Exam Blueprint and Specialty Competencies

Introduction – Blueprint for the Cardiovascular Nursing Certification Exam

The primary function of the blueprint for the CNA Cardiovascular Nursing Certification Exam is to describe how the exam is to be developed. Specifically, this blueprint provides explicit instructions and guidelines on how the competencies are to be expressed within the exam in order for accurate decisions to be made on the candidates' competence in cardiovascular nursing.

The blueprint has two major components: (1) the content area to be measured and (2) the explicit guidelines on how this content is to be measured. The content area consists of the list of competencies (i.e., the competencies expected of fully competent practising cardiovascular nurses with at least two years of experience), and the guidelines are expressed as structural and contextual variables. The blueprint also includes a summary chart that summarizes the exam guidelines.

Description of Domain

The CNA Cardiovascular Nursing Certification Exam is a criterion-referenced exam.[1] A fundamental component of a criterion-referenced approach to testing is the comprehensive description of the content area being measured. In the case of the Cardiovascular Nursing Certification Exam, the content consists of the competencies of a fully competent practising cardiovascular nurse with at least two years of experience.

This section describes the competencies, how they have been grouped and how they are to be sampled for creating an exam.

Developing the List of Competencies

The final list of competencies was updated and approved by the Cardiovascular Nursing Certification Exam Committee.

[1] Criterion-referenced exam: An exam that measures a candidate's command of a specified content or skills domain or list of instructional objectives. Scores are interpreted in comparison to a predetermined performance standard or as a mastery of defined domain (e.g., percentage correct and mastery scores), independently of the results obtained by other candidates (Brown, 1983).

Assumptions

The Cardiovascular Nursing Certification Exam targets the unique body of knowledge representing the basic foundation of practice that the cardiovascular nurse builds upon.

The examination will focus on the adult population (defined as 16 years and older).

The Cardiovascular Nurse

- The cardiovascular nurse supports initiatives that enhance the unique body of knowledge that is cardiovascular nursing.
- The cardiovascular nurse incorporates the Canadian Council of Cardiovascular Nurses (CCCN) Standards as a basis for his/her cardiovascular practice.
- The cardiovascular nurse accesses current information from a variety of sources to keep up to date with the continually evolving body of knowledge that impacts on cardiovascular nursing practice.
- The cardiovascular nurse is a highly knowledgeable and skilled health-care professional who maintains competence through continuing education, professional development and quality assurance activities.
- Cardiovascular nursing care activities include health promotion, prevention, acute care and rehabilitation, to assist clients to obtain and maintain optimal cardiovascular health throughout their lifespan.
- The cardiovascular nurse assists the client, family, groups and communities to manage the manifestations of cardiovascular disease.
- The cardiovascular nurse provides comprehensive quality care to individuals, families, groups and communities.
- The cardiovascular nurse works collaboratively with other interprofessional health-care teams.
- The cardiovascular nurse values the principles of accessibility, affordability and self-determination of the client.
- The cardiovascular nurse respects the decisions of the client throughout his/her continuum of care.
- The cardiovascular nurse forms therapeutic partnerships with clients to achieve an optimal level of autonomy.
- The cardiovascular nurse communicates assessment data, the plan of care and client responses or outcomes to the client, family and health-care team within a time frame pertinent to the client's condition.

- The cardiovascular nurse develops and documents goals of treatment that are collaboratively developed with the client.
- The cardiovascular nurse develops a therapeutic relationship with the client and family to reduce emotional distress.
- The cardiovascular nurse is a client, family, groups and communities advocate.
- The cardiovascular nurse recognizes sex and gender differences that may be reflected in clients' symptoms and needs.
- The cardiovascular nurse is dedicated to providing comfort and to maintaining a client's privacy.
- The cardiovascular nurse facilitates the client's and family's ability to cope with stressors related to illness and the environment.
- The cardiovascular nurse uses appropriate teaching strategies consistent with the readiness and needs of the client and family.
- The cardiovascular nurse strives to provide evidence-based practice and acknowledges a responsibility to promote and integrate research within the specialty area.
- The cardiovascular nurse incorporates the appropriate national and international guidelines into practice.
- The cardiovascular nurse responds to ethical, legal and professional issues.
- The cardiovascular nurse responds to environmental, physical and psychosocial stress factors affecting health-care team members in the health-care setting.
- The cardiovascular nurse identifies potential candidates for organ and tissue procurement, and supports this process.
- The cardiovascular nurse works as a member of the interprofessional health-care team to facilitate timely care/treatment and intervenes to ensure a smooth transition of clients and family along the health-care continuum.

The Environment

- The cardiovascular nurse works in a variety of clinical settings, from urban and rural to remote, with highly variable access to available technologies.
- The cardiovascular nurse recognizes the impact of physical, social and political environmental factors on health and works to reduce their negative effects and maximize their positive influences.
- The cardiovascular nurse facilitates evidence-based care as close to the client's home as possible.

The Client

- The cardiovascular client includes individuals, family, groups and communities.
- The client's ability to cope with cardiovascular illness is significantly influenced by access to family support and family members' emotional and behavioural responses to the illness.
- The client is viewed within the dimensions of biology, psychology, society, culture, developmental stage, environment and spirituality.
- The client defines the family, groups and communities of support.

