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SECTION ONE

INTRODUCTION
INTRODUCTION STATEMENT

The Prehospital Emergency Care Syllabus outlines the professional competencies required for current practice as a Primary Care Paramedic (hereafter referred to as Paramedic) in the Province of Ontario. Each Paramedic candidate must successfully complete an Advanced Emergency Medical Care Assistant Examination to qualify for entry into the practice. (Ambulance Act: Legislation Standards and Certification, Ontario Ministry of Health Services Branch, current version).

The syllabus sets forth a synopsis of the theory base and the performance skills from which Paramedic candidates will be evaluated. This synopsis connotes the knowledge level and skills to be mastered and selectively applied to patient care situations. It subsumes the criteria and protocols for prehospital patient care as outlined in:

- Basic Life Support Patient Care Standards
  (BLS – Basic Life Support, Patient Care Standards, Ontario Ministry of Health, Emergency Health Services Branch, current version)

- Symptom Relief, Protocols and Standards
  (Symptom Relief Standards & Protocols; Ontario Ministry of Health, Emergency Health Services, current version)

- Defibrillation, SAED Protocols and Standards
  (Cardiac Monitoring, Semi-Automatic External Defibrillation Protocol: Ontario Ministry of Health, Emergency Health Services Branch, current version)

This synopsis further assumes a theory and practical skill base acquired through successful completion of an approved Paramedic Program (or programs deemed equivalent by Emergency Health Services Branch, MOH) from a College of Applied Arts and Technology of Ontario.
STATEMENT OF BELIEF

The Paramedic who provides prehospital care in the province of Ontario must provide safe, efficient and timely care. To meet this mandate, the Paramedic must possess a sound knowledge base and be proficient in deductive decision-making. They must integrate their knowledge base with the elements of critical thinking and problem solving, not only to make sound clinical judgements, but judgements of safety and access unique to the prehospital and associated practice environments. They must possess skill and proficiencies in assessment and management techniques to judiciously provide the required patient care.

INTEGRATIVE COMPETENCIES

To meet the mandate, the Paramedic will:

- demonstrate competency in: utilizing the process and criteria for a primary and secondary patient assessment; interpreting manifestations and determining priorities of treatment for pathological emergency states common to the prehospital emergency care field.

- deduce pathophysiological and/or psychological rationale for: selecting the specific priority assessments to be performed; interpreting significance of assessment findings; and selecting therapeutic measures and patient care management directed towards stabilizing the patient.

- adapt priorities of assessment, treatment and management in response to: changing assessment findings; age groups; ethnicity; degree of stress and anxiety of the patient; communication ability of the patient; degree of distress and potential life threat.

- determine the need for and be competent in: utilizing cardiac monitoring and semi-automatic external defibrillators; establishing intravenous access via cannulation; administering intravenous fluids; administering specific medications designated as life saving and/or symptom relieving treatment measures.

- interpret changes in patient assessment findings in relation to: compensatory, decompensatory and failing physiological mechanisms; psychological coping mechanisms and maladaptive behavioural responses.

- demonstrate effective communication, regardless of the setting, length of interaction, or language spoken, by: utilizing therapeutic approaches which reflect a knowledge of the impact of the situation faced by the patient; responding to the needs expressed through verbal and non-verbal feedback from the patient and/or support persons and/or co-workers; participating as a team member with co-workers, other health personnel, and other emergency services personnel; reporting and recording according to the required components.
• implement patient care measures/interventions and management priorities which are safe, competent and timely.

• evaluate the effectiveness of patient management strategies, modifying care based on patient responses to treatment or care.

• utilize safe driving during emergency or non-emergency calls, adjusting to the patient condition, care being rendered, and the existing road conditions.

• implement priorities of assessment, treatment and transport based on the principles of triage in multiple casualty situations.

• incorporate legal inferences from legislative statutes, mandatory policies and guidelines, which exist and which influence the practice field in the province of Ontario and in Canada.

• utilize comfort, protection and safety measures during assessment, treatment, lifts, transfers and transport, instituting those which are unique to each patient, and are attentive to privacy and dignity needs.

• function as an extension of the health care team in home and prehospital settings when obvious assistance with patients’ self-care needs should be evaluated; when community resources are required to aid the patient or support person(s); when the patient’s home or environmental factors could influence discharge planning.

• assist other health care members with patient care, eg: Midwives, community Nurses, hospice workers, emergency department personnel.

