process called Sick Call. Inmates request treatment, generally by completing a form (a "Sick Call Slip") and are seen by a nurse. Most facilities have standardized protocols which allow administration of over-the-counter medications for simple conditions like headache, athlete's foot, and constipation without the need for communication with an advanced medical provider such as a physician. An assessment of a more serious condition, or one that falls outside the protocols, would be referred to a medical provider for further evaluation.

Correctional Nursing & Mental Illness

According to the National Alliance of Mental Health reports in 2019 roughly 40% of all people with mental illness will be introduced to the criminal justice system (2 million). Of the inmates incarcerated in the many different types of facilities, 25% have mental illness (550,000 on any day). In 2017 State and Federal Governments paid more than $150 billion to incarcerate these individuals and their stays in the system are usually 4x longer than other patients.

Treating those patients is quite difficult. Prisons rely on security over healthcare, and expression of care from nurses is restricted due to budget limitations, patient restrictions and ethical unknowns. Making their care even more difficult is the fact that many inmates in correctional justice facilities have lost their rights and are limited in what they are allowed to receive and the measure of their care leading to a dehumanizing of patients. Another main problem of nursing mental illness in correctional facilities is the overwhelming association with these patients and the likelihood they will end up in solitary confinement which compounds their mental status greatly. Nurses training in the criminal justice system must be prepared for these problems in their daily practices.

Common Careers in Correctional Nursing

When it comes to establishing a career in correctional/forensic nursing, there are many avenues one can undertake which can include sexual assault nurse examiner, forensic nurse examiner, nurse coroner, nurse attorney or a forensic nurse examiner.

Community Health--Prison Populations

When one enters into a correctional facility, the presence of health care should not go away. The patients in prison populations are at a greater risk for health complications, especially if there are untreated, underlying chronic health conditions. Some of the most common health concerns for those in prison include communicable diseases including HIV, hepatitis and tuberculosis. These remain an issue for this population due to the prisoners engaging in high-risk

behaviors including unprotected sexual contact. For the older adult prison population (considered aged 50 years and above in this subset), common chronic health conditions reported include diabetes, hypertension, arthritis, cancer and respiratory disorders including asthma and emphysema.

For women in prison, there are more components that need to be considered to ensure their overall health. Also, with the common chronic conditions as listed above, there needs to be increased access to reproductive health services including gynecological exams. There also needs to be improved mental health processes for women in prison. For some, there have been increased reports of self-harm and suicide while in prison when compared to the male prisoner demographic. The root causes of this issue is related to being isolated, being detained in locations away from loved ones and bullying from other prisoners. To further address these needs to eliminate this, there needs to be more adequate assessment screenings of the women prisoners including acknowledging any significant history of trauma as well as the offering of social support services.

Critical care nursing

Critical care nursing is the field of nursing with a focus on the utmost care of the critically ill or unstable patients following extensive injury, surgery or life threatening diseases. Critical care nurses can be found working in a wide variety of environments and specialties, such as general intensive care units, medical intensive care units, surgical intensive care units, trauma intensive care units, coronary care units, cardiothoracic intensive care units, burns unit, paediatrics

and some trauma center emergency departments. These specialists generally take care of critically ill patients who require mechanical ventilation by way of endotracheal intubation and/or titratable vasoactive intravenous medications.

Specific jobs and personal qualities

Critical care nurses are also known as ICU nurses. They treat patients who are acutely ill and unstable requiring more frequent nursing assessments and the utilization of life sustaining technology and drugs. Although many ICU patients have chronic health issues, patients are in the ICU for an acute pathology or an exacerbation of a chronic pathology. ICU nurses apply their specialized knowledge base to care for and maintain the life support of critically ill patients who are often on the verge of death. On a day-to-day basis a critical care nurse will commonly, "perform assessments of critical conditions, give intensive and intervention, advocate for their patients, and operate/maintain life support systems which include mechanical ventilation via endotracheal, tracheal, or nasotracheal intubation, and titration of continuous vasoactive intravenous medications in order to maintain a mean arterial pressure that ensures adequate organ and tissue perfusion."

Training and education

Critical care nurses in the U.S. are trained in advanced cardiac life support (ACLS), and many earn certification in acute and critical care nursing (CCRN) through the American Association of Critical–Care Nurses. Due to the unstable nature of the

patient population, LPN/LVNs are rarely utilized in a primary care role in the intensive care unit. However, with proper training and experience LPN/LVNs can play a significant role in providing exceptional bedside care for the critically ill patient. To become a critical care nurse, one must first achieve an associate or bachelor's degree in nursing and pass the National Council Licensure Examination (NCLEX-RN). Once the exam is passed, then someone can start working as a regular registered nurse (RN). After getting hired into a critical care area, additional specialized training is usually given to the nurse. After 1750 hours of providing direct bedside care in a critical care area, a nurse can then sit for the CCRN exam. The American Association of Critical Care Nurses advisory board sets and maintains standards for critical care nurses. The certification offered by this board is known as CCRN. Depending on the hospital and State, the RN will be required to take a certain amount of continuing education hours to stay up to date with the current technologies and changing techniques.

Registration is a regulatory term for the process that occurs between the individual nurse and the state in which the nurse practices. All nurses in the US are registered as nurses without a specialty. The CCRN is an example of a post registration specialty certification in critical care. There are also variants of critical care certification test that the AACN offers to allow nurses to certify in progressive care (PCCN), cardiac medicine (CMC) and cardiac surgery (CSC). In addition, Clinical Nurse Specialists can certify in adult, neonatal and pediatric acute and critical care (CCNS). In November 2007, the AACN Certification Corporation launched the ACNPC, an advanced practice certification examination for Acute Care

Nurse Practitioners . None of these certifications confer any additional practice privileges, as nursing practice is regulated by the individual's state board of nursing. These certifications are not required to work in an intensive care unit, but are encouraged by employers, as the tests for these certifications tend to be difficult to pass and require an extensive knowledge of both pathophysiology and critical care medical and nursing practices. The certification, while difficult to obtain, is looked upon by many in the field as demonstrating expertise in the field of critical care nursing, and demonstrating the individual's nurse's desire to advance their knowledge base and skill set, thereby allowing them to better care for their patients.

Intensive care nurses are also required to be comfortable with a wide variety of technology and its uses in the critical care setting. This technology includes such equipment as hemodynamic and cardiac monitoring systems, mechanical ventilator therapy, intra-aortic balloon pumps (IABP), ventricular assist devices (LVAD and RVAD), continuous renal replacement equipment (CRRT/CVVHDF), extracorporeal membrane oxygenation circuits (ECMO) and many other advanced life support devices. The training for the use of this equipment is provided through a network of in-hospital inservices, manufacturer training, and many hours of education time with experienced operators. Annual continuing education is required by most states in the U.S. and by many employers to ensure that all skills are kept up to date. Many intensive care unit management teams will send their nurses to conferences to ensure that the staff is kept up to the current state of this rapidly changing technology.

In Australia there is no compulsory prerequisite for critical care nurses to have postgraduate qualifications. However, the Australian minimum standard recommends that critical care nurses should obtain postgraduate qualifications. Critical care nurses must have a bachelor of nursing, be registered with the Nursing and Midwifery Board of Australia, and meet the NMBA's standards in order to work as a critical care nurse in Australia.

Employment areas

Critical care nurses work in a variety of different areas, with a diverse patient population. There are many critical care nurses working in hospitals in intensive care units, post-operative care and high dependency units. They also work on medical evacuation and transport teams.

In August 2004, to demonstrate the work of critical care nurses Massachusetts General Hospital invited reporter Scott Allen and photographer Michelle McDonald from The Boston Globe to take part in an 'immersion experience' in the surgical intensive care unit (SICU). *The Globe* staffers spent eight months shadowing an experienced nurse and a trainee nurse to learn about nursing practice first hand. The result was a four-part, front-page series that ran from October 23 to 26, 2005, entitled *Critical Care: The making of an ICU nurse*.

The added psychological stress of nursing in critical care units has been well-documented, and it has been argued the stress experienced in ICU areas are unique in the profession.

Patient interaction

According to Washington, no matter their specialty, all nurses must be able to build trusting relationships with their patients. When the nurses develop strong relationships between their patients they are able to obtain important information about them that may be helpful to diagnosing them. Also, family members that become involved in this relationship make it easier for the nurses to build these trusting relationships with the patients because the family members could ease any stress that could lead the patient to be timid. When a patient has a long-term illness, the good relationships built between the nurse and patient can improve the patient's quality of life.

Subspecialities

Critical care nurses can specialize in several different areas based on either the patient's age or the illness/injury that the patient has. Geriatric patients are considered to be people over the age of 65 and nurses that specialize in geriatrics work in an adult intensive care unit (ICU). Pediatric patients are children under the age of 18, a nurse that works with very sick children would work in a pediatric intensive care unit (PICU). Finally, a child is considered a neonatal patient from the time they are born to when they leave the hospital. If a child is born with a life-threatening illness the child would be transferred to a neonatal intensive care unit (NICU).

Also, the location that the CCRN works can vary. Some places that they can work most commonly include hospitals: in

regular or specialized intensive care units. Uncommonly they can work at some patients' homes, in some flight centers and outpatient facilities.

The specialty areas of the critical care nurses can also be based on the patient's illness or injury. For example, a unit that is an adult intensive care unit, specialized in the care of trauma patients would be an adult trauma intensive care unit. The focus of the unit is generally on either an adult or a pediatric/neonatal population, as the treatment methods differ for the age ranges. Another example could include an intensive care unit solely to care for patients directly before and after a major or minor surgery.

Statistics

Depending on the location, critical care nurses in Australia work approximately 31.7 hours a week. In South Australia critical are nurses are recorded to work approximately 28.2 hours a week. While in the Northern Territory critical care nurses have been documented to work 31.7 hours a week.

Tasmania has the largest percentage of nurses working part time with 71.8%, while the Northern Territory has the lowest with 18.4%.

Salary

Critical care nurses are specialty nurses; because of this, they require more in depth and specialized training than regular RNs do. Therefore, their salaries are usually higher compared

to basic RN's because of the more intense work that they do day to day. The national average salary for a CCRN is around $69,110. However, in the top percentile salaries can reach $96,630. It all depends on the job and where they are working

Critical care nurses in Australia do not need to have extra training than regular RNs do unless they have completed a postgraduate qualification. Therefore, their salaries are usually similar. Pay levels in nursing are bases on the position/level and experience. The average salary are approximately $55,617 for level 1.1, $57,841 for level 1.2, $60,155 for level 1.3, $62,561 for level 1.4, $65,063 for level 1.5, $67,666 for level 1.6, $70,373 for level 1.7, $73,187 for level 1.8, $75,488 for level 2.1, $77,028 for level 2.2, $78,600 for level 2.3 and $80,204 for level 2.4. Australian nurses receive shift loading/penalties and superannuation (approximately 10%).

Registered Dental Nurse

In the United Kingdom, a **Registered Dental Nurse** sometimes shortened to RDN, works as part of a dental team in a variety of clinical and non-clinical settings. Some Dental Nurses work in hospitals, general dental practices and the armed forces. The national NHS 111 telephone service also employ Dental Nurse Advisors. From 30 July 2008, all qualified Dental Nurses in the UK have to be registered with the General Dental Council (GDC). "Grandparenting" arrangements were in place 2006–2008 to allow unqualified dental assistants to register on the basis of experience. They now hold the title Registered Dental Nurse on the Dental Care Professionals register of the General Dental Council.

Qualifications & Entry

Entry for Dental Nursing can be competitive; especially for the new BSc Dental Nursing degree. The most up-to-date recognised qualifications that lead to registering with the GDC are specified by the General Dental Council.

Dental hospitals and further education colleges run courses on a full-time and part-time basis. Some universities in the UK now offer a BSc in Dental Nursing

A small proportion of student Dental Nurses start their career in a hospital. They will attend lectures, usually at a school of dental nursing several times a week. Their practical experience is gained from placements on specialists clinics within the hospital, before qualifying.

Professional associations in the UK

The British Association of Dental Nurses is the professional organisation representing dental nurses in the UK – whether qualified or unqualified, working in General Practice, hospital, community, the armed forces, industry, practice management or reception. This Association supports dental nurses themselves and represents the interests of Dental Nurses at all levels. BADN Executive Committee is made up of dental nurses elected by the members.

The National Dental Nursing Conference, held each year, provides an opportunity for members of the dental team to meet with colleagues, socialise and further their professional

education. The Conference is held in a different location each year. Current BADN members receive a discount on Conference registration fees.

BADN members in all categories have access to the digital quarterly journal "The British Dental Nurses' Journal". In addition, members have access to the legal helpline, as well as information and support, a members only area of the BADN website, and a range of discounts and special offers.

Full membership is available with or without indemnity cover. Student Associate e-membership is also available to Student Dental Nurses on or awaiting a place on a recognised course.

The Society for British Dental Nurses (SBDN) is another professional organisation representing Dental Nurses in the UK. Their sole purpose is to act on Dental Nurses' best interests, and with their training and development.

Nurse educator

A **nurse educator** is a nurse who teaches and prepares licensed practical nurses (LPN) and registered nurses (RN) for entry into practice positions. They can also teach in various patient care settings to provide continuing education to licensed nursing staff. Nurse Educators teach in graduate programs at Master's and doctoral level which prepare advanced practice nurses, nurse educators, nurse administrators, nurse researchers, and leaders in complex healthcare and educational organizations.

The type of degree required for a nurse educator may be dependent upon the governing nurse practice act or upon the regulatory agencies that define the practice of nursing. In the United States, one such agency is the National Council of State Boards of Nursing. For instance, faculty in the U.S. may be able to teach in an LPN program with an associate degree in nursing. Most baccalaureate and higher degree programs require a minimum of a graduate degree and prefer the doctorate for full-time teaching positions. Many nurse educators have a clinical specialty background blended with coursework in education. Many schools offer the Nurse Educator track which focuses on educating nurses going into any type setting. Individuals may complete a post-Master's certificate in education to complement their clinical expertise if they choose to enter a faculty role.

Nurse educators can choose to teach in a specialized field of their choosing. There is not extra degree needed to be earned other than a master's degree in nursing. Most schools will only hire a nurse to teach a class if they have had experience in that area. This is so the students can have a better understanding of the current subject being taught.

In Australia, Nurse Educators must be Registered Nurses (RNs/Division 1 Nurses). The Nurse Educator role is not available to Enrolled Nurses (ENs/Division 2 Nurses). Nurse Educators require a minimum of a Certificate IV in Training and Assessment to teach the Diploma of Nursing in both the classroom and clinical placement settings. Bachelor of Nursing Educators do not technically require this qualification, but it is generally favoured. A Nurse Educator may also complete post-graduate university study in Nursing or Clinical

Education, which may lead to an academic career including research, lecturing or doctoral study. To become a Clinical Nurse Educator in a healthcare setting (e.g. on an acute care ward), Registered Nurses are generally required to have 5–10 years clinical experience and 6–8 years of study (a bachelor's degree plus post-graduate certificate or diploma).

Emergency nursing

Emergency nursing is a specialty within the field of professional nursing focusing on the care of patients who require prompt medical attention to avoid long-term disability or death. In addition to addressing "true emergencies," emergency nurses increasingly care for people who are unwilling or unable to get primary medical care elsewhere and come to emergency departments for help. In fact, only a small percentage of emergency department (ED) patients have emergency conditions such as a stroke, heart attack or major trauma. Emergency nurses also tend to patients with acute alcohol and/or drug intoxication, psychiatric and behavioral problems and those who have been raped.

Emergency nurses are most frequently employed in hospital emergency departments, although they may also work in urgent care centers, sports arenas, and on medical transport aircraft and ground ambulances.

The history of emergency nursing

Around the 1800s hospitals became more popular and there was a growth in emergency care. The first development of an

emergency room was originally called the "First Aid Room." Originally, nurses only dressed wounds, applied eye ointments, treated minor burns with salves and bandages, and attended patients with minor illnesses like colds and sore throats. The rule of thumb was first in, first served, but there were many cases where some people were in more need of emergency care than others, and as the situation became more intolerable, one of the greatest medical developments came into perspective: triage.

For centuries triage had been used in war but was not yet established in the emergency department. The first time triage was referred to during a non-disaster situation was at Yale New Haven Hospital, Connecticut, United States in 1963, and since then has become developed and more defined.

Emergency nurse skills, knowledge and qualities

Emergency nurses must be able to sit, stand, walk, reach, squat and lift throughout their eight- or twelve-hour shift. They must have good manual dexterity, hearing and vision. They must understand principles of human development, anatomy, physiology, pharmacology, They must also have a working knowledge of the many legal issues impacting health care such as consent, handling of evidence, mandatory reporting of child and elder abuse, and involuntary psychiatric holds. They must be adept and comfortable working with patients of many different backgrounds, cultures, religions,

ages and types of disabilities. They must be calm and professional at all times, especially when dealing with situations which are difficult, emotional or disgusting. Emergency nurses must also know how to care for themselves physically and emotionally.

The role of the emergency nurse

The role of the emergency nurse is to evaluate and monitor patients and to manage their care in the emergency department. They may also supervise licensed practical nurses and unlicensed assistive personnel ("nurse aides" or "care partners"). It can be a challenge to get everything done quickly and correctly in an ever-changing environment. Some ED nurse functions are common to other nursing specialties, while others are specific to emergency nursing. These can be divided into 1.) assessment, 2.) planning and managing care, 3.) tasks, 4.) communication, and 5.) teaching.

- **Assessment.** Emergency nurses interview a patient to get a health history, a list of current medications being taken and allergies. He or she performs a physical examination. This is often a limited exam based on the patient's chief complaint and only infrequently a complete head-to-toe examination. The ED nurse periodically reassesses the patient to detect any changes, either improvement, decompensation or no change. This may be done after a treatment is given to evaluate its effectiveness or at certain time intervals as appropriate for the patient's condition.

- **Planning and managing care.** The ED nurse must have a plan of what to do for the patient, when and in what order. Managing an ED patient's care includes decisions such as whether the patient can go to X-ray before getting blood drawn, what tasks to delegate to unlicensed assistive personnel (UAPs), and how many visitors are allowed in the patient's room, among others.
- **Tasks.** There are procedures only the physician can perform, but many others are done by the emergency nurse. These include inserting intravenous ("IV") lines, urinary catheters and nasogastric ("NG") tubes; drawing blood samples from veins and arteries; dressing wounds; applying splints, administering medications, and in certain jurisdictions RNs are trained to suture wounds. In some cases, emergency nurses may order certain tests and medications following "collaborative practice guidelines" or "standing orders" set out by the hospital's emergency physician staff.
- **Communication.** All the emergency nurse's observations are recorded in the patient's medical record. These are used by other members of the healthcare team caring for the patient. ED nurses must keep the emergency physician apprised of a patient's condition; if it suddenly worsens, the doctor must be notified immediately. If the patient is admitted to a room in the hospital or transferred to another facility, he or she must "give report" to the nurse at the patient's destination.
- **Teaching.** In addition to keeping the patient and his or her family up-to-date throughout the visit, the

emergency nurse also conducts teaching sessions with them. Topics often include how to take prescribed medication, how to prevent complications, when to return to the ED, and a patient's diagnosis. These are often short interactions and the nurse must evaluate what information the patient needs, how in detail to explain a topic, and the patient's readiness to learn. To do this, the nurse must consider the patient's level of education, level of pain, education level, cultural influences, age, deficiencies in vision or hearing, and other factors.

Special emergency nurse roles

Triage Nurse

An emergency nurse is assigned to triage patients as they arrive in the emergency department, and as such, is the first professional patients will see. Therefore, this emergency nurse must be skilled at rapid, accurate physical examination and early recognition of life-threatening conditions. Based on the triage nurse's findings, a triage category is assigned, typically from 1 to 5, with 1 being a true, life-threatening emergency.

ED Charge Nurse

An experienced emergency nurse is put in the role of charge nurse or team leader. This nurse is responsible for the overall "flow" of the department. He or she assigns nurses to patients, assures patients are being transported to and from tests outside the ED, addresses patient complaints and concerns,

communicates with the house supervisor, takes phone calls, and assures nurses get their breaks.