Health

- Health is defined by the cardiovascular client and includes a range of physiologic, psychologic, social and spiritual responses to both sudden unexpected and chronic cardiac conditions throughout the continuum of health.

Competency Categories

The competencies are classified under an eleven-category scheme commonly used to organize cardiovascular nursing.

Some of the competencies lend themselves to one or more of the categories; therefore, these eleven categories should be viewed simply as an organizing framework. Also, it should be recognized that the competency statements vary in scope, with some representing global behaviours and others more discrete and specific nursing behaviours.

Competency Sampling

Using the grouping and the guideline that the Cardiovascular Nursing Certification Exam will consist of approximately 165 questions, the categories have been given the following weights in the total examination.

Table 1: Competency Sampling

Categories	Approximate weights in the total examination
Health Promotion, Prevention and Rehabilitation	5-10%
Psychosocial Needs	5-10%
Cardiac Dysrhythmias	10-15%
Ischemic Heart Disease	15-20%
Valvular Heart Disease	5-10%
Heart Failure	15-20%
Vascular Diseases	5-15%
Heart Disease Related to Inflammatory/Infectious Processes	1-5%
Cardiac Surgical Intervention	5-10%
Percutaneous Cardiac Interventions and Procedures	5-10%
Cardiogenic Shock	1-5%

Technical Specifications

In addition to the specifications related to the competencies, other variables are considered during the development of the Cardiovascular Nursing Certification Exam. This section presents the guidelines for two types of variables: structural and contextual.

Structural Variables: Structural variables include those characteristics that determine the general appearance and design of the exam. They define the length of the exam, the format and presentation of the exam questions (e.g., multiple-choice format) and special functions of exam questions (e.g., case-based or independent questions).

Contextual Variables: Contextual variables specify the nursing contexts in which the exam questions will be set (e.g., client culture, client health situation and health-care environment).

Structural Variables

Exam Length: The exam consists of approximately 165 multiple-choice questions.

Question Presentation: The multiple-choice questions are presented in one of two formats: case-based or independent. Case-based questions are a set of approximately four questions associated with a brief health-care scenario (i.e., a description of the client's health-care situation). Independent questions stand alone. In the Cardiovascular Nursing Certification Exam, 60 to 70 percent of the questions are presented as independent questions and 30 to 40 percent are presented within cases.

Taxonomy for Questions: To ensure that competencies are measured at different levels of cognitive ability, each question on the Cardiovascular Nursing Certification Exam is aimed at one of three levels: knowledge/comprehension, application and critical thinking.[2]

1. Knowledge/Comprehension

This level combines the ability to recall previously learned material and to understand its meaning. It includes such mental abilities as knowing and understanding definitions, facts and principles and interpreting data (e.g., knowing the effects of certain drugs or interpreting data appearing on a client's record).

2. Application

This level refers to the ability to apply knowledge and learning to new or practical situations. It includes applying rules, methods, principles and theories in providing care to clients (e.g., applying nursing principles to the care of clients).

3. Critical Thinking

The third level of the taxonomy deals with higher-level thinking processes. It includes the abilities to judge the relevance of data, to deal with abstraction and to solve problems (e.g., identifying priorities of care or evaluating the effectiveness of interventions). The cardiovascular nurse with at least two years of experience should be able to identify cause-and-effect relationships, distinguish between relevant and irrelevant data, formulate valid conclusions and make judgments concerning the needs of clients.

The following table presents the distribution of questions for each level of cognitive ability.

Table 2: Distribution of Questions for Each Level of Cognitive Ability

Cognitive Ability Level	Percentage of questions on Cardiovascular Nursing Certification Exam
Knowledge/Comprehension	20-30%
Application	35-45%
Critical Thinking	30-40%

[2] These levels are adapted from the taxonomy of cognitive abilities developed in Bloom (1956).

Contextual Variables

Client Culture: Questions are included that measure awareness, sensitivity and respect for different cultural values, beliefs and practices, without introducing stereotypes.

Client Health Situation: In the development of the Cardiovascular Nursing Certification Exam, the client is viewed holistically. The client health situations presented also reflect a cross-section of health situations encountered by cardiovascular nurses.

Health-Care Environment: It is recognized that cardiovascular nursing is practised primarily in the hospital setting. However, cardiovascular nursing can also be practised in other settings. Therefore, for the purposes of the Cardiovascular Nursing Certification Exam, the health-care environment is only specified where it is required for clarity or in order to provide guidance to the examinee.

Conclusions

The blueprint for the Cardiovascular Nursing Certification Exam is the product of a collaborative effort between CNA, Meazure Learning – Yardstick and a number of cardiovascular nurses across Canada. Their work has resulted in a compilation of the competencies required of practising cardiovascular nurses and has helped determine how those competencies will be measured on the Cardiovascular Nursing Certification Exam. A summary of these guidelines can be found in the summary chart Cardiovascular Nursing Certification Exam Development Guidelines.

Cardiovascular nursing practice will continue to evolve. As this occurs, the blueprint may require revision so that it accurately reflects current practices. CNA will ensure that such revision takes place in a timely manner and will communicate any changes in updated editions of this document.