• collaborate as a member of the Emergency Response Team by: utilizing police assistance for protection and safety of self, patient, support person(s), and patient’s property or possessions; utilizing information and assistance from fire personnel and/or first response teams; utilizing and/or supporting fire personnel and/or police services during triage of multiple patient incidents/fire/motor vehicle accidents, and/or complex disaster situations.
DESCRIPTION OF THE SYLLABUS DESIGN

The design of the syllabus uses the unifying concepts and the systems and/or problem-focused approach to organize the content in this document. Unifying concepts enable the Paramedic to individualize care by utilizing the patient’s perceptions and by assessing and interpreting findings while implementing approaches to communication and management, which befit the situation. The systems and/or problem-focused approach serve as a convenient method to organize knowledge, application and judgement components.

Brief sections have been devoted to the elderly, the child and the infant, and their unique characteristics that require adaptations in assessment and management strategies. However, the design has integrated the theory and implied skills to provide appropriate care to all age groups. This syllabus is to be utilized with the understanding that patient problems may be complex in nature. Priority determination in assessment and management is necessary when:

- pathological states pose an immediate life threat,
- pathological states represent an emergent, compromising pathophysiological crisis,
- trauma compromises other existing pathologies,
- existing pathologies supercede the effects of trauma,
- physical deterioration alters behaviour,
- crisis or behavioural maladaptions influence physical states,
- multiple victims have multiple injuries,
- the patient status deteriorates from compensatory to decompensatory or failing responses.

The Performance Profile of the Paramedics’ Competencies is a compilation of patient care techniques and/or procedures from which a selection is made to individualize care according to priorities.

The Patient Management Model (Fig. 1) represents the levels of cognitive ability required to determine and implement the priorities in patient care, i.e. priorities of assessment, priorities of treatment and management, and priorities during transport. This infers an active, critical thinking and problem-solving process. It illustrates the knowledge areas to be utilized, implies the tasks to be performed, and infers the required interpretive skills to implement individualized patient care considering the unique requirements of the patient and support persons. At the same time, the integration ability is required to make sound judgements of care pertinent to the practice environment of the Paramedic.

It should be noted that each system and associated problems of this Syllabus is preceded by a body of antecedent knowledge related to anatomy and physiology. This knowledge area specifies a base that is required for comprehending the pathophysiology, the manifestations, and the subsequent interpretation of assessment findings.
Fig. 1.
SECTION TWO

INTEGRATIVE CONCEPTS
COMMUNICATION: THERAPEUTIC APPROACHES

Apply the following to each age group: infant, child, adolescent, young adult, middle age, and elderly.

1. Describe the characteristics of effective therapeutic verbal and non-verbal communication.

2. Utilize therapeutic approaches for patients in non-emergency, potential life threat and emergency situations according to the:
   - need for help and assistance;
   - degree of anxiety manifested;
   - need for clarifying reality;
   - need to act as the patient’s advocate;
   - patient’s communicative ability, language barriers, comprehension level and/or age;
   - patient’s awareness and capability to participate in decisions of care;
   - degree of required limit setting;
   - patient’s response or non-response to distraction/diversion methods;
   - degree of physical or emotional stress;
   - degree of coping vs. disintegrative or maladaptive behaviour;
   - need to validate the patient’s responses, clarify the incident and collect information concerning the medical history.

3. (a) Explain the rationale for the selection of therapeutic approaches utilized in each patient care situation.

   (b) Select methods of approach, which personalize and promote supportive comfort for the patient when entering his/her private social sphere (social distance).

4. (a) Explain the influence that the Paramedic’s affect has on the patient’s comfort, confidence and trust.

   (b) Select those factors in interactions with which patients will perceive the genuineness of the offer to help or assist.
5. Acknowledge the patient’s degree of discomfort, distress and the impact of his/her situation.

6. (a) Utilize the components of active listening.
   
   (b) Identify the relationship of the quality of listening to the effectiveness of therapeutic interaction.

7. Identify those situations in which reducing environmental stimuli is supportive to the patient’s comfort and safety.

8. Identify those situations or cues, which indicate that the inclusion of the patient’s significant other would be supportive to the patient’s welfare.

9. Utilize supportive verbal/non-verbal communication for the deteriorating or dying patient, and/or supportive persons, and explain the reasons to support the selection.

10. Utilize and adapt therapeutic communication strategies when needed and in relation to:
    
    • the ethnicity/beliefs/culture of the patient and/or support person.
    • the variety of family structures.

11. (a) Utilize understandable language and non-intimidating therapeutic approaches when explaining the need for treatment measures.
    
    (b) Utilize understandable language and supportive approaches when explaining the consequences and/or outcomes of refusing treatment.

12. Utilize the elements of effective communication to promote confidence and cooperation with professional co-workers and other health team members.
STRESS/ANXIETY

1. Define stress, anxiety, homeostasis, stressor and physiological compensatory mechanisms.

2. (a) Describe the range in intensity of stress/anxiety responses in each individual or an individual in a group setting.