Emergency Nurse Practitioner (ENP)

In the United Kingdom

A specialist nurse will independently assess, diagnose, investigate, and treat a wide range of common accidents and injuries working autonomously without supervision by medical staff. They primarily treat a wide range of musculoskeletal problems, skin problems and minor illnesses. They are trained in advanced nursing skills. Under the National Health Service grading system, ENPs are typically graded Band 6 or 7.

Additionally, some specialized nurses perform as emergency care practitioners. They generally work in the pre-hospital setting dealing with a wide range of medical or emergency problems. Their primary function is to assess, diagnose and treat a patient in the home in an emergency setting.

In the United States

An advanced practice nurse assesses, diagnoses, and treats a variety of common illnesses, injuries and disease processes in emergency care settings. ENPs are trained in advanced nursing and medical skills such as x-ray interpretation, ophthalmic slit lamp examination, suturing, local and regional anesthesia, abscess incision and drainage, advanced airway techniques, fracture reduction, and casting and splinting.

In Australia

Australian nurse practitioners follow the clinical practice guidelines developed by the Victorian Emergency Nurse Practitioner Collaborative (VENPC), which has supported nurse practitioner development in Victoria. These guidelines include attending to minor head injuries, burns, open wounds, joint pain, haemophilia, blood and fluid exposure, PV bleeding, urinary tract infections (UTIs), abdominal pain, cellulitis, and more.

Emergency nurses in Africa

Emergency nurses work in various places, many of which are understaffed as there are nursing shortages across Africa. There is also a shortage of doctors, leaving many tasks for nurses with limited guidelines or standards to deal with, and the scope of practice is quite undefined for many emergency nurses.

Nurses may be required to work outside their scope, causing frustration and increasing the opportunities for occupational health hazards. It can be speculated that triage protocols are either lacking or not being followed.

The limited basic knowledge and skill of emergency nursing included in undergraduate nurse training programs, and the limited number of nurse trainers, provides difficulty for many pending nurses to acquire the skills needed to work in emergency settings.

Challenges of emergency nursing

Emergency nursing is a demanding job and can be unpredictable. Emergency nurses need to have basic knowledge of most specialty areas, to be able to work under pressure, communicate effectively with many types of patients, collaborate with a variety of health care providers and prioritize the tasks that must be performed.

It can be quite draining both physically and mentally for many nurses. Australian emergency departments treat over eight million patients each year as of 2018. They spend much of their time on their feet and must be ready for unexpected changes in patients' conditions as well as sudden influxes of patients to the emergency department. Emergency department nurses may be exposed to traumatic situations such as heavy bleeding, dismemberment and even death.

Violence is a growing challenge for many nurses in the emergency department. Emergency nurses often receive both physical and verbal abuse from patients and visitors.

Board certification in emergency nursing

Certified Emergency Nurse - CEN

The Certified Emergency Nurse (CEN) designation is granted to a registered nurse who has demonstrated expertise in emergency nursing by passing a computer-administered

examination given by the Board of Certification for Emergency Nursing (BCEN). The certification exam first became available in July 1980, was accredited by the Accreditation Board for Specialty Nursing Certification (ABSNC) in February 2002, and was re-accredited in 2007, 2012, and 2016. The certification is valid for four years, and can be renewed either by passing another examination, or by attesting that the nurse has completed 100 continuing education units (CEUs) in the specialty.

As of 2019, the BCEN has designated over 38,000 active CENs in the United States and Canada. The CEN exam has 175 questions; 150 are used for testing purposes (25 are sample questions). The passing score is 70% and the candidate has three hours to take the exam. The test is administered in Pearson Vue testing centers internationally.

Certified Pediatric Emergency Nurse - CPEN

The Certified Pediatric Emergency Nurse (CPEN) designation is applied to a registered nurse who has demonstrated expertise in pediatric emergency nursing by passing a computer-administered examination given jointly by the Board of Certification for Emergency Nursing (BCEN) and the Pediatric Nursing Certification Board (PNCB). The certification exam first became available on January 21, 2009, and was accredited by ABSNC in May 2015. The certification is valid for four years, and can be renewed either by passing another examination, by completing 100 contact hours (continuing education) in the specialty, or by completing 1,000 clinical practice hours and 40 contact hours in the specialty.

As of 2020, the BCEN and the PNCB have designated over 5,200 active CPENs. The CPEN exam has 175 questions; 150 are used for testing purposes (25 are sample questions). The passing score is 87% and the candidate has three hours to take the exam. The test is administered in AMP testing centers internationally.

Additional emergency nursing education/certification

- Advanced Burn Life Support (ABLS)
- Advanced Cardiac Life Support (ACLS)
- Advanced Medical Life Support (AMLS)
- Advanced Trauma Care for Nurses (ATCN)
- Basic Life Support (BLS)
- Certified Flight Registered Nurse (CFRN)
- Certified Transport Registered Nurse (CTRN)
- Course in Advanced Trauma (CATN)
- Emergency Nursing Pediatric Course (ENPC)
- Geriatric Emergency Nursing Education (GENE)
- Mobile Intensive Care Nurse (MICN)
- National Institutes of Health Stroke Scale Certification (NIHSS)
- Neonatal Resuscitation Program (NRP)
- Pediatric Advanced Life Support (PALS)
- Pre-Hospital Emergency Care (PHEC)
- Trauma Certified Registered Nurse (TCRN)
- Trauma Nurse Specialist (TNS)
- Trauma Nursing Core Course (TNCC)

Faith community nursing

Faith Community Nursing, also known as **Parish Nursing**, **Parrish Nursing**, **Congregational Nursing** or **Church Nursing**, is a movement of over 15,000 registered nurses, primarily in the United States. There are also Parish nurses in Australia, the Bahamas, Canada, England, Ghana, India, Kenya, Korea, Madagascar, Malawi, Malaysia, New Zealand, Nigeria, Palestine, Pakistan, Scotland, Singapore, South Africa, Swaziland, Ukraine, Wales, Zambia and Zimbabwe. Faith community nursing is a practice specialty that focuses on the intentional care of the spirit, promotion of an integrative model of health and prevention and minimization of illness within the context of a community of faith. The intentional integration of the practice of faith with the practice of nursing so that people can achieve wholeness in, with, and through the population which faith community nurses serve.

Parish nursing began in the mid-1980s in Chicago through the efforts of Rev. Dr. Granger Westberg as a reincarnation of the faith community nursing outreach done by religious orders, such as the "Parish Deaconesses" in Europe and America in the 1800s. Parish nursing is rooted in the Judeo-Christian tradition, and the historic practice of professional nursing, and is consistent with the basic assumptions of many faiths that we care for self and others as an expression of God's love. However, it is not only available to Christian congregations. There are Jewish Congregational Nurses, Muslim Crescent Nurses, and RNs serving in similar capacities within other faith traditions.

Faith Community Nursing (FCN) is recognized as a specialty nursing practice. *Faith Community Nursing: Scope and Standards of Practice* was approved by the American Nurses Association in 2005 (and updated in 2012) and define the specialty as "...the specialized practice of professional nursing that focuses on the intentional care of the spirit as part of the process of promoting holistic health and preventing or minimizing illness in a faith community." (American Nurses Association, 2012, Faith Community Nursing: Scope and Standards of Practice, Silver Springs, MD: Author, p1). The 16 standards of Faith Community Nursing Practice reflect the specialty's professional values and priorities and provide practice directions and the framework for practice evaluation. Each standard is measurable by a set of specific competencies that serve as evidence of minimal compliance with that standard.

Faith community nursing focuses on a wholistic approach to patient care. Faith community nursing believes that by promoting a wholistic approach this will prevent or minimize illnesses in faith communities (How is faith community nursing the same or different, 2015). Nurses in this specialty, cares for the patient as a whole; physically, emotionally, and spiritually. A good relationship between the nurse and client is vital for this specialty. The role of a faith community nurse is to provide routine spiritual care in partnership with a faith community; it also involves routine implementation and coordination of activities, resourcing and referring. Faith community nurses also maintain the goal of patient care towards wholistic functioning. Patients have needs that are not related to clinical nursing. These needs can affect the way they view their care, the way they receive that care, and the way

they engage in that care (The Joint Commission, 2010). For some, their faith is their way to cope with illnesses and stress; faith community nursing helps to bring faith and clinical nursing together to achieve this goal. To become a faith community nurse, the registered nurse must have a minimum of 2 years experience, must have a current license in the state where the faith community is located, and have completed a parish nurse foundations course for the specialty practice as recognized by the American Nurses Association. There are several different curriculum offerings for the faith community nurse which have been developed by a panel of nursing faculty. These are offeredthough a partnership with the International Parish Nurse Resource Center (IPNRC) at more than 130 nursing schools and health systems around the US and abroad.

Faith community nurses serve in several roles, including: • Health advisor • Educator on health issues • Visitor of church members at home or in the hospital • Provider of referrals to community resources and provide assistance in obtaining needed health services • Developer of support groups within the church • Trainer and coordinator of volunteers • Provider of health screenings Faith community nursing plays a tremendous role in increasing patient outcomes. Through the encouragement of spirituality, faith community nurses decrease post hospitalization adverse events; decrease hospital readmission's and increase patient's ability to thrive at home after hospital discharge. Post hospitalization adverse events can be decreased with the use of faith community nurses, during post hospital follow up care. Medical guidance and education provided by faith community nursing increases patient’s adherence. Supportive networks and measure creates

leverage when reaching out to hard to reach populations like; poverty stricken, low income, homeless, and medically uninsured individuals. These individuals remain the hardest for health care professionals to keep in touch with after hospital discharge, as well as the most least likely to adhere to medical treatment once discharged. Home visits, follow up care, community services and resources are available to these individuals through the use of faith community nurses. The utilization of social services provides preventative measures, health screening, and education on topics like: exercise, health, and nutritional, to improve the patient's health and disease status. Not only does a faith community nurse improve patient outcomes but they also improve the spiritual, mental and physical well-being of the patient, through counseling and the use of other community health programs (Schroepfer, 2016). (SHarrisCSU) It is important to note that faith community nurses are not expected to provide patient care in the church or at a patient's home but rather to be a source of referrals for services in the community. They coordinate existing services and supplement them with a holistic dimension of health and caring. A parish nurse program or faith community nurse program can operate in several different ways. Models include: 1) one church supporting its own full or part-time nurse, 2) several churches supporting one nurse, 3) a group of volunteer nurses supporting one or several churches or 4) a nurse related to a hospital or clinic who supports a church or churches as part of his or her job. Of the several thousand faith community nurses, only about 35% in the US are compensated financially for their ministry. In the United States, faith community nurses typically belong to the Health Ministries Association which is the national professional membership organization for faith community nurses. They

also have available the International Parish Nurse Resource Center and the American Nurses Association, among others.

The Caribbean has joined the community of Parish Nursing and Health Care Ministry with the launching of Health Care Ministry in The Bahamas. It began with an initial course spanning a three-week period and brought together nurses from various denominations who were commissioned on 27 February 2005. Initially, the Canadian and Australian models of Parish Nursing were introduced to The Bahamas as an extension of the Pastoral Care Ministries of Diocese 2000 &Beyond, a programme of the Anglican Diocese of The Bahamas and Turks & Caicos Islands. To date, more than 60 people have been trained and actively engaged in the ministry as either Parish Nurses or Health & Wellness Carers. Since the ministry began in 2005 it has grown steadily and was known as the Anglican Diocesan Health Care Ministry [Parish Nursing] Council. However, effective 7 March 2008 the name changed to the Ecumenical Health Care Ministry Council. It is intended that there will be continued training and that the programme will spread throughout the Commonwealth of The Bahamas and the Caribbean. To this end, the ministry will be recognised by the Bahamas Christian Council and by extension the Caribbean Council of Churches (Ecumenical Health Care Ministry, Bahamas).

Resources for faith community nurses

These organizations help to support faith community nursing and serve a wide variety of faith communities:

- International Parish Nurse Resource Center
- Canadian Association for Parish Nursing Ministry
- Australian Faith Community Nurses Association
- Australian Parish Nurse Resource Center
- New Zealand Faith Community Nurses Association
- Greater Lafayette Faith Community Nursing
- Faith Community Nursing/Health Ministries Hosted by Henry Ford Macomb Hospitals
- Parish Nursing Ministries UK
- Faith Community Nurses International - the professional nursing organization for nurses practicing in faith communities. http://www.fcninternational.org/

Other resources

- International Parish Nurse Resource Center
- Parish Nursing and Health Ministry
- FCN/HM Documentation & Reporting System (2000)

Flight nurse

A **flight nurse** is a registered nurse who specialises in the field of providing comprehensive pre-hospital, emergency critical care, and hospital care to a vast scope of patients. The care of these patients is generally during aeromedical evacuation or rescue operations aboard helicopters, propeller aircraft or jet aircraft. On board a rescue aircraft you would find a flight nurse accompanied by flight medics and respiratory practitioners, as well as the option of a flight physician for comprehensive emergency and critical transport teams. The

inclusion of a flight physician is more commonly seen in pediatric and neonatal transport teams. A critical care flight nurse must be able to deal with all age groups with broad critical emergencies. With no physicians on site the nurses scope of practice is expanded. The critical care experience is transferred over to a flight nurse with impacting factors such as altitude and changes in pressure, gravitational forces, and weather (Mazur, R., 2018). Some patients may experience exacerbation's because of factors related to the cabin environment including hypoxia, limited mobility, gas expansion, and risk of injury related to turbulence and resources with definitive care are limited (Rotta, A. T., 2020). Aeromedical evacuation crews coordinate with other organizations to plan for the safe and timely care and evacuation of patients. Crews must be prepared for patients suffering from trauma and mental health illnesses (An, 2018).

Roles and duties

A flight nurse is required to complete a copious amount of duties each and every call out. Listed below is a comprehensive list of these duties and responsibilities:

- Flight nurses perform as a member of an aeromedical evacuation team on helicopters and propeller or jet aircraft
- Responsible for planning and preparing for aeromedical evacuation missions
- Expedite mission and initiate emergency treatment in absence of Flight Physician
- Provide in-flight management and nursing care for patients

- Evaluate individual patient in-flight needs
- Liaison between medical and operational aircrews and support personnel to promote patient comfort
- Responsible for maintaining patient care, comfort and safety
- Care for patients with both medical and traumatic issues
- Request appropriate medications, supplies and equipment to provide care to patient
- Must have training in mechanical ventilation, hemodynamic support, vasoactive medications and intensive care skills
- Specialized clinical skills in union with knowledge, theory, education and expertise in hospital and pre-hospital environments are required
- Perform advanced medical procedures without supervision of a doctor such as intubation, ventilator management, chest tube insertion, intra-osseous line placement, central line placement, intra-aortic balloon pump management, management of pacing devices, titration of vasoactive medications, pain management, administration of anaesthetic medications for intubation, and in some cases, emotional and family care

Education

National requirements for most flight nurse programs include:

- License as a registered nurse

- 2–3 years of critical care experience and/or mobile intensive care unit (MICU) experience.
- Advanced cardiac life support (ACLS) certificate
- Pediatric advanced life support (PALS) certificate

Certification process and skills

While specific skills that may be performed by the flight nurse, or the scope of practice, are not universal across the globe or even the United States, the flight nurse or any critical care transport member must log a series of hours to progress within this role.

According to the Association of Critical Care Transport (2020), critical care transport providers must document a minimum of 3,700 patient contact hours or have a minimum of 5 years' experience with direct patient care to have the necessary qualifications to act as a transport provider in addition to being a licensed RN in the state of transport. These providers must minimally have BLS or ACLS certifications.

The next step in progressing in this role is to obtain an Advanced Transport Certification including the CFRN and CTRN (ACCT,2020). This certification allows the nurse to provide a higher and more inclusive level of care.

After two years of critical care transport experience, the nurse can become a Critical Care Transport Provider (ACCT, 2020). This allows the nurse to assume the role as a primary caregiver for the patient who is being transferred.

By allowing the nurse to assume the role as a primary caregiver during critical care transport, the nurse is afforded more autonomy and a wider scope of practice. Each state and each country have own scope of practice for the critical care transport, or flight nurse. Based on skills that the nurse has trained in they may perform tasks such as intubation, thoracostomy with or without mechanical ventilation, chest tube placement, management of cardiovascular devices such as Extracorporeal Membrane Oxygenation (ECMO) or Ventricular Assist Devices (VADs), in-flight ultrasound, and initiation of pharmacological interventions (ACCT,2020). These skills may only be performed by the nurse who is practicing within their scope of practice and who has trained to competently complete these skills.

Additional requirements may include:

- Neonatal Resuscitation Program (NRP)
- Nationally recognized trauma program such as Pre Hospital Trauma Life Support (PHTLS)
- Basic Trauma Life Support (BTLS), Trauma Nurse Core Course (TNCC), or Transport Nurse Advanced Trauma Course (TNATC)
- Certifications such as Critical Care certification (CCRN), Certified Emergency Nurse (CEN), or Certified Flight Registered Nurse (CFRN)

Helpful, but may not be required:

- EMT or EMT-P (paramedic) certification with field experience (some states require flight nurses to be certified as EMTs or EMT-Ps)

Simulations programs

- Simulation programs to prepare flight nurses have been shown to adequately mimic real world scenarios, In a study conduct at Case Western Reserve University's flight nurse program students reported that the flight simulator had felt like an actual rotor cuff transport. Additionally, heart rates were tracked to measure the stress response and rates were increased from 77 before the simulation to 100 at the peak, at the conclusion HR resolved to 72, the p value was <0.001.

Credentialing

- Certified Emergency Nurse (CEN)
- Certified Flight Registered Nurse (CFRN)
- Critical Care Registered Nurse (CCRN)

Types

Civilian

- Works for hospitals, federal, state and local governments, private medical evacuation firms, fire departments and other agencies.

Military

- Army Air Force Evacuation Service
- Member of aeromedical evacuation crew

- Senior medical member of aeromedical evacuation team on Continental United States (CONUS)
- Works in intra-theatre and inter-theatre flights to provide in-flight management and nursing care
- Plan/Prepare aeromedical evacuation missions and prepare patient care facilitation plan

Flight Nursing's Role in Community Health

The flight nurse is vital to the community. They aid in transport and care for the critically ill patient in extreme circumstances. These nurses possess a wide scope of practice that allows them to care for these patients in a variety of setting. The flight nurse plays a critical role in the rescues of individuals who need fast, and otherwise inaccessible transport to receive emergency care. These nurses have been used in both the military and civilian setting to perform rescue missions. The services that they provide expand the reach of hospitals and allow care to take place in rural, desert, or otherwise unreachable locations including mountains, islands, etc. (Scuissiato et al., 2012). Therefore, the flight nurse expands access of care to reach all community regions in critical care situations.

Australia

Australia has an estimated 20% of land recognised as desert with a rather small population density. Providing health care to these remote rural towns can prove to be quite laborious.

Australia provides a number of organisations that flight nurses are under employment of.

United States

In the United States there are approximately 550,000 people who require emergency or standard medical transport every year. Situations involving the need for patients to travel via air transport include patients who have been involved in a bad accident and require transport to an intensive care, patient needs a transplant, or a stable patient who has a medical condition that wants to move closer to family. Flight nursing also plays a critical role in transporting a critically ill patient who lives in a rural community to a hospital that has the resources necessary to provide the care needed to the patient. Teams involved in the air transport of a patient can include nurse/nurse, nurse/paramedic, nurse/physician, nurse/respiratory therapist, or paramedic/paramedic, depending on the needs of the patient. When transporting a patient who is on vasoactive medications or vasodilator medications, the nurse is responsible for titrating the drips to maintain the hemodynamic parameters within the ordered range and the critical care needed for the patient.

Forensic nursing

Forensic nursingis defined as the application of the nursing process to public or legal proceedings, and the application of forensic health care in the scientific investigation of trauma and/or death related to abuse, violence, criminal activity, liability, and accidents.

Before there was a specialty recognized as forensic nursing, the term used was clinical forensic medicine. This term describes the use of clinical practices to support judicial proceedings to protect a victim, usually after death has occurred. It was not until the late 20th century that medical professionals wanted more collaboration between the medical and legal systems. In the United States this problem began to be addressed. A strong advocate for the forensic nursing specialty in United States was Virginia Lynch. She pushed to have the specialty recognized and helped to form programs in the U.S. for proper education. In the 1980s articles were being written about how the important evidence needed to build a legal case was not being preserved during the treatment of a victim. From there began an explanation of the nurse's role in not just forensic medicine but also the criminal justice system when dealing with a victim of violence.