Summary Chart

Cardiovascular Nursing Certification Exam Development Guidelines

STRUCTURAL VARIABLES		
Examination Length and Format	Approximately 165 multiple choice questions	
Question Presentation	60-70% independent questions 30-40% case-based questions	
Cognitive Domain	Knowledge/Comprehension Application Critical Thinking	20-30% of questions 35-45% of questions 30-40% of questions
Competency Categories	Health Promotion, Prevention and Rehabilitation	5-10% of questions
	Psychosocial Needs	5-10% of questions
	Cardiac Dysrhythmias	10-15% of questions
	Ischemic Heart Disease	15-20% of questions
	Valvular Heart Disease	5-10% of questions
	Heart Failure	15-20% of questions
	Vascular Diseases	5-15% of questions
	Heart Disease Related to Inflammatory/ Infectious Processes	1-5% of questions
	Cardiac Surgical Intervention	5-10% of questions
	Percutaneous Cardiac Interventions and Procedures	5-10% of questions
	Cardiogenic Shock	1-5% of questions
CONTEXTUAL VARIABLES		
Client Culture	Questions are included that measure awareness, sensitivity and respect for different cultural values, beliefs and practices, without introducing stereotypes.	
Client Health Situation	In the development of the Cardiovascular Nursing Certification Exam, the client is viewed holistically. The client health situations presented also reflect a cross-section of health situations encountered by cardiovascular nurses.	
Health-Care Environment	It is recognized that cardiovascular nursing is practised primarily in the hospital setting. However, cardiovascular nursing can also be practised in other settings. Therefore, for the purposes of the Cardiovascular Nursing Certification Exam, the health-care environment is only specified where it is required for clarity or in order to provide guidance to the examinee.	

The Cardiovascular Nursing Certification Exam List of Competencies

The competencies are divided into categories that are in no particular order of priority but represent broad categories addressing cardiovascular health presently encountered in current cardiovascular nursing practice.

1. Core Concepts Related to Health Promotion, Prevention and Rehabilitation

The cardiovascular nurse:

1.1 Identifies and interprets the impact of the interdependent and cumulative effects of modifiable and non-modifiable risk factors on the primary and secondary prevention of cardiovascular disease

1.2 Selects the appropriate nursing interventions to reduce current and potential cardiovascular risks

1.3 Interprets collected data and information related to functional capacity, psychosocial well-being and perceived quality of life (e.g., validated questionnaires, cardiac and other diagnostic tests)

1.4 Selects appropriate nursing interventions to optimize functional capacity, enhance psychosocial well-being and improve perceived quality of life (e.g., education and counselling of client and family, referral to appropriate resources)

1.5 Recognizes their place of privilege and power in the nurse-client relationship and works in partnership with the client

1.6 Understands that Indigenous peoples will not access the health-care system (and its practitioners) when they do not feel safe doing so and where encountering the health-care system places them at risk of harm

1.7 Is aware that there is a range of Indigenous health knowledges and practices (traditional and non-traditional) among Indigenous peoples

2. Core Concepts Related to Psychosocial Needs

The cardiovascular nurse:

2.1 Integrates the following information into nursing assessment and care planning related to the psychosocial needs based on the client's:
- emotional response to the cardiovascular illness
- perceived experience with the health-care system
- perceived current and past experiences caregiver support

- treatment adherence
- cultural and spiritual values/beliefs
- financial situation

2.2 Selects appropriate nursing interventions to promote holistic care:

2.2a Demonstrate respectful engagement that is free of personal biases, stigma and judgment

2.2b Assist clients and their families to make informed choices about their care within a shared decision-making framework

2.2c Provide appropriate support for the client and family members based upon their perceived needs and goals for treatment, recovery, rehabilitation, palliation and end of life (e.g., autonomy, disability, advance care planning, organ donation)

2.2d Implement pharmacological and non-pharmacological methods to manage the manifestations of pain, anxiety, stress, disruption in sleep patterns, depression and fear (e.g., medications, therapeutic communication, complementary non-pharmacological therapies)

2.2e Facilitate referrals as needed (e.g., social worker, spiritual counsellor, mental health professional, palliative care provider)

3. Core Concepts Related to Cardiac Dysrhythmias

The cardiovascular nurse:

3.1 Integrates the following information into nursing assessment and care planning related to dysrhythmias:

3.1a History taking
- Presenting symptoms (e.g., dizziness, pre-syncope, syncope, dyspnea, palpitations)
- Current and past medical history (e.g., sleep apnea, renal disease, myocardial infarction, stroke, cardiomyopathy, thyroid dysfunction, stimulant intake, congenital heart disease)
- Cardiac risk factors (e.g., family history/sudden cardiac death, diabetes, hypertension)
- Medications (e.g., prescription and non-prescription, herbal supplements)
- Psychosocial history (e.g., substance use, including alcohol)
- Evaluation of social and family support (activities of daily living assessment, driving restrictions, occupation)

3.1b Physical/cardiovascular assessment
- Inspection (e.g., body habitus, shortness of breath)
- Auscultation (e.g., murmurs, bruits)
- Palpation (e.g., pulses, edema)

3.1c Electrolytes, cardiac enzymes, drug level and other common supporting laboratory investigations

3.1d 12- and/or 15-lead ECG, electrophysiology studies and other common supporting diagnostic tests

3.2 Selects appropriate nursing interventions related to non-life-threatening and life-threatening dysrhythmias (e.g., administration of medication, participation in electrical therapy, education about DVT prevention)

3.3 Selects appropriate nursing interventions for potential complications related to dysrhythmias (e.g., medication administration, monitoring client, preparing for treatment)