   (b) Identify life stress factors which precipitate detrimental anxiety responses.

   (c) Describe the reasons that “life stress factors” cause a unique range of stress/anxiety responses in each individual.

3. (a) Identify the physiological processes which are operational during the initial and prolonged stress/anxiety response.

   (b) Explain the three stages of the general adaption syndrome according to Selye, (eg. alarm stage; the stage of resistance; stage of exhaustion) in terms of the influence of the manifestations of an illness or injury.

4. Compare the psychological manifestations of the initial and prolonged stress/anxiety response.

5. (a) Identify the behavioural manifestations of normal, exaggerated and panic levels of stress/anxiety.

   (b) Identify the physiological and psychological manifestations which indicate loss of adaptive and/or compensatory ability for coping with stressors (including trauma).

6. (a) Utilize helping interventions and communication approaches from the initial encounter with the patient to the termination of transport to assist patients experiencing moderate to severe (disabling or panic) levels of anxiety.

   (b) Provide rationale to support the selection of helping interventions and approaches.

7. (a) Identify the characteristics of a Critical Stress Incident for victims and emergency response personnel.

   (b) Describe the potential detrimental reactions of emergency response personnel to acute stress/anxiety of a Critical Incident and of cumulative stress.

   (c) Implement supportive measures to assist those reacting in a non-functioning or detrimental way to the stress of a Critical Incident.
CRISIS INTERVENTION

1. Define crisis and crisis intervention.

2. (a) Identify predictable types of crises.
   (b) Identify types of maturational crises.
   (c) Identify unpredictable types of crises.

3. Describe the obvious and subtle behavioural manifestations and outcomes in each of the following stages of crisis:
   - Pre-crisis
   - Impact
   - Crisis
   - Resolution/Restructuring
   - Post-crisis

4. Identify the potential behavioural outcomes of non-resolution (non-restructuring) for the individual in crisis.

5. (a) Select and utilize therapeutic approaches which will assist the individual and significant others in each stage of crisis.
   (b) Identify cues from the individual and/or environment, which assist in the selection of a therapeutic approach.
   (c) Provide the rationale for the approach utilized to an individual in crisis.

6. Contrast and compare the psychological stages and reactions experienced by the dying patient and the family to the stages of crisis.

7. Utilize therapeutic approaches from the initial encounter to the termination of patient transport, which will assess the need for, and/or assist the dying patient, or the grieving support person(s) to express feelings and thereby release constrained emotions during each stage of the grieving process.

8. Differentiate the characteristics of normal grieving from pathological grieving.

9. Identify blocks to normal grieving.
10. (a) Compare the behaviour of significant survivors when loss is caused by sudden death versus loss caused by anticipated death.

(b) Provide immediate supportive care appropriate to the prehospital setting when assisting significant survivors.

(c) Identify and employ ways to assist significant survivors of sudden or expected death.

11. (a) Relate the grieving process to the changes in body image caused by a debilitating disease and/or to changes caused by treatment processes.

(b) Utilize helping interventions, which may assist the patient expressing grief in relation to an altered body image, during an emergency call and a non-emergency transfer.
MALADAPTIVE BEHAVIOURAL RESPONSES

1. Differentiate the behavioural patterns of neuroses and psychoses.

2. (a) Describe patient assessment findings for the following patterns of behaviour: withdrawal, depression, agitation/hyperactivity, hostility and aggression.

   (b) Utilize and describe the therapeutic approaches for the patient with each of the behaviours listed in 2.(a) from initial encounter to termination of transport.

   (c) Provide the rationale for therapeutic approaches utilized in 2.(b).

3. (a) Describe the following behavioural manifestations: delusion, paranoia, phobia, conversion hysteria, illusion, obsession, and hallucination.

   (b) Relate the distortions in thought patterns, moods, expression of feelings, actions, affect, relationships, coping ability and view of self for each of the maladaptive behaviours in 2.(a) and 3.(a).

   (c) Utilize and describe the therapeutic approaches for each of the behaviours in 3.(a), from initial encounter to termination of transport.

4. (a) Identify the behaviours which may be demonstrated in a patient who has been diagnosed as having schizophrenia, manic depression, or acute and/or chronic brain deterioration.

   (b) Utilize and describe the therapeutic approaches for each of the above in 4. (a).

   (c) Provide the rationale for the therapeutic approaches selected.

5. Describe the way in which each of the behaviours in 2.(a), 3.(a), and 4.(a) assists the patient to cope with his/her perceived reality.