Most nurses practice with the holistic framework of body, mind and spirit. With forensic nursing established, the role of a nurse was altered to also include the law. There has been an establishment of this specialty but it was not created to have nurses become investigators. Their goal is to work with a possible victim and make sure the proper medical but also forensic tasks are accomplished. The forensic evidence is then passed on to the criminal justice system for proper investigation. This specialty has started to be recognized worldwide and is helping to promote an international focus on violence. The nurses are becoming vital resources for the healthy relationship needed between the health and justice systems.

History

Forensic nursing developed in response to concerns in the 1980s regarding the treatment of patients suffering from crime-related injuries and the proper handling of evidence. Globally, the development of general clinical forensic medicine and the forensic nursing have progressed at different speeds, with one preceding the other on a country-by-country basis. Founded in 1992, the International Association of Forensic Nurses is the primary professional association for forensic nursing, which as of 2019 included 4,400 members in 25 countries.

Although forensic nursing can be traced back to the 1980s for the development of the specialty, it can be noted that the foundation may have been laid as early as the 18th century. Certain medical professionals were involved in court cases that involved crimes like rape. These medical professionals began to move these issues from a simply criminal justice view to a more recognized health concern.

Role and responsibilities

Forensic nursing combines nursing practice and forensics in the scientific investigation of death and injury resulting from criminal activity and accidents. In addition to providing care, forensic nurses act as multidisciplinary team members with and consultants to other nursing and medical professionals and law enforcement. They receive advanced training in collecting and preserving evidence, treatment protocols, and legal proceedings and testimony.

The specialized training that forensic nurses receive related to both the medical and legal needs of these patients drives demand for the specialty. Crime victims face a higher risk of post-traumatic stress disorder, depression, suicide, and medical complications than other patients; forensic nurses improve both legal outcomes and quality of life for these patients relative to standard Emergency Department care. Forensic nurses also assist in providing professional insight to potential causes of patient injuries in situations in which witnesses are unavailable.

Prior to beginning an exam, forensic nurses must receive consent from the patient. In addition to documenting obvious injuries, forensic nurses specialize in looking for subtle signs of assault, such as petechiae, voice changes, and loss of bowel or bladder function. Forensic nurses document patient injuries through tools including cameras, measuring tapes, fluid swabs, rape kits, and a high-powered light that can reveal hard-to-see bruises and fluids like semen, urine, or saliva. They document every injury for potential use as evidence in a later court case, where they may be called as an expert witness to testify to the injuries.

Forensic nurses are also responsible for educating a patient on his or her rights. In the United States, for example, patients are not required to pursue legal action to receive a medical exam, and it is the forensic nurse's responsibility to discuss this with each patient.

More specifically, forensic nurses go through training to be able to understand and treat different types of trauma that is experienced by many different types of people.

Child abuse

Child abuse is a common type of trauma that forensic nurses work with.

When these nurses encounter a possible situation involving child abuse they must make sure to protect the child from any more trauma. The forensic nurses look at things such as bruises, possible head injuries and sexual abuse. The importance of a nurse here is key to determine the difference between an inflicted bruise or a usual activity bruise. A forensic nurse will know that a bruise located on the ears, neck and other soft tissues of the body should raise a red flag. Once the physical marks are assessed for abuse or an accident a nurse can decide what to do next, whether that is more tests or a consultation with the physician.

When working with children it is important that the nurse makes the child comfortable to ensure a trusting relationship. Forensic Nurses make sure to build this relationship to allow the child to share details they otherwise might keep to themselves. There may be abuse that is not visible to the eye and it is important to make sure the child shares those key details. If abuse is detected the nurse will take the next step of reporting the abuse. Although many policies are similar, each state in the U.S. has its own laws and systems in place for reporting possible child abuse. This is where forensic nursing connects to the legal side of investigation.

The nurse must make sure to report their findings, and report them accurately because the nurse is held liable.

Sexual assault

Another type of trauma that forensic nurses provide care for is sexual assault which includes rape. Forensic nurses are trained to screen for sexual assault because many assaults go unreported. Patients may have some fear, embarrassment, or denial that could inhibit their willingness to report their assault. These nurses have the ability to know whom to screen, and how. Questions are essential to these nurses because not all potential victims are going to be honest about what they may have or may have not experienced. The questions asked need to be worded properly to avoid discomfort and inaccurate information. Recently, there has been an integration of written and verbal questionaries' that may help the patient and the nurse address a possible assault.

A possible question to begin would involve asking if the possible victim was forced to do something that he or she did not want to do. It is important that the nurse is able to help a possible victim understand the question without forcing or leading an inaccurate answer. If a patient admits to being sexually assaulted then the next step is to ensure patient safety. There are protocols in place that help a forensic nurse in taking the next step, when a patient admits to being sexually assaulted. For example, the nurse may explain to the victim their legal rights in regard to reporting the assault, as well as the details of the physical exam for evidence.

A specialty in forensic nursing is a Sexual Assault Nurse Examiner (SANE). These nurses will collect and record the forensic evidence needed for a criminal case. Some of the evidence included should be a history of the incident, removal

of clothing, head-to-toe assessment, urine collection, blood draw, oral swabs, genital exams, and a STD screening. After there has been an evidence collection or not (if the patient does not want the assault reported if over 18) follow-up care is essential.

The forensic nurse should be able to provide the victim with necessary resources. These resources may include crisis centers, therapy referrals, and support group information.

Professions

Forensic nursing includes roles such as:

- Clinical forensic nurse
- Forensic nurse investigator
- Forensic nurse examiner
- Forensic correctional or institutional nurse
- Legal nurse consultant
- Nurse attorney
- Nurse coroner

Certification

As of 2015, the International Association of Forensic Nurses offers two professional certifications under its certification body, the Commission for Forensic Nursing Certification (CFNC), for Sexual Assault Nurse Examiners: the Sexual Assault Nurse Examiner - Adult/Adolescent (SANE-A) and the Sexual Assault Nurse Examiner - Pediatric (SANE-P).

Worldwide

United States

Virginia Lynch, an early advocate of forensic nursing, proposed creation of the forensic nursing specialty in 1986 and helped establish the first graduate studies program at the University of Texas at Arlington's School of Nursing. The American Academy of Forensic Sciences recognized the forensic nursing specialty in 1991 and the American Nurses Association followed in 1995.

Great Britain

In Great Britain, forensic nursing includes a forensic psychiatric nursing sub-specialty, which emphasizes practicing forensic nursing for mental health patients.

Canada

As of June 2015, forensic nursing is not recognized as a nursing specialty in Canada and does not have a PhD program.

Gerontological nursing

Gerontological nursing is the specialty of nursing pertaining to older adults. Gerontological nurses work in collaboration with older adults, their families, and communities to support healthy aging, maximum functioning, and quality of life. The term gerontological nursing, which replaced the term **geriatric nursing** in the 1970s, is seen as being more consistent with

the specialty's broader focus on health and wellness, in addition to illness. Gerontological nursing is important to meet the health needs of an aging population. Due to longer life expectancy and declining fertility rates, the proportion of the population that is considered old is increasing. Between 2000 and 2050, the number of people in the world who are over age 60 is predicted increase from 605 million to 2 billion. The proportion of older adults is already high and continuing to increase in more developed countries. In 2010, seniors (aged 65 and older) made up 13% and 23% of the populations of the US and Japan, respectively. By 2050, these proportions will increase to 21% and 36%.

Scope

Gerontology nursing is a unique field in nursing which requires nurses to focus their care on older population. This population tend to have more comorbidities such as high blood pressure, diabetes, heart conditions, etc. This field requires complex care to fulfill their needs. Nurses are to be mindful of their long history for individualized care. Nurses use evidence based practice in their care to educate and promote well-being in gerontological population. Professional nursing involves the use of culturally competent care combined with scientific research to deliver clinical expertise.

Geriatric nurses are expected to be skilled in patient care, treatment planning, education, mental health, and rehabilitation. They also take on many roles in the workplace. The main responsibility is as a caregiver. They can also be advocates, counselors, and educators for their patients.

Gerontological nursing draws on knowledge about complex factors that affect the health of older adults. Older adults are more likely than younger adults to have one or more chronic health conditions, such as diabetes, cardiovascular disease, cancer, arthritis, hearing impairment, or a form of dementia such as Alzheimer's disease. As well, drug metabolism changes with aging, adding to the complexity of health needs.

There are many issues that arise as people age, which includes but are not limited to vision loss, hearing loss, dental issues, incontinence, and increased risk for falls.Gerontological nursing is complex and requires extensive interventions to keep the elderly safe. Nurses must be able to accommodate their patients for the vision loss, hearing loss, and dental issues. Elderly people with poor vision can be given reading materials with larger font, be provided with magnifying glasses, and brighter lighting. Interventions for hearing loss include finding a quiet place to talk among each other, speaking louder but not shouting, facing the person, speaking clearly, and providing gestures. Nursing may need to provide patients with dentures if teeth are missing to assist the patient in chewing their food. Incontinence care is crucial to preventing skin breakdown and skin infections such as candida albicans. Providing frequent incontinence care at least every two hours and skin barrier protection can decrease the chance of skin breakdown. Falls can cause fractures, hospitalizations, injuries, loss of independence, and possibly death. Many precautions can be implemented in preventing falls. Precautions include the elderly working with physical therapy to strengthen muscles and improve balance, wearing supportive shoes, making sure the environment is conducive to

safety such as reducing clutter on the floor and the floor is dry, ensuring the room is well lit, and other interventions.

Gerontological nurses work in a variety of settings, including acute care hospitals, rehabilitation, nursing homes (also known as long-term care homes and skilled nursing facilities), assisted living facilities, retirement homes, community health agencies, and the patient's home. The conditions of the geriatric patient's health determines what type of facility one should reside in. Assisted living facilities are also known as senior retirement homes, and they provide care services depending on health conditions. Skilled nursing, otherwise known as a nursing home, is a place where they can reside and get provided with 24/7 cares. Older adults have been referred to as "the core business of healthcare" by gerontological nursing experts. Population aging and the complexity of health care needs of some older adults means that older adults are more likely than younger people to use health care services. In many settings, the majority of patients are older adults. Thus, experts recommend that all nurses, not only those identified as gerontological nurses, need specialized knowledge about older adults. This position was endorsed by 55 US nursing specialty organizations.

Including, GAPNA (formerly NCGNP) which was founded in 1981, by a group of Gerontological Nurse Practitioners with the intention of offering the first continuing education conferences designed specifically to meet the needs of advanced practice nurses providing care for older adults. Currently, GAPNA represents the interests of all advanced practice nurses who work with older adults. These advance practice nurses are active in a variety of settings across the continuum including

primary, acute, post-acute and long-term care. GAPNA an organization for advanced practice nurses seeking continuing education in gerontological care as well as networking and peer support from experienced clinicians.

What Attracts Nurses to Gerontological Care

In the United States, caring for the elderly is predicted to be the quickest developing employment area in health care. The demand for nurses are high in geriatrics, however the nurses who are interested in geriatrics are low. Studies have found that less than 1% of nurses are certified in geriatrics and less than 3% of advanced practice nurses are certified in geriatrics. A qualitative, descriptive study was conducted by Negad (2017), it was found that to attract more nurse's higher compensation and health insurance should be offered. Nurses should have safe working conditions, onsite training and education, support from administration, flexible scheduling and sign on bonuses.

The last few decades have brought in more interest in older people as their numbers in society grow. More people than ever before are surviving to their senior years which substantially makes the demand for more working nurses in gerontology. Viewing aging as a natural process also develops more positive attitudes towards working with older adults. Gerontology study is becoming an important field in nursing and this is due to the increasing population of older adults. This increase requires an educated nursing staff who equipped to provide care to the needs of this growing aging population. There is a negative attitude towards old age and this bias can invoke negative feelings leading to great anxiety in many. Due to this

prejudice, many fail to see the benefits and the opportunities that old age brings, focusing only on the challenges of old age. Gerontology educates people about old age and other issues that affect older adults. This field of study is important as it educates the public about the beauty of old age and it also encourages those advancing in age to embrace this change. Knowledge about the aging process not only helps people to understand the aging process but it also assists in helping older adults to achieve a better quality of life.

Implementation of geriatric education in nursing is crucial in increasing the number of nurses who pursue a specialty in geriatrics. Not only should nursing school programs focus on the care of the geriatric population, but also education should be available on-site at facilities caring for the elderly. Nurse Educators and Nurse Leaders are important roles that can be beneficial in the nursing home environment. Nurse leaders play a critical role in mediating between owners-managers and facility staff, and are also keenly aware of the need for geriatrics training among staff. Geriatric training for nurses and nursing assistants can increase quality of patient care and improve employee retention rates in the nursing home environment.

Gerontology vs Geriatrics

The terms Gerontology and Geriatrics are often used interchangeably, but there are differences between the two. Gerontology is the study of the social, cultural, psychological, cognitive, and biological aspects of ageing. Geriatrics, or geriatric medicine, is a specialty that focuses on health care of elderly people.

Gerontological Nurses need to know how to care for illnesses that affect the aging, the other factors affect aging, and how these impact people.

History

Gerontological nurses walk a tight rope stretching across the centuries from the past to the present that introduced the notion that those who entered could survive and recover. The modern hospital is 18th century innovation and those who entered were youths with acute injuries rather than chronic illnesses heavily seen in modern society. Beginning in the 1980s, nurse researchers have pursued answers on older adults about their well-being, and those suffering from serious chronic conditions.Bowers2020/> The NIH played a powerful role in advancement of geriatric nursing science in the 1980s and 1990s, since then the NIH has funding nurse investigators who are transforming understanding of gerontological nursing. Although nurses published articles about care of older adults as early as 1904, the specialty of gerontological nursing emerged beginning in the 1950s, with the publication of the first gerontological nursing textbook. Pioneers in the field of gerontological nursing include Vera McIver, Doris Schwartz, Mary Opal Walanin.

A geriatric nursing specialty group was formed by the American Nurses Association in 1966, with the name changed to the Gerontological Nursing Division in 1976. In the US, the National Gerontological Nursing Association was founded in 1984 and in 1985 the Canadian Gerontological Nursing Association was founded. Standards of practice for gerontological nursing were published by the American Nurses

Association in 1971. In the US, certification for geriatric nurse practitioners and clinical specialists were available in 1984.

The specialty has advanced significantly since the 1990s through large scale education and practice development initiatives funded by the John A. Hartford Foundation, including the Hartford Institute for Geriatric Nursing at New York University. Significant efforts to enhance nursing education have been made in the last decade. In 2010, the American Association of Colleges of Nursing and the Hartford Institute for Geriatric Nursing published the Recommended Baccalaureate Competences and Curricular Guidelines for the Nursing Care of Older Adults. Between 2007 and 2009 the Geriatric Nursing Education Consortium created teaching tools and trained educators in the US to improve gerontological content in nursing education.

A few initiatives that were taken to improve gerontological care is “The Nurse Competence in Aging” project which focused on providing grants and assistance to over 50 specialty nursing organizations and provided nurses with a free online gerontological nursing resource center. This resource center can be assessed using the computer, an iPAD, or iPhone applications. The resource center provides nurses with the opportunity to review evidenced based articles to learn about how to care for the older adult.

Another resource that was developed in 2009 was the Sigma Theta Tau’s center for Nursing Excellence in Long-Term Care. The Geriatric Nursing Leadership Academy was sponsored by Sigma Theta and it provided products and services to support nurse’s ability to grow professionally and become great leaders.

Gerontological Nursing Research

Research has been a huge part of the nursing field due to the ever-so changing technology and procedures. In the early days of nursing research, 1930-1960, the main focus was on identifying the components of nursing care that influenced patient recovery and the nursing skills required for positive patient outcomes. A writer in 1956 requested that nurses refocus their research to include major health issues of the time and how to support the frail elderly. In the 1990s, research focus was put on how pain affected the daily lives of older adults. This research lead to improve pain identification and treatment across settings.

In today's world individuals are living longer. According to the United Nations World Populations Prospect (2020), the average life expectancy is 78.93 years which is a 0.16% increase since 2018. With the elderly population becoming more popular, there is a crucial need for gerontological nursing research. The older patient has more comorbidities and different mental health issues that affect their daily living activities. American Senior Communities (2020) lists the ten biggest health conditions the elderly deal with, being heart and respiratory diseases, cognitive decline, gait and transferring issues, oral health complications, as well as osteoporosis and osteoarthritis.

Falls in the elderly are the leading cause of injury and mortality in America. Nursing research shows that there is a continued need for education to help decrease patient falls. Gerontological nursing includes educating the elderly patient to be honest in discussing falls with medical professionals,

using ambulatory aids, having adequate footwear and adequate lighting when ambulating. Doing medication checks with any new prescriptions can help to reduce side effects that can cause a fall in the elderly. Bowers (2020) states that falls are one common area gerontological nursing research needs to focus on to continue to improve quality of life in the older patient.

The community health nurse has a role of education in the area of gerontological nursing research. The older client has areas in the community such as the local senior center, where they can have their blood sugar and blood pressure checked. There are community centers where the elderly patient can receive their influenza and pneumococcal vaccines. The community health nurse is crucial to providing much needed services to the vulnerable older population. Research shows that providing quick available healthcare services to the elderly can help to decrease negative patient outcomes for the older patient.

When it comes to managing care of older adults, it's important to properly assess their needs and correlate any associating risk factors. Also, healthcare providers need to ensure that all needs are met in order to ensure overall patient satisfaction. In an attempt to do this, it is recommended that healthcare organizations implement the use of the Transitional Care Model (TCM), which is designed to enhance continuity of care and ultimately improve patient outcomes.

The TCM is an intervention nurses primarily use in conjunction with the collaboration of patients and their families as well as members of associating healthcare

disciplines. There are multiple components linked to this model which include the screening of patients, nurse staffing, maintaining relationships with patients and their caregivers, assessing and managing risks and symptoms and providing education leading to the promotion of self-management. When implemented in practice, the TCM has had findings wherein there were fewer reports of patients being rehospitalized, leading to a decrease in overall healthcare costs (Hirschman et al., 2015).

Training and education

Gerontological nursing includes generalist and specialist practice. A generalist is a registered nurse or Licensed Practical Nurse. A gerontological nurse specialist is an advanced practice nurse or nurse practitioner who has graduate education in gerontological nursing.

Specific education in gerontological care is important for all nurses, even those who work outside of long-term care, because older adults make up a significant portion of patients across specialties. However, additional certification in Gerontological care is uncommon for registered nurses, with less than 1% being certified. Fewer than 3% of advance practice nurses in the United States have this certification.

Registered nurses have the option of becoming certified in gerontological nursing. National nursing organizations such as the American Nurses Credentialing Center and the Canadian Nurses Association offer certification in gerontological nursing. Requirements for maintaining certification vary. The American Nurses Credentialing Center lists requirements as including 2

years experience as an RN, 2,000 hours of clinical experience and 30 hours of continuing education, both within the specialty of gerontological nursing. Post graduate certificates in gerontological nursing are also available by completing continuing education courses through colleges and universities.

Gerontological nursing is often ignored within baccalaureate educational programs, with only 1/3rd of all schools requiring a specific course in geriatrics. This is due to educational programs focusing more attention on the sick rather than the well, who are more representative of the older population. Many nursing programs that do not have specific gerontological courses have instead integrated this content into the existing curriculum. 1/4th of all nursing programs in the United States do not have a gerontological staff member.

To better identify those who are most qualified and experienced in managing patient care, there is an APRN Specialty Certification in Gerontology. This APRN Gerontological Specialist Certification (GS-c) distinguishes APRNs who possess expert knowledge, experience, and skill in managing the complex health needs of older adults.

Due to the knowledge gap from nursing school to the work force, it is advised that nurse educators modify current curriculum to the fast growing elderly population by incorporating content specific to the care of the elderly from pre-licensure through the doctorate's level. Researcher Cline was able to create a framework centering around the complexity of care among the elderly, that schools could use to educate students with the intention to improve quality of care.

Another study by Hsu et al., revealed that nursing students were more likely to have a positive attitude towards older adults if they had good experiences in gerontological nursing courses and clinicals.