3.4 Demonstrates an awareness and understanding of appropriate dysrhythmia management, including device therapy, and an ability to provide education and support for the client/family (e.g., provide psychosocial and emotional support, follow-up instructions and requirements)

4. The Care of the Person with Ischemic Heart Disease

The cardiovascular nurse:

4.1 Integrates the following information into nursing assessment and care planning for clients with acute or chronic ischemic heart disease:

4.1a History taking
- Presenting symptoms
- Past and current medical and surgical history (e.g., diabetes, myocardial infarction, coronary artery disease)
- Cardiac risk factors (e.g., gender, ethnicity)
- Medications and alternative therapies (e.g., prescription and non-prescription, herbal supplements, cannabis, potential interactions)
- Psychosocial history (e.g., substance use)
- Perceived health and coping challenges (e.g., comprehension, activities of daily living)

4.1b Comprehensive pain assessment

4.1c Physical/cardiovascular assessment
- Inspection (e.g., skin colour, diaphoresis, peripheral and central cyanosis, shortness of breath, edema, markers of frailty)
- Auscultation (e.g., lung sounds, heart sounds)
- Palpation (e.g., pulses, thrills, pitting edema)

4.1d Cardiac biomarkers and other common supporting laboratory investigations

4.1e 12- and/or 15-lead ECG, angiography, ultrasound and other common supporting diagnostic tests

4.2 Selects appropriate nursing interventions to improve coronary blood flow and/or reduce myocardial oxygen demand related to acute and chronic ischemic conditions (e.g., manage chest pain, monitor hemodynamic status)

4.3 Selects appropriate nursing interventions for potential complications of ischemic heart disease

4.4 Demonstrates an ability to provide education and support for the client and family

5. The Care of the Person with Valvular Heart Disease

The cardiovascular nurse:

5.1 Integrates the following information into nursing assessment and care planning related to congenital and acquired valvular heart disease:

5.1a History taking
- Presenting symptoms
- Current and past medical history (e.g., rheumatic heart disease, myocardial infarction, cardiomyopathy, endocarditis, surgical history)
- Dental assessment/intervention
- Cardiac risk factors
- Medications (e.g., prescription and non-prescription, herbal supplements)
- Psychosocial history (e.g., substance use disorder)
- Evaluation of social and family support

5.1b Physical/cardiovascular assessment
- Inspection (e.g., petechiae, splinter hemorrhages, manifestations of heart failure)
- Auscultation (e.g., heart sounds/murmurs, lung sounds)
- Palpation (e.g., differentiation of peripheral pulses, thrills, heaves/lifts)

5.1c Complete blood count (CBC), blood cultures, coagulation status, heart failure biomarkers and other common supporting laboratory investigations

5.1d Echocardiogram and other common diagnostic tests

5.2 Selects appropriate nursing interventions to manage clients with potential complications of valvular heart disease (e.g., monitoring client for sign of possible embolic event, hemodynamic and volume assessment, promotion of preventative measures)

5.3 Demonstrates an awareness and understanding of valvular heart disease management, including percutaneous and surgical therapy, and an ability to provide education and support for the client/family (e.g., promote self-care and independence in clients, anticoagulation education, endocarditis prevention)

6. The Care of the Person with Heart Failure

The cardiovascular nurse:

6.1 Integrates the following information into nursing assessment and care planning related to acute and chronic heart failure pathophysiology:

6.1a History taking
- Presenting symptoms (e.g., shortness of breath, orthopnea, paroxysmal nocturnal dyspnea, edema)
- Underlying etiology if known (e.g., ischemic, valvular, viral, infiltrative)
- Trigger for clinical deterioration (e.g., flu, medication/diet non-adherence)
- Past and current medical history (e.g., coronary artery disease, diabetes, pulmonary disease, hypertension)
- Cardiac risk factors
- Medications and alternative therapies (e.g., prescription and non-prescription, herbal supplements, cannabis, potential interactions)
- Psychosocial history (e.g., substance use, occupation)
- Perceived health and coping challenges (e.g., cognition, activities of daily living)
- Evaluation of social and family support

6.1b Physical/cardiovascular assessment
- Functional assessment (e.g., markers of frailty, cognitive assessment, 6-minute walk)
- Inspection (e.g., jugular vein distention, ascites, work of breathing, edema, weight)
- Auscultation (e.g., lung sounds, heart sounds, murmurs, blood pressure)
- Palpation (e.g., pulses, apical displacement, organomegaly, pitting edema)

6.1c Cardiac biomarkers and other common supporting laboratory investigations

6.1d Cardiac and other common supporting diagnostic tests

6.2 Selects appropriate nursing interventions to optimize cardiac output of acute and chronic heart failure management (e.g., pharmacological and non-pharmacological management)

6.3 Selects appropriate nursing interventions to help client gain the knowledge, skills and confidence to engage in self-care maintenance, monitoring and management (e.g., counsel client/family, enhance psychosocial well-being)

6.4 Demonstrates an awareness and understanding of appropriate device therapies for heart failure management and an ability to provide education and support the client/family

6.5 Engages in dialogue to support end-of-life planning:

6.5a Selects appropriate nursing interventions to address the palliative needs of the client with heart failure (e.g., advance care planning, symptom management, community and home care services, family and caregiver support, spiritual support)

6.5b Engages the person in dialogue to better understand the nature and meaning of their request for MAiD