6. Determine the way in which anxiety precipitates maladaptive behaviours.

7. (a) Identify reasons for possible misuse of alcohol.

   (b) Identify the manifestations of alcohol abuse during the drinking phase, needing a drink phase and withdrawal phase.

   (c) Utilize and describe therapeutic approaches for each phase of the alcoholic episode.

   (d) Describe how disulfiram (Antabuse) and other anti-alcoholic medication control alcohol intake.
(e) Describe the effects of drinking while on prescribed Antabuse.

(f) Identify reasons for the dangers and possible need for life support measures for the heavily intoxicated, vomiting and/or unconscious intoxicated patient.

(g) Identify the pathophysiological consequences and increased potential for life threat resulting from chronic alcoholism.

8. (a) Identify the drugs most commonly used in substance abuse with the potential for overdose.

(b) Describe the typical behaviour that results from substance abuse, (including street drugs).

(c) Identify the psychological and physiological consequences of drug abuse.

(d) Identify the way in which a lack of knowledge regarding drugs prescribed or non-prescribed can lead to accidental overdose.

9. (a) Relate suicide attempts and/or completions to age, sex, situational crisis, and developmental crisis.

(b) Relate the gesture of suicide to the feelings of the patient.

(c) Explain the reasons that all suicide attempts should be taken seriously.

(d) Describe typical behaviour patterns of an acutely depressed individual prior to a suicide attempt.

(e) Describe and utilize therapeutic approaches and select management strategies to prevent suicide, from the initial encounter to termination of the transport.

(f) Identify and gather information from acquaintances of the suicidal patient that will be helpful to hospital personnel.

10. (a) Identify the reasons for the frustration/anger/violent cycle which operates in patients whose behaviour is “out of control”.

(b) Explain the reason for the behaviour of the patient who has a premeditated objective of exhibiting violence.

(c) Describe the following in terms of the importance and the methods, which can be utilized to assist the “out of control” or the potentially violent individual:

- safety of self
- decelerating the situation
• providing an exit
• reducing stimuli/separate antagonists
• means of allowing a cooling down
• restraining self from retaliating
• setting positive expectations/setting limits
• acknowledgement/encouragement in expressing feelings
• statements of reality/consequences

(d) Identify reasons for avoiding the use of force; restraining techniques and/or restraints; for a patient who is out of control with anger.

11. (a) Identify those situations in which patients may need to be restrained.
(b) Describe the methods of restraining a patient and/or restraint application that can be utilized by the Paramedic.
(c) Identify the legal dilemmas in restraining patients.
(d) Clarify those situations in which police assistance is or may be required to restrain a patient.

12. Describe the way in which the Paramedic’s affect may positively or negatively influence the mentally disturbed patient.

13. (a) Identify and incorporate those legal implications which need to be considered when transferring or transporting a patient according to the Mental Health Act.
(b) Identify those situations in which police or Physician assistance may be required.
PAIN AS A STRESSOR

1. Explain the difference between localized, referred and radiating pain.

2. State the physiological and protective function of pain.

3. (a) Explain the physiological, somatic and psychological response to pain.

   (b) Differentiate the characteristics of pain originating from visceral, parietal, muscular and periostial sources.

   (c) Explain the reason for the following types of pain:
       • radiating
       • referred
       • entractable
       • phantom
       • chronic pain

4. (a) State and explain the factors which vary one’s reaction to pain.

   (b) Describe the influence of anxiety on the degree of pain experienced.

   (c) Describe the physiological and psychological responses of the patient having chronic pain.

5. Interpret the manifestations and assessment findings, which indicate the patient’s degree of pain.

6. Describe and utilize therapeutic techniques for assisting the patient to manage pain.
VICTIMS OF ABUSE

1. Identify the incidence of physical, emotional, and sexual abuse for all age groups.

2. Identify the factors which contribute to abusive behaviour.

3. (a) Identify the environmental factors which are suggestive and/or contribute to abuse.

(b) Identify the assessment findings and behaviour of those involved which suggest abuse.

(c) Explain the significance of the abused and/or abuser providing an incongruent incident history.

4. Identify the need for advocacy for care and protection of the abused.

5. Describe therapeutic approaches to be utilized with the abused individual from initial contact to termination of transport.

6. (a) Identify the legal obligations, ethical considerations and the required reporting and documentation procedures related to caring for the abused individuals.