Issues in Gerontological Nursing

The nursing shortage continues to affect all aspects of nursing, and gerontological nursing is no exception. It is estimated that 50-150% more nurses will be needed in this speciality in the next decade. Often nursing students do not express a desire to work in gerontological nursing as their specialty. This can be due to negative stereotypes, misconceptions, and attitudes toward the aging that are common among nursing students. A study conducted by Garbrah et al. (2017) found that nursing students were less to work in gerontological nursing due to lack of experiences, negative experiences during clinicals, negative perceptions of aging, stereotypical attitudes, and prejudice. In order for nursing students to have an interest in gerontological nursing, students should first be introduced to healthy older adults. In addition, nurse educators should be enthusiastic, passionate, and knowledgeable about geriatrics. Nursing facilities should also implement age friendly curriculum to nursing students and current nursing staff.

In order to fulfill the open positions of the nursing shortage, many students are choosing to obtain their associate degree in nursing. Nurses who are experts in gerontologic nursing are what is needed, though associate degree nursing programs are not readily preparing their students in this specialty area. According to Boutin et al. (2019), newly licensed associate degree registered nurses have not yet acquired the knowledge,

skills, or attitudes to effectively care for this aging population. Therefore, this lack of education is limiting the number of nurses available to fulfill open positions in this area. It is imperative that associate degree nursing programs integrate evidence based gerontological nursing content into their programs as this is the primary population that needs to be taken care of upon graduation. The knowledge and attitudes of the faculty teaching this information is also imperative to persuading nurses to want to specialize in this area of nursing.

Another study conducted by Negad (2017) found a challenge nurse's experience are having poor relationships with families and residents. Nurses in the study reported having difficulty caring for patients with unstable conditions such as dementia. Families will often have high expectations of the nurses, however due to the work load nurses were unable to perform some of the interventions that the residents needed.

Gerontological nursing can be unpopular because geriatric nurses are sometimes perceived to be somewhat inferior in capabilities, or not good enough for other specialties. Facilities have also discouraged competent nurses from working in these settings by paying low salaries.

Gerontological nursing has been complicated by the areas where elderly patients live. There has been an increase in the elderly population in rural areas. 19% or more of the population is aged 65 years or more compared to 15% of those of the same age range in non-rural areas (Sharp et al., 2019). This creates a challenge of providing enough staff nurses to meet the needs of these patients. Nursing shortages certainly do play a role in this case. This can cause greater health

disparities due to the increasing rates of chronic diseases and the lack of resources and those resources needed being so far away. There is a need to blend the complementary skills provided by every discipline so that the focus of the interdisciplinary partnership is on patient-centered care addressing the health disparities and health inequities experienced by the elderly (Sharp et al., 2019). Interdisciplinary team approaches provide better health support for the rural elderly population than just having a single discipline.

Geriatric care facilities face a problem of staff retention of both professional workers (including registered nurses) and paraprofessionals (including nursing assistants). The American Healthcare Association found a turnover rate of 65% for registered nurses working in nursing homes.

A study was conducted by White et al. (2019) and it was found that the work environment plays a major role in improving nurse retention in nursing homes. It was found that nursing homes with good versus poor working conditions were one-tenth as likely to feel dissatisfied with their job and one-eighth as likely to feel burned out when working in a good environment. A few interventions to improve staff retention and support nurses are to provide continuing education courses to nurses, preceptor programs should be provided to newly hire nurses, and, quality assurance programs should be implemented to help nurses identify areas that may need improvement. Burnout among nurses in geriatric care is common. Physical stressors, such as frequent heavy lifting, and emotional stressors, such as regularly encountering death, all contribute.

Due to advances in medicine, adults are receiving the opportunity to live longer, healthier lives. In response to this, there have been concerns associate with the concept of ageism. This is the negative practice of discrimination of individuals solely on their age. This act can ultimately hinder an adults experience in receiving adequate health care leading to an overall risk of impaired health.

In response to this, Levy (2018) proposed the implementation of the PEACE (positive education about aging and contact experiences) model with the intent to provide education on aging as well as to promoting positive experiences with older adults. The overall goal is to reduce prejudice and stereotypical attitudes towards older adults in all settings.

Global Challenges in Gerontological Nursing

In 2017 global population aged 60 years and older reached more than 962 million; more than twice the number of 1980, when the worldwide population of older persons was 382 million. By 2050 the projected number of older persons is expected to double again, reaching 2.1 billion. By 2030, older people are expected to outnumber children under age 10-14 (1 billion vs. 1.35 billion) and eventually outnumber the number of adolescents and youth globally. Furthermore, the number of persons age 80 years or over is projected to increase more than threefold by 2050, climbing from 127 million to 425 million.

The growing geriatric population's economic and social needs must be anticipated globally and include worldwide

collaboration between governments and organizations in order to deliver new and innovative strategies addressing the unique needs of the aging population. Policies and services need to be specifically tailored to the older population including housing, employment, healthcare, infrastructure, and protection. Systems must manage health promotion, gender equality, employment, reduce inequity across countries, and collaborate to include global societies.

There are many global challenges to gerontological nursing including, the rapid increase in the older population, the need for different ways of working, transnational migration, changing core competencies, international collaboration, facilitating choice, and the global nurse shortages.

To support the unprecedented global growth of the elderly population, nurses will be required to modify core competencies and skills to reflect the unique healthcare needs of the older population. New roles must be defined, and research, education, and clinical practice must support those caring for the geriatric population. Older people are the primary users of health services worldwide; therefore, the healthcare system must proactively develop strategies to maximize services to effectively deliver quality care to the increasing number of older people in both developed and developing countries.

Knowledge and understanding of various cultures and their beliefs, values, and practices is vital in caring for older adults worldwide. Because of the shift globally in the aging population, more gerontological education in nursing curriculums and clinical experiences must be incorporated.

Nurses must prepare to deliver safe, effective, quality care to this population, including learning to recognize the unique differences in cultural needs across the world. Booker (2015) suggests an International service-learning curriculum aimed at teaching principles on cross-cultural gerontology, including voluntary services in other countries as a student to gain insight into the social determinants and healthcare practices, outcomes, and policy issues in diverse populations.

Nursing students and nurses will need strategic education on how to care for an aging society. One barrier to the advancement of gerontological nursing is a global shortage of nurses. The sharp and steady increase in the aging population coupled with a lack of nurses to care for them, highlights the same issues such as nurse burn-out and retention rates seen in other countries around the world. National and international policies are currently being developed in response to the shortage of nurses worldwide and the needed transformation of nursing education, practice, and collaboration standards.

Holistic nursing

Holistic nursing is a way of treating and taking care the patient as a whole body which involves physical, social environment, psychological, cultural and religious beliefs. There are many theories that support the importance of nurses approaching the patient holistically and how education on this are there to support the goal of holistic nursing. The important skill to be used in holistic nursing would be communicating skills with patients and other practitioners. These emphasizes that patients being treated would be treated not only their body but also mind and spirit.

Holistic nursing is a nursing speciality concerning the integration of one's mind, body, and spirit with his or her environment. This speciality has a theoretical basis in a few grand nursing theories, most notably the science of unitary human beings, as published by Martha E. Rogers in *An Introduction to the Theoretical Basis of Nursing*, and the mid-range theory Empowered Holistic Nursing Education, as published by Dr. Katie Love. Holistic nursing has gained recognition by the American Nurses Association (ANA) as a nursing specialty with a defined scope of practice and standards. Holistic nursing focuses on the mind, body, and spirit working together as a whole and how spiritual awareness in nursing can help heal illness. Holistic medicine focuses on maintaining optimum well-being and preventing rather than just treating disease.

Core values

The Holistic philosophy: theory and ethics

Holistic nursing is based on the fundamental theories of nursing, such as the works of Florence Nightingale and Jean Watson as well as alternative theories of world connectedness, wholeness, and healing. Holistic nurses respect the patient as the decision-maker throughout the continuum of care. The holistic nurse and patient relationship is based on a partnership in which the holistic nurse engages the patient in treatment options and healthcare choices. The holistic nurse seeks to establish a professional and ethical relationship with the patient in order to preserve the patient's sense of dignity, wholesomeness, and inner worth.

Theories of Holistic Nursing

The goal for holistic nursing is in the definition of holistic where it is to treat the patient in whole not just physically. Various nursing theories have helped on viewing the importance holistic nursing. These theories may differ on the views of holistic nursing care but have common goal which is to treat the patient in whole body and mind. One of the theories is The Intersystem Model, explaining that individuals are holistic being therefore they're illness are interacted and adapted them as a whole not just physically. Also as health can be a different value to individuals which ranges constantly from well-being to disease. For example, despite their chronic condition the patient is satisfied with the changed healthy life for their living. In holistic nursing knowing the theory does not mean that this will be implanted in doing in real life practice many nurses are not able to apply the theory in real life.

Holistic caring process

Holistic nursing combines standard nursing interventions with various modalities that are focused on treating the patient in totality. Alternative therapies can include stress management, aroma therapy, and therapeutic touch. The combination of interventions allows the patient to heal in mind, body, and spirit by focusing on the patient's emotions, spirituality, and cultural identity as much as the illness. The six steps of the holistic caring process occur simultaneously, including assessment, diagnosis, outcomes, therapeutic plan of care, implementation, and evaluation. The holistic assessment of the patient can include spiritual, transpersonal, and energy-field assessments in combination with the standard physical and

emotional assessments. The therapeutic plan of care in holistic nursing includes a highly individualized and unique plan for each patient. Holistic nurses recognize that the plan of care will change based on the individual patient, and therefore embrace healing as a process that is always changing and adapting to the individual's personal healing journey. Therapies utilized by holistic nurses include stress management techniques and alternative or complementary practices such as reiki and guided imagery. These therapy modalities are focused on empowering individuals to reduce stress levels and elicit a relaxation response in order to promote healing and well-being.

The caring for patients in holistic nursing may differ from other nursing care as some may lack in caring for the patient as a whole, which includes spiritually. In holistic nursing, taking care of the patient does not differ from other nursing, but is focused on mental and spiritual needs as well as physical health. In holistic nursing there should be a therapeutic trust between the patient and nurse, as caring holistically involves knowing the patient's illness as whole. This can be only done by the patient who is the one to tell the nurse about the social, spiritual and internal illness that they are experiencing. Also as caring could be involved as assertive action, quiet support or even both which assist in understanding a person's cultural differences, physical and social needs. Through this the nurse is able to give more holistic care to meet the social and spiritual needs of the patient. The attitude of nurse includes helping, sharing and nurturing. In holistic caring there is spiritual care where it needs an understanding of patient's beliefs and religious views. This is the reason why there should be therapeutic trust

between nurse and patient, as in order to understand and respect the patient's religious beliefs the nurse has to get information from the patient directly which is hard to get when there is not therapeutic trust. There is no specific order or template for how to care holistically, but the principle of holistic caring is to include patient's social and internal needs and not just focus on treating the physical illness.

Holistic Communication

Holistic nurses use intentional listening techniques("Focus completely on the speaker") and unconditional positive regard to communicate with patients. The goal of using these communication techniques is to create authentic, compassionate, and therapeutic relationships with each patient.

In holistic nursing having therapeutic trust with patient and nurse gives great advantage of achieving the goal of treating patients as a whole. Therapeutic trust can be developed by having conversation with the patient. In communication the sender can also become a receiver or vice versa which in holistic nursing the nurses are the receiver of patients concern and the pass the information on to the doctor and do the vice versa. As communication is vital element in nursing it is strongly recommended to nurses to understand what is needed and how to communicate with patients. Communicating with patients can help in the performances of nurses in holistic nursing as by communicating the nurses are able to understand the cultural, social values and psychological conditions. Through this the nurses are able to satisfy the needs of a patients and as well as protecting the nurse for

doing their roles as a nurse. In holistic nursing non-verbal communication is also another skill that is taught to nurses which are expressed by gestures, facial expression, posture and creating physical barriers. In holistic nursing as all individuals are not all the same but their social and psychological illness should be treated it is up to the nurse on how they communicate in order to build a therapeutic trust. To achieve the goal of holistic nursing it is important to communicate with the patient properly and to this successfully between the nurse and patient is freakiness and honesty. Without these communicating skills the nurse would not be able to build therapeutic trust and is likely to fail the goal of holistic nursing.

Building a Therapeutic Environment

Holistic nursing focuses on creating not only a therapeutic relationship with patients but also on creating a therapeutic environment for patients. Several of the therapies included in holistic nursing rely on therapeutic environments to be successful and effective. A therapeutic environment empowers patients to connect with the holistic nurse and with themselves introspectively.

Depending on the environment of where the patient is holistic approach may be different and knowing this will help nurses to achieve better in holistic nursing. For patients with illness, trauma and surgery increasing sleep will benefit in recovery, blood pressure, pain relief and emotional wellbeing. As in hospital there are many disturbances which can effect in patients' quality of sleep and due to this the patients are lacking in aid for healing, recovery and emotional wellbeing.

Nurse being able note or take care of patient's sleep will determine how closely they are approaching to holistic nursing. Depending on disease some the treatment may differ and may need further check-ups or program for patients to do. For example, there are higher chance for women to get cardiovascular disease but there is less number of enrollment for cardiac rehabilitation program compared to men. This was due to the environment of hospital not being able to support females in completing the CR programs. Some examples are physicians are less likely refer CR programs to women and patient's thought against safety of the program. In situation like this from the knowledge and education that was done from holistic nursing the nurses will be able to approach the patient as they can relate to what the patient is going thought which gives more comfort and safety to patients in doing the programs.

Cultural Diversity

Part of any type of nursing includes understanding the patient's comprehension level, ability to cope, social supports, and background or base knowledge. The nurse must use this information to effectively communicate with the patient and the patient's family, to build a trusting relationship, and to comprehensively educate the patient. The ability of a holistic nurse to build a therapeutic relationship with a patient is especially important. Holistic nurses ask themselves how they can culturally care for patients through holistic assessment because holistic nurses engage in ethical practices and the treatment of all aspects of the individual.

Australia has many different cultures as they are many people who were born overseas and migrated to Australia, which we can experience many cultural diversities. Culture can be defined as how people create collective beliefs and shared practices in order to make sense of their lived experiences which how concepts of language, religion and ethnicity are built in the culture. As the meaning of holistic nursing to heal the person as a whole knowing their cultural identities or backgrounds will help to reach the goal (Mariano, 2007). Understanding peoples culture may help to approach treatment correctly to the patient as it provides knowledge to nurses how patient's view of the concept of illness and disease are to their values and identity. As in holistic approach culture, beliefs and values are essential components to achieve the goal. People's actions to promote, maintain and restore health and healing are mainly influenced by their culture which is why knowing other cultures will assist in holistic nursing. By developing knowledge, communication, assessment skills and practices for nurses it guides to provide better experiences to patients who have diverse beliefs, values, and behaviors that respects their social, cultural and linguistic needs. As for most patients and families their decision on having treatment against illness or disease are done from cultural beliefs. This means if the nurses are unable to understand and give information relating to what they believe in the patients will most likely reject the treatment and give hardship on holistic nursing.

Holistic Education and Research

Holistic registered nurses are responsible for learning the scope of practice established in *Holistic Nursing: Scope and*

Standards of Practice(2007) and for incorporating every core value into daily practice. It is the holistic nurse's responsibility to become familiar with both conventional practices as well as alternative therapies and modalities. Through continuing education and research, the holistic nurse will remain updated on all treatment options for patients. Areas of research completed by holistic nurses includes: measurements of outcomes of holistic therapies, measurements of caring behaviors and spirituality, patient responsiveness to holistic care, and theory development in areas such as intentionality, empowerment, and several other topics.

The goal of holistic nursing is treat the patient's individual's social, cognitive, emotional and physical problems as well as understanding their spiritual and cultural beliefs. Involving holistic nursing in the education will help future nurses to be more familiar in the terms holistic and how to approach the concept. In the education of holistic nursing all other nursing knowledge is included which once again developed through reflective practice. In holistic nursing the nurses are taught on the five core values in caring, critical thinking, holism, nursing role development and accountability. These values help the nurse to be able to focus on the health care on the clients, their families and the allied health practitioners who is also involved in patient care. Education in holistic nursing is continuous education program which will be ongoing even after graduation to improve in reaching the goal. Education on holistic nursing would be beneficial to nurses if this concept is introduced earlier as repetition of educating holistic nursing could also be the revision of it. There is different education on commutating skills and an example would be the non-verbal and verbal communication with patients. This is done to

improve when would the right or wrong to use the communication skill and how powerful skills this could be.

Holistic Nurse Self-Care

Through the holistic nurse's integration of self-care, self-awareness, and self-healing practices, the holistic nurse is living the values that are taught to patients in practice. Holistic "nurses cannot facilitate healing unless they are in the process of healing themselves."

In order to provide holistic nursing to patient it is also important for nurses to take care of themselves. There are various ways which the nurses can heal, assess and care for themselves such as self-assessment, meditation, yoga, good nutrition, energy therapies, support and lifelong learning. By nurses being able achieve balance and harmony in their lives it can assist to understand how to take care of patient holistically. In Florida Atlantic University there is a program that focus on all caring aspects and recognize how to take care of others as well as on how to start evaluation on their own mind, body and spirit. Also there is Travis' Wellness Model which explores the idea of "self-care, wellness results from an ongoing process of self-awareness, exploring options, looking within, receiving from others (education), trying out new options (growth), and constantly re-evaluating the entire process. Self-awareness and education precede personal growth and wellness". This model of concepts shows being able to understand own status of health can benefit to patients and reach the goal of holistic nursing.

Certification

National certification for holistic nursing is regulated by the American Holistic Nurses Certification Corporation (AHNCC). There are two levels of certification: one for nurses holding a bachelor's degree and one for nurses holding a master's degree. Accreditation through the AHNCC is approved by the American Nurses Credentialing Center (ANCC).

Global initiatives

United States

American Holistic Nurses Association (AHNA): Mission Statement

"The Mission of the American Holistic Nurses Association is to illuminate holism in nursing practice, community, advocacy, research and education."

Canada

Canadian Holistic Nurses Association (CHNA): Mission Statement

"To support the practice of holistic nursing across Canada by: acting as a body of knowledge for its practitioners, by advocating with policy makers and provincial regulatory bodies and by educating Canadians on the benefits of complementary and integrative health care."

Australia

Australian Holistic Nurses Association (AHNA)

"The Mission of the Australian Holistic Nurses Association (AHNA) is to illuminate holism in nursing practice, research, and education; act as a body of knowledge for its practitioners; advocate with policymakers and regulatory bodies; and educate Australians on the benefits of Complementary and Alternative Medicine (CAM) and integrative health care."

Home health nursing

Home health nursing is a nursing specialty in which nurses provide multidimensional home care to patients of all ages. Home health care is a cost efficient way to deliver quality care in the convenience of the client's home. Home health nurses create care plans to achieve goals based on the client's diagnosis. These plans can include preventive, therapeutic, and rehabilitative actions. Home health nurses also supervise certified nursing assistants. The professional nursing organization for home health nurses is the Home Healthcare Nurses Association (HHNA). Home health care is intended for clients that are well enough to be discharged home, but still require skilled nursing personnel to assess, initiate and oversee nursing interventions.

History

Lillian Wald is recognized as the pioneer of public health nursing. She established the Henry Street Settlement which

served underprivileged individuals and families. Nurses and social workers that worked at the Henry Street Settlement visited patients in their homes, assessed their health needs, and provided support with hygiene, nutrition, immunizations and more. Wald was able to convince Metropolitan Life Insurance Company to cover home care services. This allowed public health nursing to shift from charitable work to profitable work.

Roles and responsibilities

There is a wide range of services that are performed by many different professionals, services include wound care, disease management, medical equipment, therapy, medical social services, and patient education. Home health nurses have a wide range of duties and services provided, and in addition to services provided nurses also consult with doctors on the status of the patient and provide feedback on any potential changes that need to be made to the care plan.

Some responsibilities that home health nurses take on include promoting health and disease prevention, medication administration, educating patients on their current diagnosis, providing emotional support, and providing basic care such as personal hygiene.

Nurses also step into the role of case managers, meaning that they coordinate services from different disciplines for the patient. This can include rehabilitation, pharmacy, community resources and more.