6.5c Understands that nurses must not impose their own views and values about MAiD onto others nor use their position to influence, judge or discriminate against others whose values are different from their own

6.5d Understands MAiD may have a personal impact that may affect their practice and takes steps to seek support as needed

7. The Care of the Person with Vascular Diseases

The cardiovascular nurse:

7.1 Integrates the following information into nursing assessment and care planning related to acute or chronic peripheral vascular diseases including the pathophysiology of arterial and venous vascular disease:

7.1a History taking
- Presenting symptoms (e.g., rest pain, claudication, calf pain, edema)
- Current and past medical history (e.g., ischemic heart disease, stroke/transient ischemic attack [TIA], deep vein thrombosis, surgical history, trauma)
- Cardiovascular risk factors
- Medications (e.g., prescription and non-prescription, herbal supplements)
- Psychosocial history (e.g., substance use, travel history)
- Evaluation of social and family support

7.1b Pain assessment

7.1c Physical/cardiovascular assessment to identify arterial and/or venous occlusion (e.g., the 6 P's [pain, paralysis, pallor, pulselessness, paresthesia, poikilothermia], ankle-brachial index, lower limb wounds/ulcers)

7.1d Coagulation studies, D-dimer and other common laboratory investigations indicative of acute ischemia

7.1e Cardiovascular and other common diagnostic tests (e.g., Doppler ultrasounds, venogram, angiogram, CT, MRI)

7.2 Selects appropriate nursing interventions to improve blood flow and prevent complications of acute or chronic peripheral vascular diseases (e.g., counselling in smoking cessation, limb repositioning and use of supporting devices)

7.3 Interprets the following data related to aortic aneurysms, aortic dissection:

7.3a History taking
- Presenting symptoms
- Current and past medical history (e.g., hypertension, trauma injuries, connective tissue disorders, ischemic heart disease, renal disease)
- Cardiovascular risk factors
- Medications (e.g., prescription and non-prescription, herbal supplements)
- Psychosocial history (e.g., recent accidents, falls, substance use)
- Evaluation of social and family support

7.3b Pain assessment

7.3c Physical/system assessment to identify presence of aneurysm or aortic dissection
- Inspection (e.g., pulsatile mass, abdominal distention, skin colour changes [mottling])
- Auscultation (e.g., bilateral limb blood pressures[s], bruits, bilateral pulse comparisons)
- Palpation (e.g., diminished or absent peripheral pulses, pulsatile mass)

7.3d CBC, coagulation and other common laboratory investigations (e.g., type and crossmatch, electrolytes, renal function, blood gases, cardiac biomarkers)

7.3e Cardiovascular and other common diagnostic tests (e.g., computerized tomography [CT] scan, ultrasound)

7.4 Selects appropriate nursing interventions to maintain client's condition with acute or chronic presentation of large vessel dissection or aneurysm (e.g., monitor hemodynamic stability and tissue perfusion, pain control)

7.5. Demonstrates an awareness and understanding of surgical and medical management of large vessel diseases and an ability to provide education and support for the client/family (e.g., promote self-care and independence, promote risk factor reduction)

8. The Care of the Person with Cardiac Inflammatory and Infectious Processes

The cardiovascular nurse:

8.1 Integrates the following information into nursing assessment and care planning related to the impact of the cardiac inflammatory/infectious disease, including pericarditis, endocarditis, and myocarditis:

8.1a History taking
- Presenting symptoms (e.g., manifestations of a heart failure, symptoms of infection, joint pain)
- Current and past medical history (e.g., congenital heart disease, recent dental and other invasive/surgical procedures, recent myocardial infarction, recent infections, autoimmune syndromes, radiation therapy, pregnancy)
- Cardiovascular risk factors

- Medications (e.g., prescription and non-prescription, herbal supplements)
- Psychosocial history (e.g., intravenous drug use)
- Evaluation of social and family support

8.1b Pain assessment

8.1c Physical/system assessment
- Inspection (e.g., lethargy, joints, temperature, dental status)
- Auscultation (e.g., heart sounds, pericardial friction rub, murmurs, lung sounds)
- Palpation (e.g., pulses)

8.1d Common laboratory investigations (e.g., blood cultures, inflammatory markers, CBC, electrolytes, coagulation studies [PTT and INR], viral titres)

8.1e Cardiac and other common diagnostic tests (e.g., 12/15-lead ECG, echocardiograms, CT scan, cardiac biopsy)

8.2 Selects appropriate nursing interventions related to the management of pericarditis/pericardial effusion, including manifestations of tamponade (e.g., monitoring hemodynamic status, administration of medication, pain control, preparation for cardiac procedures)

8.3 Selects appropriate nursing interventions related to the management of myocarditis including manifestations of acute heart failure (e.g., monitoring hemodynamic status, preparation for cardiac procedures)

8.4 Demonstrates an awareness and understanding of surgical and medical management of pericarditis/pericardial effusion and myocarditis to provide education and support for the client/family (e.g., promote self-care and independence in clients, regular monitoring and follow-up)

9. The Care of the Person Who Needs Cardiac Surgical Intervention

The cardiovascular nurse:

9.1 Integrates the following information into nursing assessment and care planning for cardiac surgery:

9.1a History taking
- Presenting symptoms/medical diagnosis
- Cardiac risk factors
- Past and current medical and surgical history (e.g., malignant hyperthermia, cancer and radiation therapy, blood transfusion reaction, dental history, heparin sensitivity, cognitive assessment, thromboembolic disease)
- Medications (e.g., prescription and non-prescription, herbal supplements, anticoagulants)
- Psychosocial history (e.g., substance use disorder)
- Evaluation of social and family support

9.1b Physical assessment/system assessment
- Inspection (e.g., height and weight, signs of infection, edema, varicosities)
- Auscultation (e.g., lung sounds, heart sounds, murmurs, blood pressure, bruits)
- Palpation (e.g., pulses, Allen's test)

9.1c Standard preoperative and other common supporting laboratory investigations

9.1d Cardiac and other common supporting diagnostic tests

9.2 Selects appropriate preoperative nursing interventions to enhance recovery and manage potential complications of cardiac surgery (e.g., client/family education, postoperative recovery and discharge planning, prepare client for anti-coagulation bridging, surgical checklist)

9.3 Selects appropriate postoperative nursing interventions to detect, monitor and manage early and late potential complications of cardiac surgery (e.g., early and progressive mobilization, appropriate pain-relief strategy, assessing and monitoring hemodynamic and fluid status, monitoring and managing end organ function)

9.4 Selects appropriate pain control interventions for clients who use substances

9.5 Demonstrates an awareness and understanding of cardiac surgical procedures and an ability to provide education and support to the client and family

10. The Care of the Person Requiring Percutaneous Cardiac Interventions and Procedures

The cardiovascular nurse:

10.1 Integrates the following pre-procedure information into nursing assessment and care planning related to potential complications of various percutaneous cardiac interventions:

10.1a History taking
- Medical diagnosis/presenting symptoms
- Cardiac risk factors
- Past and current medical history (e.g., age and comorbidities, previous vascular and cardiac surgeries, renal function)
- Medications (e.g., prescription and non-prescription, herbal supplements, contrast sensitivity)
- Evaluation of social and family support, activities of daily living assessment

10.1b Pain assessment (e.g., ischemic, chronic, access site)

10.1c Physical assessment/cardiovascular assessment
- Inspection (e.g., weight, access site and prep)
- Auscultation (e.g., lung sounds, heart sounds, bruits, blood pressure)
- Palpation (e.g., peripheral pulses, Allen's test)

10.1d Standard preoperative and other common supporting laboratory investigations

10.1e Cardiac and other common supporting diagnostic tests

10.2 Selects appropriate pre-procedure nursing interventions to enhance recovery and manage potential complications (e.g., client/family education, pre-procedural checklist, discharge planning)

10.3 Selects appropriate post-procedure nursing interventions to prevent, detect, monitor and manage early and late potential complications (e.g., site integrity, perfusion assessment, pain control)

10.4 Demonstrates an awareness and understanding of various percutaneous cardiac interventions and an ability to provide education and support to the client and family

11. Cardiogenic Shock

The cardiovascular nurse:

11.1 Integrates the following information into nursing assessment and care planning related to cardiogenic shock:

11.1a History taking
- Presenting symptoms (e.g., manifestations of low cardiac output state)
- Past and current medical history (e.g., recent cardiac event[s], trauma, failed reperfusion strategies, late presentation for treatment, valvular heart disease)
- Cardiac risk factors
- Medications and alternative therapies (e.g., prescription and non-prescription, herbal supplements)
- Psychosocial history (substance use)

11.1b Physical/system assessment
- Inspection (e.g., signs of inadequate perfusion)
- Auscultation (e.g., lung sounds, heart sounds, murmur, blood pressure[s])
- Palpation (e.g., peripheral pulses, skin temperature, capillary refill)

11.1c Common laboratory investigations (e.g., serum electrolytes, renal and liver function, lactate, CBC, coagulation studies [PTT and INR], blood gases, biomarkers)

11.1d Cardiac and other common diagnostic tests (e.g., echocardiograms, pulmonary artery pressure assessments)

11.2 Selects appropriate nursing interventions related to cardiogenic shock to re-establish hemodynamic stability (e.g., maintaining airway, breathing, circulation, ECG and blood pressure monitoring)

11.3 Demonstrates an awareness and understanding of surgical and medical management of cardiogenic shock (e.g., using inotropic medication and circulatory support devices)

11.4 Demonstrates an ability to provide education and support for the client/family (e.g., crisis management, teaching about circulatory support devices)

APPENDIX

Example of competency 1.3
The following are potential nursing interventions to reduce current and potential cardiovascular risks:

- Promote awareness of signs and symptoms of cardiovascular disease
- Manage the signs and symptoms of cardiovascular disease
- Identify modifiable risk factors (e.g., diabetes, hypertension, obesity, stress, smoking)
- Identify stages of change (e.g., pre-contemplation, contemplation, preparation, action, maintenance)
- Implement/identify programs related to lifestyle such as smoking cessation, weight control, stress management and physical activity programs
- Promote lifestyle modification strategies
- Tailor client teaching to optimize self-management skills
- Encourage discussion of current therapies using evidence-based practice (e.g., antiplatelet agents, lipid management)
- Monitor client progress and compare results to expected time frames for rehabilitation
- Encourage client to maintain and surpass rehabilitation goals

Example of competency 3.2
The following are potential nursing interventions to manage **non-life threatening** and/or stable dysrhythmias:

- Assess vital signs (e.g., blood pressure, heart rate)
- Recognize and treat associated symptoms (e.g., anxiety, other symptoms)
- Evaluate laboratory and other diagnostic tests
- Continuous ECG monitoring
- Correct underlying causes once identified (e.g., hypoxia, electrolyte imbalance)
- Administer appropriate pharmacological agents and evaluate client response
- Prepare for electrical cardioversion and evaluate client response
- Prepare client for further diagnostic testing/procedure to identify cause and/or treatment for abnormalities (e.g., implantable cardioverter defibrillator [ICD], ablation, electrophysiology studies)

Example of competency 3.2
The following are potential nursing interventions related to **life-threatening** dysrhythmias:

- Assess and maintain airway, breathing, circulation
- Assess level of consciousness
- Initiate call for appropriate emergency medical personnel if required
- Prepare for emergent interventions (e.g., defibrillation, intubation, pacing)
- Evaluate laboratory and other diagnostic tests
- Continuous ECG monitoring
- Correct underlying causes once identified (e.g., hypoxia, electrolyte imbalance)
- Administer appropriate pharmacological agents and evaluate client response
- Support family during and after critical situation (e.g., family access, privacy, social work, spiritual counsellor)

Example of competency 3.3

The following are examples of nursing interventions for potential complications related to dysrhythmias (e.g., embolic stroke related to atrial fibrillation/flutter, hemodynamic instability arising from non-sustained ventricular tachycardia [NSVT] and other conduction abnormalities):

- Administer appropriate pharmacological agents (e.g., anticoagulants, antiarrhythmics, beta blockers)
- Prepare for treatment (e.g., beta blockers/synchronous cardioversion, temporary external pacemaker, transthoracic pacemaker, permanent pacemaker or ICD, ablation)
- Monitor client status and outcome of interventions
- Tailor client teaching to individual needs (e.g., medication and symptom management, activity restrictions and ambulation, medication adherence, planning discharge and evaluation of social support)
- Monitoring device functioning (e.g., post-procedure functioning and care)

Example of competency 3.4
The following are potential nursing interventions for the client with an electronic device:

- Promote self-care and independence in clients with electronic devices (e.g., pacemaker, ICD)
- Facilitate optimal level of functioning
- Tailor client teaching to individual needs (e.g., medication and symptom management, activity restrictions and ambulation, medication adherence, planning discharge and evaluation of social support)
- Prepare client for follow-up requirements and problems relating to technology (e.g., shocks, infection)
- Acknowledge fear, anxiety, and concern from client and family with respect to living with technological devices (e.g., depression, sexuality)

Example of competency 4.2
The following are potential nursing interventions used to improve coronary blood flow and/or reduce myocardial demand for oxygen related to ischemic heart disease:

- Manage chest pain (e.g., pharmacological and non-pharmacological interventions)
- Monitor oxygenation (e.g., pulse oximetry, administer oxygen via nasal cannula)
- Monitor hemodynamic status (e.g., fluid balance, blood pressures, heart rate, peripheral perfusion)
- Monitor pharmacological effects/side effects (e.g., vasodilators, beta blockers, diuretics, calcium channel blockers, angiotensin-converting enzyme inhibitors, renin inhibitors, angiotensin receptor blockers, anticoagulants, antiplatelets, thrombolytics, nitroglycerin)
- Tailor client teaching to individual and family needs (e.g., chest pain/symptom management, activities, risk factor modification, coping with chronic and acute illness)
- Tailor client teaching to optimize self-management skills (e.g., activity modification, symptom management, medication use, when to seek help)
- Prepare for diagnostic testing, potential treatment options (e.g., thrombolytics) and other potential complications (e.g., bleeding)
- Smoking cessation aids

Example of competency 4.3
The following are potential complications of ischemic heart disease:

- dysrhythmias
- heart failure
- cardiogenic shock
- renal failure
- systemic embolism
- pericarditis
- aneurysms
- papillary muscle dysfunction
- ventricular septal defect
- ventricular rupture
- stroke
- myocardial infarction/reocclusion
- post myocardial infarction angina

Example of competency 5.2
The following are examples of potential complications of valvular heart disease:

- infection
- heart failure
- embolization
- dysrhythmia
- stroke
- rupture (e.g., valve, aorta)
- valvular thrombosis

Example of competency 5.2
The following are examples of nursing interventions to manage clients with potential complications from valvular heart disease:

- Prepare for diagnostic testing and potential treatment options
- Monitor pharmacological effects (e.g., beta blockers, anticoagulants, diuretics, vasodilators)
- Monitor hemodynamic status
- Monitor neurological status for possible stroke (e.g., aphasia, ataxia, facial droop, visual disturbances, weakness/dizziness, gag reflex)
- Tailor client teaching to individual needs (e.g., heart failure management, surgical repair options, anticoagulation management, prophylactic antibiotics)
- Manage dysrhythmias
- Promote preventive measures (e.g., prophylactic antibiotics, dental care, early treatment of infections, addiction counselling)

Example of competency 6.2
The following are potential nursing interventions to optimize cardiac output of acute and chronic heart failure management:

- Monitor oxygenation
- Monitor pharmacological effects (e.g., angiotensin-converting enzyme inhibitors [ACE-I], angiotensin II receptor blockers [ARB], diuretics, beta blockers, aldosterone blockers, inotropes, angiotensin receptor neprilysin inhibitor [ARNI], SGLT2 inhibitors)
- Monitor and maintain hemodynamic stability (e.g., fluid balance, inotropes)
- Prepare for diagnostic testing (e.g., angiogram echocardiogram) and potential treatment options (e.g., percutaneous coronary intervention [PCI], cardiac surgery options, bilevel positive airway pressure [BiPAP], ICD, cardiac resynchronization therapy, ventricular assist devices, transplant assessment)

Example of competency 7.2
The following are potential nursing interventions to improve blood flow and prevent complications of vascular diseases:

- Prepare for diagnostic testing (e.g., non-invasive vascular studies, CT, angiogram, Dopplers) and potential treatment options (e.g., surgery, endovascular procedures)
- Monitor pharmacological effects (e.g., risk factor modification, antiplatelets, anticoagulants, analgesics, lipid therapy, anti-smoking therapy, ACE-I)
- Promote rest and limb repositioning and use of supporting devices (e.g., support stockings and sequential pneumatic compression device used for venous disease)
- Tailor client teaching to individual needs (e.g., self-management, modifying risk factors, exercise, medication management, symptom management, activities of daily living, infection and progression of disease, sexual issues)
- Monitor for dissection extensions (e.g., spinal cord ischemia, mesenteric ischemia, renal failure)

Example of competency 7.4
The following are potential nursing interventions to maintain a client's condition with an aortic dissection or an aneurysm:

- Prepare for diagnostic testing and potential treatment options
- Monitor oxygenation
- Monitor and maintain blood pressure within parameters
- Monitor pharmacological effects (e.g., antihypertensives, beta blockers, diuretics, analgesics)
- Monitor peripheral pulses
- Monitor laboratory values (e.g., CBC, creatinine)
- Monitor levels of consciousness
- Monitor fluid balance
- Tailor client teaching to individual needs (e.g., modifying risk factors, medication regimen management, symptom management, activities of daily living, exercise)

Example of competencies 8.2 & 8.3
The following are potential nursing interventions for managing inflammatory/infectious diseases of the heart:

- Manage pain (e.g., cardiac, pleuritic, joint)
- Maintain hemodynamic stability (e.g., fluids and inotropic agents)
- Monitor temperature and ECG
- Arrange for appropriate venous access if long-term antibiotics are required
- Assess for manifestations of heart failure
- Assess nutritional status
- Refer for dental assessment
- Prepare for diagnostic testing and potential treatment options (e.g., cardiac biopsy, ventricular assist device, transplant)
- Tailor client teaching to individual needs (e.g., antibiotic prophylaxis, social support, steroids, addiction counselling, self-management)

Example of competency 9.3
The following are examples of potential early and late complications related to cardiac surgery:

- bleeding (e.g., tamponade, chest tube management, anticoagulation, GI)
- hemodynamic instability (e.g., fluid balance, inotropes, vasodilators)
- pulmonary disorders (e.g., effusions, pneumothorax, pulmonary embolism, pneumonia, pulmonary hypertension)
- renal insufficiency/failure
- pain (e.g., postoperative, pleural, pericardial, ischemic)
- dysrhythmia (e.g., atrial fibrillation)
- GI dysfunction (e.g., nausea, constipation, ileus, ischemia)
- cerebral vascular events (e.g., ischemic, hemorrhagic)
- delirium (e.g., confusion)
- brachial plexus injury/ulnar nerve injury
- infection (e.g., sepsis, wound infections)
- loss of skin integrity (e.g., pressure ulcers)
- sternal instability
- peripheral vascular complications (e.g., DVT, ischemic limb)
- hematological disorders (e.g., anemia, heparin-induced thrombocytopenia)
- cardiac (e.g., heart failure, myocardial infarction, rejection, post pericardiotomy syndrome, pericarditis)
- depression (e.g., insomnia, anxiety)

Competency Category 10: Percutaneous Cardiac Interventions and Procedures includes but is not limited to angiogram, percutaneous coronary intervention (PCI), electrophysiological studies/ablation, valvuloplasty, septal occluder devices, transcatheter valve implantation, balloon pulmonary angioplasty

Example of competency 10.3
The following are examples of potential early and late complications related to percutaneous cardiac interventions and procedures:

- bleeding (e.g., hematoma, tamponade, retroperitoneal)
- embolic/thrombotic (e.g., peripheral, central, cerebral)
- hemodynamic instability (e.g., vasovagal response, reocclusion, esophageal rupture)
- allergic reaction or anaphylaxis (e.g., contrast media)
- renal dysfunction/failure
- pain (e.g., ischemic, other)
- dysrhythmias
- hematological disorders
- vascular (e.g., pseudoaneurysms)
- infection
- device embolization/erosion

Example of competency 11.2
The following are potential nursing interventions related to cardiogenic shock to re-establish hemodynamic stability:

- Maintain airway, breathing, circulation
- Optimize oxygenation and hemodynamic status (e.g., fluids, titrate inotropes, intra-aortic counterpulsation)
- Continuous ECG monitoring
- Monitor pharmacological effects of vasopressors and inotropes
- Prepare for diagnostic testing and potential treatment options (e.g., temporary pacemaker, ventilation, intra-aortic balloon pump, angiogram, PCI, cardiac surgery options, ventricular assist device, transplant)