(b) Identify the precautions, and demonstrate the ways and means to preserve evidence (materials) during the care of a victim of physical/sexual abuse.
MEDICAL-LEGAL RESPONSIBILITY

1. Select from the following legislation the legal duties and responsibilities, which apply to the Paramedic providing care in the prehospital setting:
   - Ambulance Act
   - Canada Evidence Act
   - Canadian Charter of Rights and Freedoms
   - Child and Family Services Act
   - Consent to Treatment Act
   - Coroner’s Act
   - Criminal Code of Canada
   - Highway Traffic Act
   - Mental Health Act
   - Occupational Health & Safety Act
   - Public Hospitals Act
   - Regulated Health Professions’ Act

2. Differentiate the intent of tort and criminal law.

3. (a) Differentiate between the tort laws governing assault, malpractice and negligence which pertain to the Paramedic.
   (d) Identify four elements of law which must be proven before a Paramedic can be found guilty of negligence.

4. State those offences which constitute moral turpitude.

5. (a) Differentiate the purpose and outcomes of a criminal court proceeding and those of a Coroner’s inquest.
   (b) Identify those circumstances of death in which a Coroner must be notified.
   (c) Describe the purpose of and when the Canada Evidence Act can be used.
   (d) Identify the consequences of providing false or misleading statements as a witness.
   (e) Identify when opinion or hearsay evidence is admissible in the Canadian court system.
6. (a) Explain the phrase “that which is reasonable” which is the underlying principle of Canadian law.

(b) Describe the application of this principle to the practice of the Paramedic.

7. Identify and explain those Ontario Emergency Health Services policy directives, such as: transportation of VSA patients; role and duty when a Midwife is on scene; DNR policy; and criteria to presume death in the absence of a Physician.

8. (a) Define assault.

(b) Differentiate between the three levels of assault and the consequence of each if charged as guilty.

(c) State the functions of the Paramedic when assisting a sexual assault victim.

9. (a) Identify the legal duties and constraints when the Paramedic is certified to administer treatments and/or medications which are designated as Controlled Medical Acts.

(b) State the reasons for being certified to administer treatments and/or medications legislated as Controlled Medical Acts.

(c) State the criteria for certification of these controlled acts.

(d) State the criteria for maintaining certification.

(e) State the reasons and associated outcomes for deactivation, decertification and/or provisional certification of Controlled Medical Acts.

10. Identify the legal obligations, constraints, purposes and benefits of being certified to practice as a Paramedic.

11. (a) Identify the legal and ethical obligations and the constraints related to maintaining patient confidentiality.

(b) Explain the ways in which patient privacy must be protected.

12. (a) Differentiate the meaning and describe the interrelationship of ethical behaviour and moral obligation.

(b) Describe the considerations which constitute an ethical basis in providing care in the prehospital setting.

(c) Describe the ethical role of the Paramedic in patient advocacy.
13. (a) Describe the elements which are to be regarded as rights of the patient and family when being cared for by a Paramedic.

(b) Describe the aspects of “consent to treatment” which are to be implemented in the prehospital practice field of the Paramedic.

(c) Describe the approaches and legal obligations the Paramedic should use when a patient refuses to accept the interventions which are clearly required for the patient’s welfare and safety.

(d) State the circumstances and legal obligation of a Paramedic to function as a guardian of a child unaccompanied by an adult responsible for them.

(e) Describe the circumstances in which the Paramedic is obligated to act as a patient’s advocate.

(f) Differentiate the legal obligations and circumstances involved in an implied consent and informed consent as it applies to the role of the Paramedic.
SECTION THREE

SYSTEMS AND ASSOCIATED PATHOPHYSIOLOGICAL PROBLEMS

The following pages in this section represent the knowledge/theory base from which the Paramedic will determine and then implement assessment based patient care/management in a prehospital setting.
RESPIRATORY SYSTEM

ANATOMY AND PHYSIOLOGY

1. (a) Identify the location, structural features and function of the following:
   - nasal cavities
   - nasal septum
   - turbinates
   - palate
   - uvula
   - tonsils
   - pharynx
   - larynx
   - cricoid cartilage
   - thyroid cartilage
   - epiglottis
   - tongue
   - glottis
   - vocal cords
   - hilum of lung
   - trachea
   - esophagus
   - right mainstem bronchus
   - left mainstem bronchus
   - cilia
   - parenchyma cells (type II cells)
   - bronchioles
   - alveoli (type I cell)
   - lung
   - pleura
   - pleural space
   - diaphragm
   - apex and base (lung)

   (b) Differentiate the structures of the upper airway from the lower airway.

2. Describe:
   - internal respiration
   - external respiration
   - hypoxia
   - anoxia
   - minute volume
   - tidal volume
   - capillary-perfusion membrane (diffusion membrane)
   - alveolar volume
   - diffusion
   - compliance
   - expiratory reserve volume
   - inspiratory reserve volume
   - dead space volume

3. (a) Identify the major and accessory muscles and their innervation involved in respiration including those of the bronchioles.
(b) Identify the airway structure which can constrict or dilate, thereby regulating air entry and exit out of the lower airway.