Providing the most up-to-date and effective care for a patient is also a very important part of a home health nurse's job. They do this by continually keeping up to date on the latest research and Evidence-Based Practice.

Education and certification

Home health nurses can have a nursing diploma, be a licensed practical nurse, have an associate of science in nursing, or a bachelor of science in nursing. They can then sit for a test through the American Nurses Credentialing Center that will allow them to become a certified home health care nurse.

Scope and standards of practice

The scope of home health nursing is directly related to the nursing process. This includes assessment, diagnosis, planning, implementation, and evaluation. The standards of home health nursing integrate research, education, proper use of resources, the quality of care provided, team collaboration, and ethical principles.

Pediatric Home Health Nursing

To help reduce cost and improve quality of care for increasing numbers of children with chronic conditions, pediatric medicine is transitioning many patients from hospitalized care to home health management. Home Health Care is often a less expensive and more convenient option for pediatric patients, and discharge to home with home health care has been shown

to reduce hospital readmission rates and length of hospital stays, ultimately reducing costs for the patient.

There are 2 types of pediatric home health nursing: 1) Skilled Nursing Visits (SNV): intermittent, short visits by nurses to a patients home with the goal of helping the patient and caregivers reach total independence at home. Nurses typically visit the patient to provide monitoring, perform lab work, and administer medications. 2) Private Duty Nursing (PDN): extended, 24-hour care services to patients at home to satisfy long-term care needs of patients who cannot safely live at home with their caregivers without medical care supervision. In a recent study of 2783 hospitalized pediatric patients who were discharged home with home health nursing, 92% of the patients received PDN services, while 8% received SNV, suggesting that PDN is more common in the pediatric population.

Barriers in home health nursing

Home health nursing is a unique field considering the obstacles faced by healthcare professionals. When out visiting clients, the nurse is alone and cannot rely on others most of the time. Nurses in home health care must learn to be autonomous.

The variety of home conditions that a nurse will step into can also present problems. Cleanliness and safety play large roles in client care. Not all homes are equipped to provide a clean environment for the client. Environmental issues in the home include unsanitary conditions that allow for bacterial growth and conditions that may increase the risk of falling for the

client, such as poor lighting and area rugs. Education regarding this is important for the nurse to share with the client.

Medication adherence is also more complicated at home. Unlike in a hospital setting, the medication is scheduled around the clock and readily available. It is really dependent on the client's resources and financial situation. Also, client compliance, or client adherence to the plan of care, factors into client health outcomes.

Eligibility

Home health care is generally less expensive and more convenient then in the hospital. When possible home health care helps regain independence, become more self-sufficient, and maintain current level of function. The primary payer for home health care is Medicare dependent on meeting certain eligibility criteria.

Home health services are covered when all of the following criteria are met:

- Patient is under the care of a doctor, and getting services under a plan of care established.
- A doctor certifies that the patient needs, one or more of the following: intermittent skilled nursing care, physical therapy, speech-language pathology, and continued occupational therapy
- Home health agency caring for patient is approved by Medicare
- Doctor certifies that patient is homebound

- As part of eligibility, a doctor or health care professional must document that they have had a face to face encounter within required timeframe and the reason was related to need for home health care

Eligibility for home health care is determined by intermittent skilled nursing care that is needed fewer than 7 days each week and daily less than 8 hours each day for up to 21 days. If skilled nursing care is needed more than this over extended period of time it would not qualify for home health benefits under Medicare guidelines.

Hyperbaric nursing

Hyperbaric nursing is a nursing specialty involved in the care of patients receiving hyperbaric oxygen therapy. The National Board of Diving and Hyperbaric Medical Technology offers certification in hyperbaric nursing as a Certified Hyperbaric Registered Nurse (CHRN). The professional nursing organization for hyperbaric nursing is the Baromedical Nurses Association.

Hyperbaric nurses are responsible for administering hyperbaric oxygen therapy to patients and supervising them throughout the treatment. These nurses must work under a supervising physician trained in hyperbarics who is available during the treatment in case of emergency. Hyperbaric nurses either join the patient inside the multiplace hyperbaric oxygen chamber or operate the machine from outside of the monoplace hyperbaric oxygen chamber, monitoring for adverse reactions to the treatment. Patients can experience adverse reactions to the hyperbaric oxygen therapy such as oxygen toxicity,

hypoglycemia, anxiety, otic barotrauma, or pneumothorax. The nurse must know how to handle each adverse event appropriately. The most common adverse effect is otic barotrauma, trauma to the inner ear due to pressure not being released on descent. Since hyperbaric oxygen therapy is usually administered daily for a set number of treatments, adverse effects must be prevented in order for the patient to receive all prescribed treatments. The hyperbaric nurse will collaborate with the patient's physician to determine if hyperbaric oxygen therapy is the right treatment. The nurse must know all approved indications that warrant hyperbaric oxygen therapy treatments, along with contraindications to the treatment.

Legal nurse consultant

A **legal nurse consultant** is a registered nurse who uses expertise as a health care provider and specialized training to consult on medical-related legal cases. Legal nurse consultants assist attorneys in reading medical records and understanding medical terminology and healthcare issues to achieve the best results for their clients. The specialty is a relatively recent one, beginning in the mid-1980s.

A legal nurse consultant bridges gaps in an attorney's knowledge. While the attorney is an expert on legal issues, the legal nurse consultant is an expert on nursing and the health care system. A legal nurse consultant screens cases for merit, assists with discovery, conducts the existing literature and medical research, reviews medical records, identifies standards of care, prepares reports and summaries on the extent of injury or illness, creates demonstrative evidence, and locates

or acts as an expert witness. The legal nurse consultant acts as a specialized member of the litigation team whose professional contributions are often critical to achieving a fair and just outcome for all parties.

A legal nurse consultant differs from a paralegal in that a paralegal assists attorneys in the delivery of legal services and frequently requires a legal education, while a legal nurse consultant is first and foremost a practitioner of nursing, and legal education is not necessarily a prerequisite.

A legal nurse consultant uses existing expertise as a health care professional to consult and educate clients on specific medical and nursing issues in their cases.

Aside from within law firms, legal nurse consultants may also work for government agencies, insurance companies and health maintenance organizations, in hospitals as part of the risk management department, and may also be in independent practice.

The American Association of Legal Nurse Consultants which was founded in 1989, is a non-profit membership organization whose mission is to promote legal nurse consulting as a nursing speciality. The Association also promulgates a Code of Ethics for the Legal Nurse Consultant practitioner. As of 2001, the Association had approximately 4,000 members, the majority of whom had joined after 1994.

There are a number of training courses and certifications available for legal nurse consultants. The American Legal Nurse Consultant Certification Board offers an online examination which is the only certification exam credited by

the American Board of Nursing Specialties. Other training and certification programs are available from both commercial and non-commercial organizations. As of 2001, the American Bar Association sanctioned 28 legal nurse consultant programs across the United States.

Chapter 5

Specialties and Areas of Practice: Part II

Matron

Matron is the job title of a very senior or the chief nurse in several countries, including the United Kingdom, its former colonies, such as India, and also the Republic of Ireland. The chief nurse, in other words the person in charge of nursing in a hospital and the head of the nursing staff, is also known as the **senior nursing officer**, **matron**, **nursing officer**, or **clinical nurse manager** in UK English; the **head nurse** or **director of nursing** in US English, and the **nursing superintendent** or **matron** in Indian English, among other countries in the Commonwealth of Nations.

In the United Kingdom, matrons today "have powers over budgets, catering and cleaning as well as being in charge of nurses and doctors" and "have the powers to withhold payments from catering and cleaning services if they don't think they are giving the best service to the NHS." Historically, matrons supervised the hospital as a whole but today, they are in-charge of supervising two or three wards.

The chief nurse is a registered nurse who supervises the care of all the patients at a health care facility. The chief nurse is the senior nursing management position in an organization and often holds executive titles like **chief nursing officer**

(**CNO**), **chief nurse executive**, or **vice-president of nursing**. They typically report to the CEO or COO.

In the United States a matron is not a nurse, but a female assistant to males running a residential facility, like a camp, boarding school, or prison (see #Other uses, below).

History

The word "matron" is derived from the Latin for "mother", via French.

The matron was once the most senior nurse in a hospital (in the United Kingdom before c. 1972). She was responsible for all the nurses and domestic staff, overseeing all patient care, and the efficient running of the hospital, although she almost never had real power over the strategic running of the hospital. Matrons were almost invariably female—male nurses were not at all common, especially in senior positions. They were often seen as fearsome administrators, but were respected by nurses and doctors alike.

The National Health Service matron became memorably associated with the formidable character played by actress Hattie Jacques in the 1959 film *Carry On Nurse* and the 1967 film *Carry On Doctor* (and gentler portrayals in *Carry On Again Doctor* and *Carry On Matron*). The matron usually had a very distinctive uniform, with a dark blue dress (although often of a slightly different colour from those worn by her direct subordinates, the sisters) and an elaborate headdress.

Contemporary matrons

In 2001 the British Government announced the return of the matron to the NHS, electing to call this new breed of nurses "modern matrons," in response to various press complaints of dirty, ineffective hospitals with poorly disciplined staff.

They are not intended to have the same level of responsibility as the old matrons, as they often oversee just one department (therefore a hospital may have many matrons—one for surgery, one for medicine, one for geriatrics, one for the accident & emergency department, etc.) but do have budgetary control regarding catering and cleaning contracts. In larger hospitals some will have a group of wards to manage.

Their managerial powers are more limited, and they spend most of their time on administrative work rather than having direct responsibility for patient care.

Many areas of the UK now employ Community Matrons. The role of this staff group is predominantly Clinical and these Matrons have a caseload of patients for whom they are clinically responsible. Many of these patients have chronic health conditions such as COPD, Emphysema, and/or palliative conditions which result in multiple hospital admissions. It is the aim of this staff group to treat the patient within the community thereby limiting hospital admissions. This staff group are predominantly Nurses, but there are other Allied Health Professionals also in the role such as Paramedics and Occupational Therapists.

The nursing branches of the British Armed Forces have never abandoned the term "Matron", and it is used for male as well as female officers, usually holding the rank of Major (or equivalent) or above. It was formerly used as an actual rank in the nursing services.

In South Africa and its former mandated territory South-West Africa (today's Namibia), Matron is the rank of the most senior nurse of a hospital.

Other uses

Long before women were commonly employed as fully sworn police officers, many police forces employed uniformed women with limited powers to search and attend to female prisoners and deal with matters specifically affecting women and children. These female officers were often known as "police matrons". Officers in women's prisons sometimes also used the title of "matron"; sometimes the matron was a senior officer who supervised the other wardresses.

Institutions such as children's homes and workhouses were also run by matrons. The matron of a workhouse was very often the wife of the master and looked after the domestic affairs of the establishment. This was, in fact, the original meaning of the term. Its use in hospitals was borrowed from workhouses.

The term was also used in boarding schools (and is still used in some British independent schools) for the woman in charge of domestic affairs in a boarding house or the school nurse. In the past, the matron was sometimes the wife of the

housemaster. In The Church of Jesus Christ of Latter-day Saints, the female spouse of a temple president or his counselors is referred to as a *temple matron*.

In New York City, movie theater matrons were employed beginning in 1936 to ensure that children would behave in theaters. They were licensed by the Department of Health until 1943, and the ordinance that required their hiring and selection was formally repealed by the city in 1995.

Medical-surgical nursing

Medical-surgical nursing is a nursing specialty area concerned with the care of adult patients in a broad range of settings. The Academy of Medical-Surgical Nurses (AMSN) is a specialty nursing organization dedicated to nurturing medical-surgical nurses as they advance their careers. Traditionally, medical-surgical nursing was an entry-level position that most nurses viewed as a stepping stone to specialty areas. Medical-surgical nursing is the largest group of professionals in the field of nursing. Advances in medicine and nursing have resulted in medical-surgical nursing evolving into its own specialty.

Many years ago a majority of hospital nurses worked on wards, and everyone was a medical-surgical nurse. Today licensed medical-surgical nurses work in a variety of positions, inpatient clinics, emergency departments, HMO's, administration, out patient surgical centers, home health care, humanitarian relief work, ambulatory surgical care, and skilled nursing homes. Some military medical-surgical nurses serve on battlefields.

Registered nurses can become certified medical-surgical nurses through the American Nurses Credentialing Center. and also through the Medical-Surgical Nursing Certification Board's (MSNCB) (msncb.org) Certified Medical-Surgical Registered Nurse (CMSRN) credential.

Nurse midwife

A **nurse midwife** is both a nurse (usually a registered nurse) and a midwife, having completed nursing and midwifery education leading to practice as a nurse midwife and sometimes credentialed in the specialty. Nurse midwives provide care of women across the lifespan, including during pregnancy and the postpartum period, and well woman care and birth control.

Practice

Nurse midwives can function as primary healthcare providers for women and most often provide medical care for relatively healthy women, whose health and births are considered uncomplicated rather than high risk, as well as their neonates. Women with high risk pregnancies can often receive the benefits of midwifery care from a nurse midwife in collaboration with a physician. The nurse midwife may work closely or in collaboration with an obstetrician & gynecologist, who provides consultation and assistance to patients who develop complications or have complex medical histories or disease(s). They provide health care for sexual health, as they also see women for routine exams and are able to initiate all types of contraception.

Nurse midwives practice in hospitals and private practice medical clinics and may also deliver babies in birthing centers and attend at-home births. Some work with academic institutions as professors. They are able to prescribe medications, treatments, medical devices, therapeutic and diagnostic measures. They are able to provide medical care to women from puberty through menopause, including care for their newborn (neonatology), antepartum, intrapartum, postpartum and nonsurgical gynecological care. In some cases, nurse midwives may also provide care to the male partner of their female patient in areas of sexually transmitted diseases and reproductive health. In the United States, less than one percent of nurse midwives are men.

Military nurse

Most professional militaries employ specialised**military nurses**. They are often organised as a distinct nursing corps. Florence Nightingale formed the first nucleus of a recognised Nursing Service for the British Army during the Crimean War in 1854. In the same theatre of the same war, Professor Nikolai IvanovichPirogov and the Grand Duchess Yelena Pavlovna originated Russian traditions of recruiting and training military nurses – associated especially with besieged Sevastopol (1854–1855). Following the war Nightingale fought to institute the employment of women nurses in British military hospitals, and by 1860 she had succeeded in establishing an Army Training School for military nurses at the Royal Victoria Military Hospital in Netley, Hampshire, England.

In 1898, after the Spanish-American War, the United States added 1,500 nurses to their military personnel (Brooks, 2018). A year later in 1899, the Surgeon General recognized the importance of these nurses and established a "reserve group" of nurses with specific criteria to prepare for future wars. Military nurses are similar to floor nurses in that they spend most of their time providing direct patient care. Patient assessments, medication distribution, interventions and documentation are part of their daily work. These nurses are needed at all military bases, active war zones, clinics and front lines – not always on United States territory.

Well-known nursing corps

- U.S. Army Nurse Corps, a special branch of the Army Medical Department (United States)
- Queen Alexandra's Royal Army Nursing Corps, a specialist corps of the Army Medical Services of the British Army
- Royal Australian Army Nursing Corps
- U.S. Navy Nurse Corps, a staff corps of the United States Navy
- U.S. Air Force Nurse Corps
- Military Nursing Service (India)

Educational Requirements

According to Nguh (2020), for nursing officers to serve in the military it normally requires a Bachelor's degree in Nursing. For example, a branch known as the Air National Guard, allows an individual to join as enlisted and work as a Aeromedical

Evacuation Technician while finishing their BSN degree. The military branch will pay for the individuals BSN and after graduation the nurse can earn a salary as a 2nd Lieutenant contingent upon successfully passing their nursing boards.

Challenges to working as a military nurse

Nurses can often experience challenges when delivering care to patients when they do not have the appropriate supplies, medicines, and equipment that is normally available in American hospitals A study was conducted in Camp Bastion Hospital in Afghanistan, where 18 British Armed Forces nurses were interviewed. These nurses serves in Afghanistan between 2001 and 2014 and it was found that nurses often experienced many psychological stressors such as lacking family support, suffering from mental health issues, experiencing separation anxiety, missing their families and friends, feeling unprepared and not able to take care of seriously injured patients, and nurses found it emotionally difficult taking care of terminally ill patients.

Pediatric nursing

Pediatric nursing is part of the nursing profession, specifically revolving around the care of neonates and children up to adolescence. The word, *pediatrics*, comes from the Greek words 'paedia' (child) and 'iatrike' (physician). 'Paediatrics' is the British/Australian spelling, while 'pediatrics' is the American spelling.

Disciplines

Direct nursing

Nursing functions vary regionally, by individual education, experience, and individual career goals. Functions include the administration of procedures and medicines according to prescribed nursing care plans. These nurses observe vital signs and develop communication skills with children and family members, as well as with other medical personnel. Supporting children and their families is one component of direct nursing care. Awareness of the concerns of children and parents, physical presence at times of stress, and helping children and family members cope are other common functions.

Neonatal nursing

Neonatal nurses specialize in working with the youngest patients. Neonatal nursing focuses on providing care and support for newborn babies delivered prematurely or who are suffering from health problems such as birth defects, infections, or heart deformities. Many neonatal nurses work in a Neonatal Intensive Care Unit (NICU) providing specialized medical care to at-risk newborns.

A *dysmature newborn* "is one whose developmental level is poor at birth."p These newborns require a special type of care, due to their health issues, such as:

- Inadequate respiratory function
- Poor control of body temperature
- Increased tendency to bleed

- Poor resistance to infection
- Poor nutrition
- Immature kidneys and skin
- Jaundice

Neonatal nurses employ medical techniques, including the use of incubators. Essentially, the incubator "provide[s] proper heat, humidity, oxygen, and mist... and protection from infection." The medical apparatus provides essential medical care for at-risk newborns.

Emergency nursing

Pediatric nurses are expected to provide a quick response to stressful circumstances in life-threatening situations. Key features of pediatric emergency nursing include:

- Handling multifaceted trauma, injury or illness cases without letting the patients succumb to the urgency of the situation
- Stabilizing patients
- Quickly diagnosing conditions and providing on-spot solutions
- Administering appropriate medications to address pain
- Upgrading skills and knowledge
- Remaining patient and caring for the traumatized families accompanying the patient
- Maintaining equanimity around patients who do not improve.

Pediatric nurse practitioners

Pediatric nurse practitioner must attend school for at least two years after earning a bachelor's degree, pass an examination, and apply to their state board of nursing.

Goals

- Normalize the life of the child during hospitalization.
- Minimize the impact of the child's unique condition.
- Foster growth and development.
- Develop realistic, functional and coordinated home care plans.
- Respect the roles of the families.
- Prevent disease and promote health.

Training

Australia

A registered nurse license is required. A registered nurse requires a Bachelor of Science (Nursing), a 3–4 years full-time investment. Once completed 12–18 months in a clinical setting is required followed by completing a graduate certificate in pediatric nursing.

United States

The CPN (certified pediatric nurse) exam validates knowledge and expertise beyond the prerequisite Registered Nurse (RN) licensure. Eligible RNs may have a diploma, associate's degree,

BSN, MSN, or higher nursing degree and must have a minimum of 1800 hours of pediatric nursing experience. Over 30,000 nurses actively held CPN certification as of April 15, 2021.

Training involves a mix of formal education and clinical experiences. Pediatric nurses can become certified in the field and may choose to further specialize. Students can enroll in an associate or bachelor's degree program. Some diploma programs offered exclusively through hospitals may also prepare students for the RN exam.

Global development

Southern and eastern Africa

Strengthening the pediatric nursing workforce has been recommended as a primary strategy to reduce under-five mortality in African nations.

Children make up close to half the population in many African countries, but research suggests that children's nurses often make up less than 1% of the nursing workforce: a 2019 workforce survey found approximately 4,000 qualified children's nurses in South Africa, Uganda, Zambia, Malawi and Kenya. The majority (8/10) were in South Africa.

Career overview

Pediatric nurses work in settings including doctor's offices and community-based settings to hospitals and critical care facilities. Pediatric nurses may assist pediatricians or work

alongside them. Pediatric nurses offer primary care services such as diagnosing and treating common childhood illnesses and conducting developmental screenings. Acute care and specialty services are also available for the chronically ill. Some pediatric nurses and nurse practitioners specialize in areas such as cardiology, dermatology, gastroenterology or oncology.