4. Describe the way in which muscles can modify chest diameter in the respiratory cycle and influence the inspiratory and expiratory capacity.

5. (a) Describe the changes in intrapulmonic and interpleural pressure within the respiratory system during inspiration and expiration.

(b) Summarize the dynamics of breathing in relation to major and accessory muscles, the elastic properties of the lungs and chest wall, lung and chest wall compliance, and airway resistance.

(c) Summarize the way in which aging affects ventilatory ability in relation to the factors in 5 (b).

6. Identify passive and active phases of the respiratory cycle.

7. (a) List the factors which may cause the respiratory rate to vary in the individual.

(b) Describe the differences in the respiratory pattern between infants and adults.

8. (a) Identify the anatomical part of the brain which controls involuntary and voluntary respiration.

(b) Describe the way in which the brain stem regulates respiration rate, volume and rhythmicity.

(c) Describe the influence of the autonomic nervous system on respirations.

(d) Differentiate the effect of stimulation of irritant receptors, juxtapulmonary capillary receptors (J-receptors) and beta_2_ receptors.

9. State the function of the Herring-Breuer reflex (stretch receptors).

10. (a) Describe the relationship between oxygen levels, carbon dioxide/pH, and chemoreceptors in controlling the rate and depth of respiration.

(b) Summarize the location of the brain and circulatory chemoreceptors, which control rate and depth of respiration.

11. (a) State the factors which influence tidal volume.

(b) Summarize the factors which influence ventilatory exchange.

12. Outline the changes in pressure gradients and transport mechanisms for oxygen and carbon dioxide to and from the alveolar-capillary unit.
13. (a) Explain the means by which oxygen is transported from the alveolocapillary membrane to body cells.
   (b) State the normal arterial pO₂ for an adult breathing atmospheric air.

14. (a) Explain the means by which carbon dioxide is transported from the body cells to the aveoli.
   (b) State the normal arterial pCO₂ for an adult.

15. Define hypercapnea and explain its effect on respiratory activity and on blood pH in the normal individual.

16. Define hypoxemia and explain its effect on respiratory activity in the normal individual.

17. Explain the consequences and the way in which hypoventilation, diffusion and perfusion deficits cause an increase in CO₂.

18. (a) Explain the effect of a low hemoglobin level on O₂ and CO₂ transport in the blood.
   (b) Explain the reason oxygen is required for metabolism within each body cell.
   (c) Explain the way in which carbon dioxide is produced in each body cell and the means by which it is removed from the body.
   (d) State the ways in which the body controls CO₂ levels to maintain a normal pH range.

19. State the influence of respiratory and metabolic acidosis and pyrexia on oxyhemoglobin dissociation.

20. (a) Explain the functions, locations and importance of the mast cells and goblet cells within the respiratory tract.
   (b) Describe the production and function of surfactant in relation to alveolar surface tension and the mechanics of ventilation.
QUALITATIVE ASSESSMENTS FOR PATIENTS WITH ACUTE RESPIRATORY DISTRESS

1. (a) Gather the pertinent incident and past medical history to be asked of a patient and/or support person concerning an acute respiratory distress episode.

(b) Perform the assessment required in a primary and secondary assessment for all patients experiencing acute respiratory distress.

(c) Select and interpret those assessment findings which assist in discriminating the cause of the acute respiratory distress episode.

(d) Select and interpret those assessment findings which indicate that anxiety may be exaggerating the patient’s respiratory distress.

(e) Isolate the priority assessment findings which indicate respiratory distress of a life threat nature.

2. (a) Define the following abnormal breathing patterns:

- dyspnea
- tachypnea
- hyperpnea
- bradypnea
- orthopnea
- Cheyne-Stokes respiration
- Kussmaul’s respiration
- Biot’s
- Hypoventilation
- ataxic
- hyperventilation
- apneustic (apneusis)
- agonal

(b) Interpret the consequences of each of the above in 2.(a) when prolonged, on perfusion of the lungs, heart, cerebrum and brain stem.

3. Explain the pathophysiological rationale for variations from normal to abnormal assessment findings, for each of the following:

- sputum (variations)
- cough (variations)
- rate
- rales/rhonchi (wet, crackling)
- rhythm – regular/irregular
- wheezes – expiratory/inspiratory
- chest wall symmetry
- flaring nostrils
- stridor
- lung sounds (abnormal or muffled)
- inspiratory/expiratory volume
- stertorous breathing
• expiratory force/grunt  
• hemoptysis  
• inspiratory pain  
• hyporesonance/hyperresonance  
• inspiratory to expiratory ratio  
• subcutaneous emphysema  
• superclavicular/sternal/intercostal

4.  (a) Interpret the potential reasons for and consequences of pulse oximetry results of 90% $\text{SaO}_2$, 80%, and 70% or lower in an infant, child, adult under 60 years of age and elderly patients.

(b) State the factors which contribute to a false pulse oximetry result.

(c) State the way in which a low Hgb can influence $\text{SaO}_2$.

(d) State the influence the stated oxygen saturation levels in 4.(a) will have as the Paramedic attempts to coach a patient’s breathing.

5.  (a) Demonstrate and explain the technique for auscultating chest sounds.

(b) Identify the upper and lower anatomical borders of the lung in an inflated state (full excursion).

(c) Explain the reason for assessing the posterior chest as well as the anterior chest wall for breath sounds during auscultation.

(d) Identify the chest sounds which indicate a decompensatory or life threat response.

6.  Explain the specific assessment findings of the chest wall structures, movement, and other abnormalities that relate to chronic respiratory distress/difficulty.
PATHOPHYSIOLOGY RELATED TO RESPIRATORY PROBLEMS: PATIENT ASSESSMENT AND MANAGEMENT

1. (a) Differentiate the following: respiratory distress, respiratory insufficiency, ventilatory-perfusion deficit and hypoventilation.

(b) Summarize the manifestations of 1.(a) and provide the pathophysiological rationale for each.

(c) Describe the influence of chest pain on the breathing pattern.

(d) State the initial and prolonged effects of hypoventilation on arterial pH, pO\(_2\) and pCO\(_2\).

(e) Describe the influence of anxiety on acute respiratory distress.

2. Summarize the types of upper and lower airway pathophysiological alterations which cause acute respiratory insufficiency/hypoventilation.

3. Summarize the type of upper and lower airway trauma-related problems that cause acute respiratory insufficiency/hypoventilation.

4. Describe the sequence to be employed in the management of the respiratory arrest patient (Per the Ontario Heart & Stroke Foundation and per Ministry of Health, Emergency Health Services Branch, Patient Care Standards, current version).

5. (a) State the causes of upper airway obstruction, and select the cause that occurs most often as it relates to each age group.

(b) Identify the manifestations of upper airway obstruction and describe the reason for each.

(c) Describe and implement the methods of opening the airway in the suspected presence of an upper airway obstruction.

(d) Describe and utilize a safe method for manual removal of a foreign body and/or mechanical suctioning of vomitus or secretions.

(e) State the reasons and outcomes of suctioning for fluid, mucus and/or solid particles in the oropharynx and bronchi.

6. (a) Describe and implement methods to maintain upper airway patency, including positioning.

(b) Identify those assessment findings which indicate the need for insertion of an oro/nasopharyngeal airway.
(c) Describe those assessment findings which negate the insertion of an oro/nasopharyngeal airway.

7. Define chronic obstructive pulmonary disease (COPD).

8. List the contributing factors related to the development of COPD.

9. (a) State the most common causes and/or contributing factors to the development for each of the following:

- Acute asthma: Intrinsic and Extrinsic/Allergic and Non Allergic Types
- Status asthmaticus
- Chronic asthma
- Chronic bronchitis
- Pulmonary Fibrosis
- Chronic emphysema
- Cystic Fibrosis
- Pneumonia: aspiration, stasis, viral, bacterial
- Pleurisy

(b) (i) Differentiate the pathophysiology processes and consequences for each in 9.(a).

(ii) Compare the way in which each pathology in 9.(a) is an obstructive process which increases the resistance to air movement into and out of the alveoli.

(iii) List the ways in which chronic asthma and/or chronic bronchitis results in the pathological development of COPD.

(c) Differentiate the pathophysiological process of compensation (stability) and decompensation (instability) and failure of respiratory function as it applies to each pathology listed in 9.(a).

(d) Differentiate the manifestations and/or assessment findings related to each pathology listed in 9.(a) and describe the rationale for each.

(e) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each listed in 9.(a).
(f) (i) Differentiate and implement the priority management and the rationale for each to support decision-making while caring for the patient in acute respiratory distress caused by each pathology listed in 9.(a).

(ii) Select and utilize therapeutic interaction and supportive measures to assist a patient:

- who is dyspneic
- during coughing episodes
- while trying to loosen a mucous plug
- while experiencing pain on inspiration.

(g) Select the priority assessment findings which indicate the need for urgent load and transport.

(h) State the rationale for providing humidified high concentration oxygen during the acute phase of an asthmatic attack.