Education

Pediatric nurses are responsible for helping patients adapt to a hospital setting and prepare them for medical treatments and procedures. Nurses also coach parents to observe and wait for important signs and responses to therapies, to increase the child's comfort, and even to provide ongoing care.

Counseling

Injury-prevention strategies and anticipatory guidance are provided via counseling. Helping the child or family solve a problem is often a focus, usually provided by advanced practice nurses or other experienced nurses.

Advocacy

The effective advocate nurse must be aware of the child's and the family's needs, the family's resources, and available health care services.

Nurses help reinforce families to help them make knowledgeable choices about medical services and to act in the child's best interests.

Orthopaedic nursing

Orthopaedic nursing (or **orthopedic nursing**) is a nursing specialty focused on the prevention and treatment of musculoskeletal disorders. Orthopaedic issues range from acute problems such as fractures or hospitalization for joint replacement to chronic systemic disorders such as loss of bone density or lupus erythematosus.

Orthopaedic nurses have specialized skills such as neurovascular status monitoring, traction, continuous passive motion therapy, casting, and care of patients with external fixation.

Board certification

Certification in general orthopaedic nursing results in the designation "Orthopaedic Nurse Certified" (ONC).

Dates

- International Orthopaedic Nurses Day is October 30.
- Osteoporosis Awareness and Prevention Month is May.

Oncology nursing

An **oncology nurse** is a specialized nurse who cares for cancer patients. These nurses require advanced certifications and clinical experiences in oncology further than the typical

baccalaureate nursing program provides. Oncology nursing care can defined as meeting the various needs of oncology patients during the time of their disease including appropriate screenings and other preventive practices, symptom management, care to retain as much normal functioning as possible, and supportive measures upon end of life.

Certification in the United States

The Oncology Nursing Certification Corporation (ONCC) offers several different options for board certification in oncological nursing. Certification is a voluntary process and ensures that a nurse has proper qualifications and knowledge of a specialty area and has kept up-to-date in his or her education.

The ONCC offers eight options for certification:

- *Basic:*
- OCN: Oncology Certified Nurse
- CPON: Certified Pediatric Oncology Nurse
- CPHON: Certified Pediatric Hematology Oncology Nurse
- *Specialty:*
- BMTCN: Blood and Marrow Transplant Certified Nurse
- CBCN: Certified Breast Care Nurse
- *Advanced:*
- AOCN: Advanced Oncology Certified Nurse
- AOCNP: Advanced Oncology Certified Nurse Practitioner
- AOCNS: Advanced Oncology Certified Clinical Nurse Specialist

Certification is granted for four years, after which it must be renewed by taking a recertification test or by earning a certain number of continuing education credits.

To become certified, nurses must have an RN license, meet specific eligibility criteria for nursing experience and specialty practice, and must pass a multiple-choice test.

For the advanced AOCNP and AOCNS certifications, a nurse must have a master's degree or higher in nursing and a minimum of 500 hours of supervised clinical practice of oncology nursing. The AOCNP certification also requires successful completion of an accredited nurse practitioner program.

Oncology Nursing in Morocco

Demand

The demand for oncology nurses is enormous in Morocco. Statistics of the Moroccan Ministry of Health indicate that the death toll of malignant neoplasms mounts to 17 thousands a year. The number of patients with cancer is believed to be three-times the number of annual deaths. A recent study of the European Institute of Health Sciences (InstitutEuropéen des Sciences de la Santé) projected that the need for oncology nurses in 2025 is estimated at 5 thousand nurses. Yet, the number of qualified oncology nurses in the country is equal to nil. The reason is obviously the absence of a formal educational program in oncology nursing.

Oncology nursing training in Morocco

Currently there currently exists only one educational program in oncology nursing that is being offered by the European Institute of Health Sciences. It has been approved by the Ministry of Higher Education as well as the Ministry of Health in 2014. The duration of this Bachelor of Science program in Oncology Nursing is 3 years and encompasses a total of 6 thousands hours, equivalent to 120 semester credits in the US educational system and 180 ECTS in the European system. The program attracts a large number of students from African countries.

Certification requirements in Morocco

In Morocco, there exists no system for certification of oncology nurses. However, graduates of the oncology nursing program of the European Institute of Health Sciences can set for certification exams abroad, particularly in European countries.

Roles

Oncology nurses, like any Registered Nurse have a large variety of settings they can work in. Oncology nurses can work inpatient settings such as hospitals, outpatient settings, in hospice services, or in physician offices. There are a variety of specialties such as radiation, surgery, pediatric, or gynecologic. Oncology nurses have advanced knowledge of assessing the client's status and from this assessment will help the multi-disciplinary medical team to develop a treatment plan.

Education

The nurse must also educate the patient on their condition, its side effects, its treatment plan, and how to prevent possible complications. This education should be done effectively throughout the treatment of the disease, according to the teaching style that best suits the particular patient. According to the Oncology Nursing Standards, the patient or caregivers for the patient should understand the state of the disease and the therapy used at their education level, understand the therapy schedule and when it is being used, be involved in decisions regarding their own care, and state interventions for serious side effects and complications of the disease and intervention.

Treatment

Nurses must be able to manage the many side effects associated with cancer and the treatment. Nurses must have extensive knowledge of pharmacological and nonpharmacological nursing interventions, and when they are appropriate to use.

Chemotherapy

Oncology nurses must have appropriate training in the administration, handling, side effects, and dosing of chemotherapy. Each institution will have its own policies for various chemotherapy drugs to ensure adequate training and for prevention of errors. The Oncology Nursing Society (ONS) and Oncology Nursing Certification Corporation (ONCC) offer a Chemotherapy/Biotherapy training course available to any

oncology nurse to ensure the safe administration and management of side effects of chemotherapy and biotherapy agents. This course consists of 16 contact hours. This certification needs to be renewed after two years.

Occupational health nursing

Occupational health nursing is a specialty nursing practice that provides for and delivers health and safety programs and services to workers, worker populations, and community groups. The practice focuses on promotion, maintenance and restoration of health, prevention of illness and injury, and protection from work-related and environmental hazards. Occupational health nurses (OHNs) aim to combine knowledge of health and business to balance safe and healthful work environments and a "healthy" bottom line.

Job Functions

Occupation health nursing can be found in almost every major healthcare facility. Saldana, Pimentel, and Posada (2019) describe occupation health as a niche in nursing that specializes in assessing and evaluating the "health status" of employees and function to maintain the highest level of well-being of the workforce. The key components of occupational health nursing involves prevention of illness and injury in the workplace, health and wellness, protection, and education (McCullagh& Berry, 2015). Nurses in occupational health also have a role in implementing research projects and incorporating evidence based practice into clinical practice (Saldana et al., 2019). Occupational health nursing is an

important niche and works to protect and promote the wellbeing of the community and workforce (Saldana et al., 2019). KWiggancsu

In the United States

In the United States the role of the occupational health nurse started in 1888. A nurse named Betty Moulderwas hired by multiple coal mining companies in Pennsylvania to take care of their employees and families because of the conditions at the workplace. Because of this many people consider Pennsylvania as the birthplace of occupational health nursing Through the years occupational health nursing grew in order to fight against infectious diseases and health issues related to labor shortages. Today employees with poor health will cost companies one trillion dollars. Occupational health nurses are hired by companies within the United States in order to decrease job related injuries and absentee percentages. According to the CDC (2017), studies have shown that occupational health nurses provide significant financial benefits to employers and their employees. As of 2012, there were approximately 19,000 occupational health nurses in the U.S. Occupational health nurse training in the U.S. is supported by the National Institute for Occupational Safety and Health through the NIOSH Education and Research Centers.

Roles and Responsibilities

Modern roles of Occupational Health Nurses are as diverse as clinicians to educators. As the profession progresses the

responsibilities of this profession have also grown. Some of the areas that occupation nurses are responsible for but are not limited to:

Case Management: OHNs routinely coordinate and manage the care of ill and injured workers. Occupational Health Nurses role as case managers has grown as they now assist with the coordination and management of work-related and non-work related injuries and illness, which includes group health, worker's compensation and Family Medical Leave Act (FMLA) as well as short/long term disability.

Health Promotion and risk reduction: OHNs develop programs that promote lifestyle change and individual efforts that lower risk of disease and injury. OHNs also assist in creating environments that provide a sense of balance among work, family, personal, health and psychosocial concerns. Additional strategies to assist in health promotion to keep workers healthy and productive include immunizations, smoking cessation, exercise/fitness, nutrition and weight control, stress management, chronic disease management, and use of medical services.

Counseling and crisis intervention: Occupational Health Nurses (OHNs) offer counseling to workers for many issues. They provide counseling for common challenges such as work-related issues and injuries (American Association of Occupational Health Nurse [AAOHN], n.d.). They also provide counseling for other issues such as substance abuse, psychological issues, concerns for health and wellness, etc. (AAOHN, n.d.). OHNs can also manage employee assistance

programs, take charge of referrals, and coordinate follow-up of community resources (AAOHN, n.d.). (apaulCSU)

Workplace hazard identification: OHNs can detect hazards or potential hazards in the workplace. They are able to conduct research in order to monitor, evaluate, and analyze certain hazardous elements (AAOHN, n.d.). Conducting research assists in developing a safety plan and implementing preventative and control measures (AAOHN, n.d.). Examples of workplace hazards include toxic chemical exposure, confined spaces, frayed cords, infectious material exposure, extreme heat/cold conditions, and injuries such as falls. It is important to detect patterns and implement changes to promote a safer workplace environment. (apaulCSU)

(apaulCSU).

Requirements

Occupational Health Nurses need a license in the state they practice. Nurses usually have a baccalaureate in nursing and experience in community health, ambulatory care, critical care or emergency care (Wachs, 2017). Most occupational health nurses get their master's degrees in public health, advanced practice or business to have a higher professional competency (Wachs, 2017).

Nurses can get certified in occupational health nursing through The American Board for Occupational Health Nurse, INC (Wachs, 2017).

Future of Occupational Health Nursing

Occupational Health is projected to grow by 12% 2022 (McCauley & Peterman, 2017). Health and wellness in the workplace areas becoming more important than ever. Healthcare reform is set to improve access to deliver healthcare services for all individuals (McCauley & Peterman, 2017). The demand for occupational health nurses will increase due to the reform. Workplaces today have rising insurance costs and worker compensation cases, this creates a need for qualified occupational health nurses who understand the healthcare market (Peckham et al., 2017). Most cooperation's have incorporated a wellness program to help decrease employee related injury and illness (Peckham et al., 2017). Also, many companies are taking precautions to prevent lawsuits.

Obstetrical nursing

Obstetrical nursing, also called **perinatal nursing**, is a nursing specialty that works with patients who are attempting to become pregnant, are currently pregnant, or have recently delivered. Obstetrical nurses help provide prenatal care and testing, care of patients experiencing pregnancy complications, care during labor and delivery, and care of patients following delivery. Obstetrical nurses work closely with obstetricians, midwives, and nurse practitioners. They also provide supervision of patient care technicians and surgical technologists.

Obstetrical nurses perform postoperative care on a surgical unit, stress test evaluations, cardiac monitoring, vascular monitoring, and health assessments. Obstetrical nurses are required to possess specialized skills such as electronic fetal monitoring, nonstress tests, neonatal resuscitation, and medication administration by continuous intravenous drip.

Obstetrical nurses are also expected to be detailed and organized because they usually have more than one patient to deal with at a time. Their mental and physical strength is important because the nurses work long hours usually standing and also have to be able to perform tasks expertly. Nurses should be emotionally stable because they will have to cope with emergencies and loss. Lastly, they need to have critical thinking skills because the patient's health could change in an instant and they have to be ready to know what to do quickly and accurately.

Obstetrical nurses work in many different environments such as medical offices, prenatal clinics, labor & delivery units, antepartum units, postpartum units, operating theatres, and clinical research.

In the U.S. and Canada, the professional nursing organization for obstetrical nurses is the Association of Women's Health, Obstetric and Neonatal Nursing (AWHONN).

Certification for obstetrical nurses

The National Certification Corporation (NCC) offers certifications for obstetrical nurses. These include RNC-OB (Inpatient Obstetrics), a certification that allows graduate

nurses who have completed a bachelor's degree in the US or Canada, who want to expand into obstetrics. It is an online exam that costs around $325, and by the end of it they will gain themselves RNC-OB certificates. RNC-MNN (Maternal Newborn Nursing) is another online exam that is for certified registered nurses, who have completed their bachelor's degrees in Nursing and have gained experienced in the area of newborn nursing, and are wanting to gain a certification/qualification in the area. The test costs around $325 and they have a 90-day window to complete the actual exam and C-EFM (Electronic Fetal Monitoring). This certification like the other two is an online citification exam, for US and Canadian graduate nursing students. To do the online certification they are required to be either a licensed registered nurse, nurse practitioner, nurse midwife, physician, physician assistant, or paramedic, according to the US and Canada requirements.

Australian certification and requirements

Bachelor's degrees in either nursing and/or midwifery are required to become an obstetrical or perinatal nurse in Australia. In Australia alone there are 32 different universities that offer nursing as an undergraduate degree, such as Australian Catholic university, Charles Darwin University and the University of Notre Dame in Australia. Once completing their degree, they are required to complete their master's degree in nursing. Bachelor's degrees and jobs as licensed nurses/midwives are required in order to be accepted for the master's degree. There are 24 different universities in Australia

that offer a master's degree in nursing, including Edith Cowan University, Monash University, James Cook University and University of Canberra.

Health informatics

Healthcare informatics or **biomedical informatics** is the field of science and engineering that apply informatics fields to medicine. The health domain provides an extremely wide variety of problems that can be tackled using computational techniques.

Medical informatics is a spectrum of multidisciplinary fields that includes study of the design, development and application of computational innovations to improve health care. The disciplines involved combines medicine fields with computing fields, in particular computer engineering, software engineering, information engineering, neuroinformatics, bio-inspired computing, theoretical computer science, information systems, data science, information technology, autonomic computing, and behavior informatics. In academic institutions, medical informatics research focus on applications of artificial intelligence in healthcare and designing medical devices based on embedded systems. Medical informatics also includes modern applications of neuroinformatics and cognitive informatics in the fields of brain mapping and emulation. In some countries term informatics is also used in the context of applying library science to data management in hospitals. According to *Journal of Biomedical Informatics*, cognitive informatics is a burgeoning interdisciplinary domain comprising the cognitive and information sciences that focuses

on human information processing, mechanisms and processes within the context of computing and computing applications.

Subspecialities

- According to Jan van Bemmel, medical informatics comprises the theoretical and practical aspects of information processing and communication based on knowledge and experience derived from processes in medicine and health care.

Medical image computing and imaging informatics

Imaging informatics and medical image computing develops computational and mathematical methods for solving problems pertaining to medical images and their use for biomedical research and clinical care. Those fields aims to extract clinically relevant information or knowledge from medical images and computational analysis of the images. The methods can be grouped into several broad categories: image segmentation, image registration, image-based physiological modeling, and others.

Cognitive informatics and artificial intelligence in healthcare

A pioneer in the use of artificial intelligence in healthcare was american biomedical informaticianEdward H. Shortliffe. This field deals with utilization of machine-learning algorithms and artificial intelligence, to emulate human cognition in the analysis, interpretation, and comprehension of complicated

medical and healthcare data. Specifically, AI is the ability of computer algorithms to approximate conclusions based solely on input data. AI programs are applied to practices such as diagnosis processes, treatment protocol development, drug development, personalized medicine, and patient monitoring and care. A large part of industry focus of implementation of AI in the healthcare sector is in the clinical decision support systems. As more data is collected, machine learning algorithms adapt and allow for more robust responses and solutions. Numerous companies are exploring the possibilities of the incorporation of big data in the healthcare industry. Many companies investigate the market opportunities through the realms of "data assessment, storage, management, and analysis technologies" which are all crucial parts of the healthcare industry. The following are examples of large companies that have contributed to AI algorithms for use in healthcare:

- IBM's Watson Oncology is in development at Memorial Sloan Kettering Cancer Center and Cleveland Clinic. IBM is also working with CVS Health on AI applications in chronic disease treatment and with Johnson & Johnson on analysis of scientific papers to find new connections for drug development. In May 2017, IBM and Rensselaer Polytechnic Institute began a joint project entitled Health Empowerment by Analytics, Learning and Semantics (HEALS), to explore using AI technology to enhance healthcare.
- Microsoft's Hanover project, in partnership with Oregon Health & Science University's Knight Cancer Institute, analyzes medical research to predict the

most effective cancer drug treatment options for patients. Other projects include medical image analysis of tumor progression and the development of programmable cells.

- Google's DeepMind platform is being used by the UK National Health Service to detect certain health risks through data collected via a mobile app. A second project with the NHS involves analysis of medical images collected from NHS patients to develop computer vision algorithms to detect cancerous tissues.
- Tencent is working on several medical systems and services. These include AI Medical Innovation System (AIMIS), an AI-powered diagnostic medical imaging service; WeChat Intelligent Healthcare; and TencentDoctorwork
- Intel's venture capital arm Intel Capital recently invested in startup Lumiatawhich uses AI to identify at-risk patients and develop care options.
- Kheiron Medical developed deep learning software to detect breast cancers in mammograms.
- Fractal Analytics has incubated Qure.ai which focuses on using deep learning and AI to improve radiology and speed up the analysis of diagnostic x-rays.
- Neuralink has come up with a next generation neuroprosthetic which intricately interfaces with thousands of neural pathways in the brain. Their process allows a chip, roughly the size of a quarter, to be inserted in place of a chunk of skull by a precision surgical robot to avoid accidental injury .

Digital consultant apps like Babylon Health's GP at Hand, Ada Health, AliHealthDoctor You, KareXpert and Your.MD use AI to give medical consultation based on personal medical history and common medical knowledge. Users report their symptoms into the app, which uses speech recognition to compare against a database of illnesses. Babylon then offers a recommended action, taking into account the user's medical history. Entrepreneurs in healthcare have been effectively using seven business model archetypes to take AI solution[buzzword] to the marketplace. These archetypes depend on the value generated for the target user (e.g. patient focus vs. healthcare provider and payer focus) and value capturing mechanisms (e.g. providing information or connecting stakeholders). IFlytek launched a service robot "Xiao Man", which integrated artificial intelligence technology to identify the registered customer and provide personalized recommendations in medical areas. It also works in the field of medical imaging. Similar robots are also being made by companies such as UBTECH ("Cruzr") and Softbank Robotics ("Pepper"). The Indian startup Haptik recently developed a WhatsAppchatbot which answers questions associated with the deadly coronavirus in India. With the market for AI expanding constantly, large tech companies such as Apple, Google, Amazon, and Baidu all have their own AI research divisions, as well as millions of dollars allocated for acquisition of smaller AI based companies. Many automobile manufacturers are beginning to use machine learning healthcare in their cars as well. Companies such as BMW, GE, Tesla, Toyota, and Volvo all have new research campaigns to find ways of learning a driver's vital statistics to ensure they are awake, paying attention to the road, and not under the influence of substances or in emotional distress.

Examples of projects in computational health informatics include the COACH project.

Neuroinformatics in healthcare

Neuroinformatics is a scientific study of information flow and processing in nervous system. Institute scientists utilize brain imaging techniques, such as magnetic resonance imaging, to reveal the organization of brain networks involved in human thought. Brain simulation is the concept of creating a functioning computer model of a brain or part of a brain. There are three main directions where neuroinformatics has to be applied:

- the development of computational models of the nervous system and neural processes,
- the development of tools for analyzing data from devices for neurological diagnostic devices,
- the development of tools and databases for management and sharing of patients brain data in healthcare institutions.

Brain mapping and simulation

Brain simulation is the concept of creating a functioning computational model of a brain or part of a brain. In December 2006, the Blue Brain project completed a simulation of a rat's neocortical column. The neocortical column is considered the smallest functional unit of the neocortex. The neocortex is the part of the brain thought to be responsible for higher-order functions like conscious thought, and contains 10,000 neurons in the rat brain (and 10 synapses). In November 2007, the

project reported the end of its first phase, delivering a data-driven process for creating, validating, and researching the neocortical column. An artificial neural network described as being "as big and as complex as half of a mouse brain" was run on an IBM Blue Gene supercomputer by the University of Nevada's research team in 2007. Each second of simulated time took ten seconds of computer time. The researchers claimed to observe "biologically consistent" nerve impulses that flowed through the virtual cortex. However, the simulation lacked the structures seen in real mice brains, and they intend to improve the accuracy of the neuron and synapse models.

Mind uploading

Mind uploading is the process of scanning a physical structure of the brain accurately enough to create an emulation of the mental state (including long-term memory and "self") and copying it to a computer in a digital form. The computer would then run a simulation of the brain's information processing, such that it would respond in essentially the same way as the original brain and experience having a sentient conscious mind. Substantial mainstream research in related areas is being conducted in animal brain mapping and simulation, development of faster supercomputers, virtual reality, brain–computer interfaces, connectomics, and information extraction from dynamically functioning brains. According to supporters, many of the tools and ideas needed to achieve mind uploading already exist or are currently under active development; however, they will admit that others are, as yet, very speculative, but say they are still in the realm of engineering possibility.

Medical signal processing

An important application of information engineering in medicine is medical signal processing. It refers to the generation, analysis and use of signals, which could take many forms such as image, sound, electrical, or biological.

Computer engineering in healthcare

Field of computer engineering is known in Europe as technical informatics and is closely related to engineering informatics which includes also information engineering. Computer engineers create computer-based devices for the health service, in particular embedded systems.

Medical robotics and autonomic computing

A medical robot is a robot used in the medical sciences. They include surgical robots. These are in most telemanipulators, which use the surgeon's activators on one side to control the "effector" on the other side. There are the following types of medical robots:

- Surgical robots: either allow surgical operations to be carried out with better precision than an unaided human surgeon or allow remote surgery where a human surgeon is not physically present with the patient.
- Rehabilitation robots: facilitate and support the lives of infirm, elderly people, or those with dysfunction of body parts affecting movement. These robots are also

used for rehabilitation and related procedures, such as training and therapy.

- Biorobots: a group of robots designed to imitate the cognition of humans and animals.
- Telepresence robots: allow off-site medical professionals to move, look around, communicate, and participate from remote locations.
- Pharmacy automation: robotic systems to dispense oral solids in a retail pharmacy setting or preparing sterile IV admixtures in a hospital pharmacy setting.
- Companion robot: has the capability to engage emotionally with users keeping them company and alerting if there is a problem with their health.
- Disinfection robot: has the capability to disinfect a whole room in mere minutes, generally using pulsed ultraviolet light. They are being used to fight Ebola virus disease.

Telehealth and telemedicine

Telehealth is the distribution of health-related services and information via electronic information and telecommunication technologies. It allows long-distance patient and clinician contact, care, advice, reminders, education, intervention, monitoring, and remote admissions. Telemedicine is sometimes used as a synonym, or is used in a more limited sense to describe remote clinical services, such as diagnosis and monitoring. Remote monitoring, also known as self-monitoring or testing, enables medical professionals to monitor a patient remotely using various technological devices. This method is primarily used for managing chronic diseases or specific conditions, such as heart disease, diabetes mellitus, or

asthma. These services can provide comparable health outcomes to traditional in-person patient encounters, supply greater satisfaction to patients, and may be cost-effective. Telerehabilitation (or e-rehabilitation[40][41]) is the delivery of rehabilitation services over telecommunication networks and the Internet. Most types of services fall into two categories: clinical assessment (the patient's functional abilities in his or her environment), and clinical therapy. Some fields of rehabilitation practice that have explored telerehabilitationare: neuropsychology, speech-language pathology, audiology, occupational therapy, and physical therapy. Telerehabilitation can deliver therapy to people who cannot travel to a clinic because the patient has a disability or because of travel time. Telerehabilitation also allows experts in rehabilitation to engage in a clinical consultation at a distance.

Archival science and databases in healthcare

Archival clinical informaticians use their knowledge of patient care combined with their understanding of informatics concepts, methods, and health informatics tools to:

- assess information and knowledge needs of health care professionals, patients and their families.
- characterize, evaluate, and refine clinical processes,
- develop, implement, and refine clinical decision support systems, and
- lead or participate in the procurement, customization, development, implementation, management, evaluation, and continuous improvement of clinical information systems.

Clinicians collaborate with other health care and information technology professionals to develop health informatics tools which promote patient care that is safe, efficient, effective, timely, patient-centered, and equitable. Many clinical informaticists are also computer scientists. In October 2011 American Board of Medical Specialties (ABMS), the organization overseeing the certification of specialist MDs in the United States, announced the creation of MD-only physician certification in clinical informatics. The first examination for board certification in the subspecialty of clinical informatics was offered in October 2013 by American Board of Preventive Medicine (ABPM) with 432 passing to become the 2014 inaugural class of Diplomates in clinical informatics. Fellowship programs exist for physicians who wish to become board-certified in clinical informatics. Physicians must have graduated from a medical school in the United States or Canada, or a school located elsewhere that is approved by the ABPM. In addition, they must complete a primary residency program such as Internal Medicine (or any of the 24 subspecialties recognized by the ABMS) and be eligible to become licensed to practice medicine in the state where their fellowship program is located. The fellowship program is 24 months in length, with fellows dividing their time between Informatics rotations, didactic method, research, and clinical work in their primary specialty.

Integrated data repository

One of the fundamental elements of biomedical and translation research is the use of integrated data repositories. A survey conducted in 2010 defined "integrated data repository" (IDR) as a data warehouse incorporating various sources of clinical data

to support queries for a range of research-like functions. Integrated data repositories are complex systems developed to solve a variety of problems ranging from identity management, protection of confidentiality, semantic and syntactic comparability of data from different sources, and most importantly convenient and flexible query. Development of the field of clinical informatics led to the creation of large data sets with electronic health record data integrated with other data (such as genomic data). Types of data repositories include operational data stores (ODSs), clinical data warehouses (CDWs), clinical data marts, and clinical registries. Operational data stores established for extracting, transferring and loading before creating warehouse or data marts. Clinical registries repositories have long been in existence, but their contents are disease specific and sometimes considered archaic. Clinical data stores and clinical data warehouses are considered fast and reliable.

Though these large integrated repositories have impacted clinical research significantly, it still faces challenges and barriers. One big problem is the requirement for ethical approval by the institutional review board (IRB) for each research analysis meant for publication. Some research resources do not require IRB approval. For example, CDWs with data of deceased patients have been de-identified and IRB approval is not required for their usage.

Another challenge is data quality. Methods that adjust for bias (such as using propensity score matching methods) assume that a complete health record is captured. Tools that examine data quality (e.g., point to missing data) help in discovering data quality problems.

Data science and knowledge representation in healthcare

Clinical research informatics

Clinical research informatics (CRI) is a sub-field of health informatics that tries to improve the efficiency of clinical research by using informatics methods. Some of the problems tackled by CRI are: creation of data warehouses of health care data that can be used for research, support of data collection in clinical trials by the use of electronic data capture systems, streamlining ethical approvals and renewals (in US the responsible entity is the local institutional review board), maintenance of repositories of past clinical trial data (de-identified). CRI is a fairly new branch of informatics and has met growing pains as any up and coming field does. Some issue CRI faces is the ability for the statisticians and the computer system architects to work with the clinical research staff in designing a system and lack of funding to support the development of a new system. Researchers and the informatics team have a difficult time coordinating plans and ideas in order to design a system that is easy to use for the research team yet fits in the system requirements of the computer team. The lack of funding can be a hindrance to the development of the CRI. Many organizations who are performing research are struggling to get financial support to conduct the research, much less invest that money in an informatics system that will not provide them any more income or improve the outcome of the research (Embi, 2009). Ability to integrate data from multiple clinical trials is an important part of clinical research

informatics. Initiatives, such as PhenX and Patient-Reported Outcomes Measurement Information System triggered a general effort to improve secondary use of data collected in past human clinical trials. CDE initiatives, for example, try to allow clinical trial designers to adopt standardized research instruments (electronic case report forms). A parallel effort to standardizing how data is collected are initiatives that offer de-identified patient level clinical study data to be downloaded by researchers who wish to re-use this data. Examples of such platforms are Project Data Sphere, dbGaP, ImmPort or Clinical Study Data Request. Informatics issues in data formats for sharing results (plain CSV files, FDA endorsed formats, such as CDISC Study Data Tabulation Model) are important challenges within the field of clinical research informatics. There are a number of activities within clinical research that CRI supports, including:

- more efficient and effective data collection and acquisition
- improved recruitment into clinical trials
- optimal protocol design and efficient management
- patient recruitment and management
- adverse event reporting
- regulatory compliance
- data storage, transfer, processing and analysis
- repositories of data from completed clinical trials (for secondary analyses)

Translational bioinformatics

Translational Bioinformatics (TBI) is a relatively new field that surfaced in the year of 2000 when human genome sequence

was released. The commonly used definition of TBI is lengthy and could be found on the AMIA website. In simpler terms, TBI could be defined as a collection of colossal amounts of health related data (biomedical and genomic) and translation of the data into individually tailored clinical entities. Today, TBI field is categorized into four major themes that are briefly described below:

- Clinical big data is a collection of electronic health records that are used for innovations. The evidence-based approach that is currently practiced in medicine is suggested to be merged with the practice-based medicine to achieve better outcomes for patients. As CEO of California-based cognitive computing firm Apixio, Darren Schutle, explains that the care can be better fitted to the patient if the data could be collected from various medical records, merged, and analyzed. Further, the combination of similar profiles can serve as a basis for personalized medicine pointing to what works and what does not for certain condition (Marr, 2016).
- Genomics in clinical care
- Genomic data are used to identify the genes involvement in unknown or rare conditions/syndromes. Currently, the most vigorous area of using genomics is oncology. The identification of genomic sequencing of cancer may define reasons of drug(s) sensitivity and resistance during oncological treatment processes.
- Omics for drugs discovery and repurposing
- Repurposing of the drug is an appealing idea that allows the pharmaceutical companies to sell an

already approved drug to treat a different condition/disease that the drug was not initially approved for by the FDA. The observation of "molecular signatures in disease and compare those to signatures observed in cells" points to the possibility of a drug ability to cure and/or relieve symptoms of a disease.

- Personalized genomic testing
- In the US, several companies offer direct-to-consumer (DTC) genetic testing. The company that performs the majority of testing is called 23andMe. Utilizing genetic testing in health care raises many ethical, legal and social concerns; one of the main questions is whether the health care providers are ready to include patient-supplied genomic information while providing care that is unbiased (despite the intimate genomic knowledge) and a high quality. The documented examples of incorporating such information into a health care delivery showed both positive and negative impacts on the overall health care related outcomes.

History

Worldwide use of computer technology in medicine began in the early 1950s with the rise of the computers. In 1949, Gustav Wagner established the first professional organization for informatics in Germany. The prehistory, history, and future of medical information and health information technology are discussed in reference. Specialized university departments and Informatics training programs began during the 1960s in

France, Germany, Belgium and The Netherlands. Medical informatics research units began to appear during the 1970s in Poland and in the U.S. Since then the development of high-quality health informatics research, education and infrastructure has been a goal of the U.S. and the European Union.

Early names for health informatics included medical computing, biomedical computing, medical computer science, computer medicine, medical electronic data processing, medical automatic data processing, medical information processing, medical information science, medical software engineering, and medical computer technology.

The health informatics community is still growing, it is by no means a mature profession, but work in the UK by the voluntary registration body, the UK Council of Health Informatics Professions has suggested eight key constituencies within the domain–information management, knowledge management, portfolio/program/project management, ICT, education and research, clinical informatics, health records(service and business-related), health informatics service management. These constituencies accommodate professionals in and for the NHS, in academia and commercial service and solution providers.

Since the 1970s the most prominent international coordinating body has been the International Medical Informatics Association (IMIA).

In the United States

Even though the idea of using computers in medicine emerged as technology advanced in the early 20th century, it was not until the 1950s that informatics began to have an effect in the United States.

The earliest use of electronic digital computers for medicine was for dental projects in the 1950s at the United States National Bureau of Standards by Robert Ledley. During the mid-1950s, the United States Air Force (USAF) carried out several medical projects on its computers while also encouraging civilian agencies such as the National Academy of Sciences – National Research Council (NAS-NRC) and the National Institutes of Health (NIH) to sponsor such work. In 1959, Ledley and Lee B. Lusted published "Reasoning Foundations of Medical Diagnosis," a widely read article in *Science*, which introduced computing (especially operations research) techniques to medical workers. Ledley and Lusted's article has remained influential for decades, especially within the field of medical decision making.

Guided by Ledley's late 1950s survey of computer use in biology and medicine (carried out for the NAS-NRC), and by his and Lusted's articles, the NIH undertook the first major effort to introduce computers to biology and medicine. This effort, carried out initially by the NIH's Advisory Committee on Computers in Research (ACCR), chaired by Lusted, spent over $40 million between 1960 and 1964 in order to establish dozens of large and small biomedical research centers in the US.

One early (1960, non-ACCR) use of computers was to help quantify normal human movement, as a precursor to scientifically measuring deviations from normal, and design of prostheses. The use of computers (IBM 650, 1620, and 7040) allowed analysis of a large sample size, and of more measurements and subgroups than had been previously practical with mechanical calculators, thus allowing an objective understanding of how human locomotion varies by age and body characteristics. A study co-author was Dean of the Marquette University College of Engineering; this work led to discrete Biomedical Engineering departments there and elsewhere.

The next steps, in the mid-1960s, were the development (sponsored largely by the NIH) of expert systems such as MYCIN and Internist-I. In 1965, the National Library of Medicine started to use MEDLINE and MEDLARS. Around this time, Neil Pappalardo, Curtis Marble, and Robert Greenes developed MUMPS (Massachusetts General Hospital Utility Multi-Programming System) in Octo Barnett's Laboratory of Computer Science at Massachusetts General Hospital in Boston, another center of biomedical computing that received significant support from the NIH. In the 1970s and 1980s it was the most commonly used programming language for clinical applications. The MUMPS operating system was used to support MUMPS language specifications. As of 2004, a descendant of this system is being used in the United States Veterans Affairs hospital system. The VA has the largest enterprise-wide health information system that includes an electronic medical record, known as the Veterans Health Information Systems and Technology Architecture (VistA). A graphical user interface known as the Computerized Patient

Record System (CPRS) allows health care providers to review and update a patient's electronic medical record at any of the VA's over 1,000 health care facilities.

During the 1960s, Morris Collen, a physician working for Kaiser Permanente's Division of Research, developed computerized systems to automate many aspects of multi-phased health checkups. These systems became the basis the larger medical databases Kaiser Permanente developed during the 1970s and 1980s. The American College of Medical Informatics (ACMI) has since 1993 annually bestowed the Morris F. Collen, MD Medal for Outstanding Contributions to the Field of Medical Informatics. Kaiser permanente

In the 1970s a growing number of commercial vendors began to market practice management and electronic medical records systems. Although many products exist, only a small number of health practitioners use fully featured electronic health care records systems. In 1970, Warner V. Slack, MD, and Howard L. Bleich, MD, co-founded the academic division of clinical informatics at Beth Israel Deaconess Medical Center and Harvard Medical School. Warner Slack is a pioneer of the development of the electronic patient medical history, and in 1977 Dr. Bleich created the first user-friendly search engine for the worlds biomedical literature. In 2002, Dr. Slack and Dr. Bleichwere awarded the Morris F. Collen Award for their pioneering contributions to medical informatics.

Computerized systems involved in patient care have led to a number of changes. Such changes have led to improvements in electronic health records which are now capable of sharing medical information among multiple health care stakeholders

(Zahabi, Kaber, &Swangnetr, 2015); thereby, supporting the flow of patient information through various modalities of care. One opportunity for electronic health records (EHR)to be even more effectively used is to utilize natural language processing for searching and analyzing notes and text that would otherwise be inaccessible for review. These can be further developed through ongoing collaboration between software developers and end-users of natural language processing tools within the electronic health EHRs.

Computer use today involves a broad ability which includes but isn't limited to physician diagnosis and documentation, patient appointment scheduling, and billing. Many researchers in the field have identified an increase in the quality of health care systems, decreased errors by health care workers, and lastly savings in time and money (Zahabi, Kaber, &Swangnetr, 2015). The system, however, is not perfect and will continue to require improvement. Frequently cited factors of concern involve usability, safety, accessibility, and user-friendliness (Zahabi, Kaber, &Swangnetr, 2015). As leaders in the field of medical informatics improve upon the aforementioned factors of concern, the overall provision of health care will continue to improve.

Homer R. Warner, one of the fathers of medical informatics, founded the Department of Medical Informatics at the University of Utah in 1968. The American Medical Informatics Association (AMIA) has an award named after him on application of informatics to medicine.

There are Informatics certifications available to help informatics professionals stand out and be recognized. The

American Nurses Credentialing Center (ANCC) offers a board certification in Nursing Informatics. For Radiology Informatics, the CIIP (Certified Imaging Informatics Professional) certification was created by ABII (The American Board of Imaging Informatics) which was founded by SIIM (the Society for Imaging Informatics in Medicine) and ARRT (the American Registry of Radiologic Technologists) in 2005. The CIIP certification requires documented experience working in Imaging Informatics, formal testing and is a limited time credential requiring renewal every five years. The exam tests for a combination of IT technical knowledge, clinical understanding, and project management experience thought to represent the typical workload of a PACS administrator or other radiology IT clinical support role. Certifications from PARCA (PACS Administrators Registry and Certifications Association) are also recognized. The five PARCA certifications are tiered from entry-level to architect level. The American Health Information Management Association offers credentials in medical coding, analytics, and data administration, such as Registered Health Information Administrator and Certified Coding Associate. Certifications are widely requested by employers in health informatics, and overall the demand for certified informatics workers in the United States is outstripping supply. The American Health Information Management Association reports that only 68% of applicants pass certification exams on the first try. In 2017, a consortium of health informatics trainers (composed of MEASURE Evaluation, Public Health Foundation India, University of Pretoria, Kenyatta University, and the University of Ghana) identified the following areas of knowledge as a curriculum for the digital health workforce, especially in low- and middle-income countries: clinical decision support; telehealth;

privacy, security, and confidentiality; workflow process improvement; technology, people, and processes; process engineering; quality process improvement and health information technology; computer hardware; software; databases; data warehousing; information networks; information systems; information exchange; data analytics; and usability methods.

In the UK

The broad history of health informatics has been captured in the book *UK Health Computing: Recollections and reflections*, Hayes G, Barnett D (Eds.), BCS (May 2008) by those active in the field, predominantly members of BCS Health and its constituent groups. The book describes the path taken as 'early development of health informatics was unorganized and idiosyncratic'. In the early 1950s, it was prompted by those involved in NHS finance and only in the early 1960s did solutions including those in pathology (1960), radiotherapy (1962), immunization (1963), and primary care (1968) emerge. Many of these solutions, even in the early 1970s were developed in-house by pioneers in the field to meet their own requirements. In part, this was due to some areas of health services (for example the immunization and vaccination of children) still being provided by Local Authorities. The coalition government has proposed broadly to return to the 2010 strategy Equity and Excellence: Liberating the NHS (July 2010); stating: "We will put patients at the heart of the NHS, through an information revolution and greater choice and control' with shared decision-making becoming the norm: 'no decision about me without me' and patients having access to the information they want, to make choices about their care.

They will have increased control over their own care records." BCS via FEDIP provides 4 different professional registration levels for Health and Care Informatics Professionals: Practitioner, Senior Practitioner, Advanced Practitioner, and Leading Practitioner.FEDIP is the Federation for Informatics Professionals in Health and Social Care, a collaboration between the leading professional bodies in health and care informatics supporting the development of the informatics profession.

Current state and policy initiatives

America

Argentina

Since 1997, the Buenos Aires Biomedical Informatics Group, a nonprofit group, represents the interests of a broad range of clinical and non-clinical professionals working within the Health Informatics sphere. Its purposes are:

- Promote the implementation of the computer tool in the health care activity, scientific research, health administration and in all areas related to health sciences and biomedical research.
- Support, promote and disseminate content related activities with the management of health information and tools they used to do under the name of Biomedical informatics.
- Promote cooperation and exchange of actions generated in the field of biomedical informatics, both

in the public and private, national and international level.

- Interact with all scientists, recognized academic stimulating the creation of new instances that have the same goal and be inspired by the same purpose.
- To promote, organize, sponsor and participate in events and activities for training in computer and information and disseminating developments in this area that might be useful for team members and health related activities.

The Argentinian health system is heterogeneous in its function, and because of that, the informatics developments show a heterogeneous stage. Many private health care centers have developed systems, such as the Hospital Aleman of Buenos Aires, or the Hospital Italiano de Buenos Aires that also has a residence program for health informatics.

Brazil

The first applications of computers to medicine and health care in Brazil started around 1968, with the installation of the first mainframes in public university hospitals, and the use of programmable calculators in scientific research applications. Minicomputers, such as the IBM 1130 were installed in several universities, and the first applications were developed for them, such as the hospital census in the School of Medicine of RibeirãoPreto and patient master files, in the Hospital das Clínicas da Universidade de São Paulo, respectively at the cities of RibeirãoPreto and São Paulo campuses of the University of São Paulo. In the 1970s, several Digital Corporation and Hewlett Packard minicomputers were acquired

for public and Armed Forces hospitals, and more intensively used for intensive-care unit, cardiology diagnostics, patient monitoring and other applications. In the early 1980s, with the arrival of cheaper microcomputers, a great upsurge of computer applications in health ensued, and in 1986 the Brazilian Society of Health Informatics was founded, the first Brazilian Congress of Health Informatics was held, and the first *Brazilian Journal of Health Informatics* was published. In Brazil, two universities are pioneers in teaching and research in medical informatics, both the University of Sao Paulo and the Federal University of Sao Paulo offer undergraduate programs highly qualified in the area as well as extensive graduate programs (MSc and PhD). In 2015 the Universidade Federal de Ciências da Saúde de Porto Alegre, Rio Grande do Sul, also started to offer undergraduate program.

Canada

Health Informatics projects in Canada are implemented provincially, with different provinces creating different systems. A national, federally funded, not-for-profit organization called Canada Health Infowaywas created in 2001 to foster the development and adoption of electronic health records across Canada. As of December 31, 2008, there were 276 EHR projects under way in Canadian hospitals, other health-care facilities, pharmacies and laboratories, with an investment value of $1.5-billion from Canada Health Infoway.

Provincial and territorial programmes include the following:

- eHealth Ontario was created as an Ontario provincial government agency in September 2008. It has been

plagued by delays and its CEO was fired over a multimillion-dollar contracts scandal in 2009.

- Alberta Netcare was created in 2003 by the Government of Alberta. Today the netCARE portal is used daily by thousands of clinicians. It provides access to demographic data, prescribed/dispensed drugs, known allergies/intolerances, immunizations, laboratory test results, diagnostic imaging reports, the diabetes registry and other medical reports. netCARE interface capabilities are being included in electronic medical record products that are being funded by the provincial government.

United States

In 2004, President George W. Bush signed Executive Order 13335, creating the Office of the National Coordinator for Health Information Technology (ONCHIT) as a division of the U.S. Department of Health and Human Services (HHS). The mission of this office is widespread adoption of interoperable electronic health records (EHRs) in the US within 10 years. See quality improvement organizations for more information on federal initiatives in this area. In 2014 the Department of Education approved an advanced Health Informatics Undergraduate program that was submitted by the University of South Alabama. The program is designed to provide specific Health Informatics education, and is the only program in the country with a Health Informatics Lab. The program is housed in the School of Computing in Shelby Hall, a recently completed $50 million state of the art teaching facility. The University of South Alabama awarded David L. Loeser on May 10, 2014 with the first Health Informatics degree. The program

currently is scheduled to have 100+ students awarded by 2016. The Certification Commission for Healthcare Information Technology (CCHIT), a private nonprofit group, was funded in 2005 by the U.S. Department of Health and Human Services to develop a set of standards for electronic health records (EHR) and supporting networks, and certify vendors who meet them. In July 2006, CCHIT released its first list of 22 certified ambulatory EHR products, in two different announcements. Harvard Medical School added a department of biomedical informatics in 2015. The University of Cincinnati in partnership with Cincinnati Children's Hospital Medical Center created a biomedical informatics (BMI) Graduate certificate program and in 2015 began a BMI PhD program. The joint program allows for researchers and students to observe the impact their work has on patient care directly as discoveries are translated from bench to bedside.

Europe

The European Union's Member States are committed to sharing their best practices and experiences to create a European eHealth Area, thereby improving access to and quality health care at the same time as stimulating growth in a promising new industrial sector. The European eHealth Action Plan plays a fundamental role in the European Union's strategy. Work on this initiative involves a collaborative approach among several parts of the Commission services.

The European Institute for Health Records is involved in the promotion of high quality electronic health record systems in the European Union.

UK

There are different models of health informatics delivery in each of the home countries (England, Scotland, Northern Ireland and Wales) but some bodies like UKCHIP (see below) operate for those 'in and for' all the home countries and beyond.

NHS informatics in England was contracted out to several vendors for national health informatics solutions under the National Programme for Information Technology (NPfIT) label in the early to mid-2000s, under the auspices of NHS Connecting for Health (part of the Health and Social Care Information Centre as of 1 April 2013). NPfIT originally divided the country into five regions, with strategic 'systems integration' contracts awarded to one of several Local Service Providers (LSP). The various specific technical solutions were required to connect securely with the NHS 'Spine', a system designed to broker data between different systems and care settings. NPfIT fell significantly behind schedule and its scope and design were being revised in real time, exacerbated by media and political lambasting of the Programme's spend (past and projected) against the proposed budget. In 2010 a consultation was launched as part of the new Conservative/Liberal Democrat Coalition Government's White Paper 'Liberating the NHS'. This initiative provided little in the way of innovative thinking, primarily re-stating existing strategies within the proposed new context of the Coalition's vision for the NHS. The degree of computerization in NHS secondary care was quite high before NPfIT, and the programme stagnated further development of the install base – the original NPfIT regional approach provided neither a single, nationwide solution nor local health

community agility or autonomy to purchase systems, but instead tried to deal with a hinterland in the middle.

Almost all general practices in England and Wales are computerized under the GP Systems of Choice programme, and patients have relatively extensive computerized primary care clinical records. System choice is the responsibility of individual general practices and while there is no single, standardized GP system, it sets relatively rigid minimum standards of performance and functionality for vendors to adhere to. Interoperation between primary and secondary care systems is rather primitive. It is hoped that a focus on interworking (for interfacing and integration) standards will stimulate synergy between primary and secondary care in sharing necessary information to support the care of individuals. Notable successes to date are in the electronic requesting and viewing of test results, and in some areas, GPs have access to digital x-ray images from secondary care systems.

In 2019 the GP Systems of Choice framework was replaced by the GP IT Futures framework, which is to be the main vehicle used by clinical commissioning groups to buy services for GPs. This is intended to increase competition in an area that is dominated by EMIS and TPP. 69 technology companies offering more than 300 solutions have been accepted on to the new framework.

Wales has a dedicated Health Informatics function that supports NHS Wales in leading on the new integrated digital information services and promoting Health Informatics as a career.

Netherlands

In the Netherlands, health informatics is currently a priority for research and implementation. The Netherlands Federation of University medical centers (NFU) has created the *Citrienfonds*, which includes the programs eHealth and Registration at the Source. The Netherlands also has the national organizations Society for Healthcare Informatics (VMBI) and Nictiz, the national center for standardization and eHealth.

European research and development

The European Commission's preference, as exemplified in the 5th Framework as well as currently pursued pilot projects, is for Free/Libre and Open Source Software (FLOSS) for health care. Another stream of research currently focuses on aspects of "big data" in health information systems. For background information on data-related aspects in health informatics see, e.g., the book "Biomedical Informatics" by Andreas Holzinger.

Asia and Oceania

In Asia and Australia-New Zealand, the regional group called the Asia Pacific Association for Medical Informatics (APAMI) was established in 1994 and now consists of more than 15 member regions in the Asia Pacific Region.

Australia

The Australasian College of Health Informatics (ACHI) is the professional association for health informatics in the Asia-

Pacific region. It represents the interests of a broad range of clinical and non-clinical professionals working within the health informatics sphere through a commitment to quality, standards and ethical practice. ACHI is an academic institutional member of the International Medical Informatics Association (IMIA) and a full member of the Australian Council of Professions. ACHI is a sponsor of the "e-Journal for Health Informatics", an indexed and peer-reviewed professional journal. ACHI has also supported the "Australian Health Informatics Education Council" (AHIEC) since its founding in 2009.

Although there are a number of health informatics organizations in Australia, the Health Informatics Society of Australia (HISA) is regarded as the major umbrella group and is a member of the International Medical Informatics Association (IMIA). Nursing informaticians were the driving force behind the formation of HISA, which is now a company limited by guarantee of the members. The membership comes from across the informatics spectrum that is from students to corporate affiliates. HISA has a number of branches (Queensland, New South Wales, Victoria and Western Australia) as well as special interest groups such as nursing (NIA), pathology, aged and community care, industry and medical imaging (Conrick, 2006).

China

After 20 years, China performed a successful transition from its planned economy to a socialist market economy. Along this change, China's health care system also experienced a significant reform to follow and adapt to this historical

revolution. In 2003, the data (released from Ministry of Health of the People's Republic of China (MoH)), indicated that the national health care-involved expenditure was up to RMB 662.33 billion totally, which accounted for about 5.56% of nationwide gross domestic products. Before the 1980s, the entire health care costs were covered in central government annual budget. Since that, the construct of health care-expended supporters started to change gradually. Most of the expenditure was contributed by health insurance schemes and private spending, which corresponded to 40% and 45% of total expenditure, respectively. Meanwhile, the financially governmental contribution was decreased to 10% only. On the other hand, by 2004, up to 296,492 health care facilities were recorded in statistic summary of MoH, and an average of 2.4 clinical beds per 1000 people were mentioned as well.

Along with the development of information technology since the 1990s, health care providers realized that the information could generate significant benefits to improve their services by computerized cases and data, for instance of gaining the information for directing patient care and assessing the best patient care for specific clinical conditions. Therefore, substantial resources were collected to build China's own health informatics system. Most of these resources were arranged to construct hospital information system (HIS), which was aimed to minimize unnecessary waste and repetition, subsequently to promote the efficiency and quality-control of health care. By 2004, China had successfully spread HIS through approximately 35–40% of nationwide hospitals. However, the dispersion of hospital-owned HIS varies critically. In the east part of China, over 80% of hospitals constructed HIS, in northwest of China the equivalent was no more than

20%. Moreover, all of the Centers for Disease Control and Prevention (CDC) above rural level, approximately 80% of health care organisations above the rural level and 27% of hospitals over town level have the ability to perform the transmission of reports about real-time epidemic situation through public health information system and to analysis infectious diseases by dynamic statistics.

China has four tiers in its health care system. The first tier is street health and workplace clinics and these are cheaper than hospitals in terms of medical billing and act as prevention centers. The second tier is district and enterprise hospitals along with specialist clinics and these provide the second level of care. The third tier is provisional and municipal general hospitals and teaching hospitals which provided the third level of care. In a tier of its own is the national hospitals which are governed by the Ministry of Health. China has been greatly improving its health informatics since it finally opened its doors to the outside world and joined the World Trade Organization (WTO). In 2001, it was reported that China had 324,380 medical institutions and the majority of those were clinics. The reason for that is that clinics are prevention centers and Chinese people like using traditional Chinese medicine as opposed to Western medicine and it usually works for the minor cases. China has also been improving its higher education in regards to health informatics. At the end of 2002, there were 77 medical universities and medical colleges. There were 48 university medical colleges which offered bachelor, master, and doctorate degrees in medicine. There were 21 higher medical specialty institutions that offered diploma degrees so in total, there were 147 higher medical and educational institutions. Since joining the WTO, China has

been working hard to improve its education system and bring it up to international standards. SARS played a large role in China quickly improving its health care system. Back in 2003, there was an outbreak of SARS and that made China hurry to spread HIS or Hospital Information System and more than 80% of hospitals had HIS. China had been comparing itself to Korea's health care system and figuring out how it can better its own system. There was a study done that surveyed six hospitals in China that had HIS. The results were that doctors didn't use computers as much so it was concluded that it wasn't used as much for clinical practice than it was for administrative purposes. The survey asked if the hospitals created any websites and it was concluded that only four of them had created websites and that three had a third-party company create it for them and one was created by the hospital staff. In conclusion, all of them agreed or strongly agreed that providing health information on the Internet should be utilized.

Collected information at different times, by different participants or systems could frequently lead to issues of misunderstanding, dis-comparing or dis-exchanging. To design an issues-minor system, health care providers realized that certain standards were the basis for sharing information and interoperability, however a system lacking standards would be a large impediment to interfere the improvement of corresponding information systems. Given that the standardization for health informatics depends on the authorities, standardization events must be involved with government and the subsequently relevant funding and supports were critical. In 2003, the Ministry of Health released the Development Lay-out of National Health Informatics (2003–2010) indicating the identification of standardization for health

informatics which is 'combining adoption of international standards and development of national standards'.

In China, the establishment of standardization was initially facilitated with the development of vocabulary, classification and coding, which is conducive to reserve and transmit information for premium management at national level. By 2006, 55 international/ domestic standards of vocabulary, classification and coding have served in hospital information system. In 2003, the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) and the ICD-10 Clinical Modification (ICD-10-CM) were adopted as standards for diagnostic classification and acute care procedure classification. Simultaneously, the International Classification of Primary Care (ICPC) were translated and tested in China 's local applied environment. Another coding standard, named Logical Observation Identifiers Names and Codes (LOINC), was applied to serve as general identifiers for clinical observation in hospitals. Personal identifier codes were widely employed in different information systems, involving name, sex, nationality, family relationship, educational level and job occupation. However, these codes within different systems are inconsistent, when sharing between different regions. Considering this large quantity of vocabulary, classification and coding standards between different jurisdictions, the health care provider realized that using multiple systems could generate issues of resource wasting and a non-conflicting national level standard was beneficial and necessary. Therefore, in late 2003, the health informatics group in Ministry of Health released three projects to deal with issues of lacking national health information standards, which were the Chinese National Health

Information Framework and Standardization, the Basic Data Set Standards of Hospital Information System and the Basic Data Set Standards of Public Health Information System.

The objectives of the Chinese National Health Information Framework and Standardization project were:

- Establish national health information framework and identify in what areas standards and guidelines are required
- Identify the classes, relationships and attributes of national health information framework. Produce a conceptual health data model to cover the scope of the health information framework
- Create logical data model for specific domains, depicting the logical data entities, the data attributes, and the relationships between the entities according to the conceptual health data model
- Establish uniform represent standard for data elements according to the data entities and their attributes in conceptual data model and logical data model
- Circulate the completed health information framework and health data model to the partnership members for review and acceptance
- Develop a process to maintain and refine the China model and to align with and influence international health data models

Comparing China's EHR Standard and ASTM E1384

In 2011, researchers from local universities evaluated the performance of China's Electronic Health Record (EHR)

Standard compared with the American Society for Testing and Materials Standard Practice for Content and Structure of Electronic Health Records in the United States (ASTM E1384 Standard, withdrawn in 2017). The deficiencies that were found are listed in the following.

- The lack of supporting on privacy and security. The ISO/TS 18308 specifies "The EHR must support the ethical and legal use of personal information, in accordance with established privacy principles and frameworks, which may be culturally or jurisdictionally specific" (ISO 18308: Health Informatics-Requirements for an Electronic Health Record Architecture, 2004). However this China's EHR Standard did not achieve any of the fifteen requirements in the subclass of privacy and security.
- The shortage of supporting on different types of data and reference. Considering only ICD-9 is referenced as China's external international coding systems, other similar systems, such as SNOMED CT in clinical terminology presentation, cannot be considered as familiar for Chinese specialists, which could lead to internationally information-sharing deficiency.
- The lack of more generic and extensible lower level data structures. China's large and complex EHR Standard was constructed for all medical domains. However, the specific and time-frequent attributes of clinical data elements, value sets and templates identified that this once-for-all purpose cannot lead to practical consequence.

In Hong Kong, a computerized patient record system called the Clinical Management System (CMS) has been developed by the Hospital Authority since 1994. This system has been deployed at all the sites of the authority (40 hospitals and 120 clinics). It is used for up to 2 million transactions daily by 30,000 clinical staff. The comprehensive records of 7 million patients are available on-line in the electronic patient record (ePR), with data integrated from all sites. Since 2004 radiology image viewing has been added to the ePR, with radiography images from any HA site being available as part of the ePR.

The Hong Kong Hospital Authority placed particular attention to the governance of clinical systems development, with input from hundreds of clinicians being incorporated through a structured process. The health informatics section in the Hospital Authority has a close relationship with the information technology department and clinicians to develop health care systems for the organization to support the service to all public hospitals and clinics in the region.

The Hong Kong Society of Medical Informatics (HKSMI) was established in 1987 to promote the use of information technology in health care. The eHealth Consortium has been formed to bring together clinicians from both the private and public sectors, medical informatics professionals and the IT industry to further promote IT in health care in Hong Kong.

India

- eHCF School of Medical Informatics
- eHealth-Care Foundation

Malaysia

Since 2010, the Ministry of Health (MoH) has been working on the Malaysian Health Data Warehouse (MyHDW) project. MyHDW aims to meet the diverse needs of timely health information provision and management, and acts as a platform for the standardization and integration of health data from a variety of sources (Health Informatics Centre, 2013). The Ministry of Health has embarked on introducing the electronic Hospital Information Systems (HIS) in several public hospitals including Putrajaya Hospital, Serdang Hospital and Selayang Hospital. Similarly, under Ministry of Higher Education, hospitals such as University of Malaya Medical Centre (UMMC) and University Kebangsaan Malaysia Medical Centre (UKMMC) are also using HIS for healthcare delivery.

A hospital information system (HIS) is a comprehensive, integrated information system designed to manage the administrative, financial and clinical aspects of a hospital. As an area of medical informatics, the aim of hospital information system is to achieve the best possible support of patient care and administration by electronic data processing. HIS plays a vital role in planning, initiating, organizing and controlling the operations of the subsystems of the hospital and thus provides a synergistic organization in the process.

New Zealand

Health informatics is taught at five New Zealand universities. The most mature and established programme has been offered for over a decade at Otago. Health Informatics New Zealand (HINZ), is the national organisation that advocates for health

informatics. HINZ organises a conference every year and also publishes a journal- *Healthcare Informatics Review Online*.

Saudi Arabia

The Saudi Association for Health Information (SAHI) was established in 2006 to work under direct supervision of King Saud bin Abdulaziz University for Health Sciences to practice public activities, develop theoretical and applicable knowledge, and provide scientific and applicable studies.

Post-Soviet countries

The Russian Federation

The Russian health care system is based on the principles of the Soviet health care system, which was oriented on mass prophylaxis, prevention of infection and epidemic diseases, vaccination and immunization of the population on a socially protected basis. The current government health care system consists of several directions:

- Preventive health care
- Primary health care
- Specialized medical care
- Obstetrical and gynecologic medical care
- Pediatric medical care
- Surgery
- Rehabilitation/ Health resort treatment

One of the main issues of the post-Soviet medical health care system was the absence of the united system providing

optimization of work for medical institutes with one, single database and structured appointment schedule and hence hours-long lines. Efficiency of medical workers might have been also doubtful because of the paperwork administrating or lost book records.

Along with the development of the information systems IT and health care departments in Moscow agreed on design of a system that would improve public services of health care institutes. Tackling the issues appearing in the existing system, the Moscow Government ordered that the design of a system would provide simplified electronic booking to public clinics and automate the work of medical workers on the first level.

The system designed for that purposes was called EMIAS (United Medical Information and Analysis System) and presents an electronic health record (EHR) with the majority of other services set in the system that manages the flow of patients, contains outpatient card integrated in the system, and provides an opportunity to manage consolidated managerial accounting and personalized list of medical help. Besides that, the system contains information about availability of the medical institutions and various doctors.

The implementation of the system started in 2013 with the organization of one computerized database for all patients in the city, including a front-end for the users. EMIAS was implemented in Moscow and the region and it is planned that the project should extend to most parts of the country.