(i) (i) Describe the pathophysiological developmental changes and subsequent complications of COPD as it relates to hypoxic drive, increased blood viscosity, systemic hypoxia, respiratory and metabolic acidosis, pulmonary hypertension, myocardial/cerebral ischemia, and thrombi formation.

(ii) Describe the breakdown of the alveolar ducts and alveolar-capillary units and the consequences to the lungs and subsequent perfusion as COPD progresses in its development.

(iii) Describe the reason for and consequences of acute and/or chronic air trapping in the air passages as COPD progresses in its development.

(j) Interpret those assessment findings which indicate that oxygen must be administered to the COPD patient at the highest possible concentration.

(k) State the rationale for providing high O₂ concentrations for the decompensating emphysemic patient with cardiac compromise and all other chronic lung problems.

(l) (i) Identify the main desired pharmacological effects from inhaling a bronchodilator and/or a steroid medication.

(ii) List the oral and/or inhaled bronchodilator, steroidal and other pharmacological medications which are commonly prescribed for patients with:

- Asthma
- Chronic Emphysema
• Chronic Bronchitis
• Pneumonia

(iii) Explain the therapeutic effect of stimulating beta$_2$ receptors in the lung via inhalation of salbutamol (Ventolin).

(iv) Determine the salbutamol (Ventolin) dosages via nebulizer mask for the following weights:

- < 10 kilograms
- 10 to 30 kilograms
- > 30 kilograms

(v) State the conditions and indications for administering salbutamol (Ventolin) via nebulizer mask.

(vi) State the peak effect and duration for 1 dose of salbutamol (Ventolin).

(vii) Summarize the side effects from use and over-use of salbutamol (Ventolin).

(viii) Explain the reason for giving a small drink of water post inhalation of steroidal preparation.

(ix) Provide the criteria and precautions for administering salbutamol (Ventolin) for shortness of breath, as outlined in the provincial guidelines. (Symptom Relief: Shortness of Breath Protocol; Ministry of Health, Emergency Health Service Branch, current version)

(m) (i) Identify the drug classification of epinephrine.

(ii) Explain the physiological responses of epinephrine administration under the following headings:

- Alpha$_1$ and Alpha$_2$ adrenergic receptor stimulation
- Beta$_1$ and Beta$_2$ adrenergic receptor stimulation
- Myocardial tissue effects (e.g. chronotropic and inotropic effects)

(iii) Isolate the physiological rationale and desired effects to support the use of epinephrine when patient relief from nebulized Ventolin does not occur, or, when status asthmaticus is obvious.

(iv) Differentiate the potential undesired effects and/or side effects from the pharmacological use of epinephrine in the prehospital patient situation.

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(v) Outline the contraindications for using epinephrine for the asthmatic patient.

(vi) Outline the peak and duration of epinephrine’s pharmacological effect.

(vii) Identify the dosages and method of epinephrine administration to the asthmatic permitted under the established protocols. (Ministry of Health, EHS; Patient Care Standards; Symptom Relief-Shortness of Breath and Wheezing, Epinephrine Protocol, current version).

(n) State the rationale for antibiotic use in patients with:
- Pneumonia
- Chronic Bronchitis
- COPD

(o) State the reason for the use of an expectorant and/or cough suppressant medication for patients with:
- Pneumonia
- Chronic Asthma
- Acute and/or Chronic Bronchitis

10. (a) Differentiate the respiratory pathologies leading to the development of pulmonary edema or acute cor pulmonale and describe the sequences of pathological changes and consequences specific to the cardiovascular/respiratory function.

(b) Explain the way in which the inflammatory process of most chronic and acute lung pathologies result in low level to acute (fulminating) type pulmonary edema.

(c) Identify the manifestations and describe the reason for each in 10. (a).

(d) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each in 10. (a).

(e) Describe and implement the priority management and provide the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for an urgent load and transport.

(g) State the preferred transport position for a patient with pulmonary edema.

11. (a) Identify the predisposing types of conditions which can lead to Adult Respiratory Distress Syndrome, (ARDS).
(b) Summarize the pathological consequences to the lungs as a result of ARDS.

(c) State the reasons to be prepared for a respiratory arrest in a patient known to have ARDS.

(d) State the reason for loss of compliance and subsequent difficulty when ventilating a patient with ARDS.

(e) Describe and implement the priority management and provide the rationale for decision making for the patient with ARDS.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

(See Section Four for Pediatrics IRDS.)

12. Define pulmonary embolus and identify the most common site of formation of a pulmonary embolus.

13. (a) (i) State the factors which predispose to the development of pulmonary emboli.

(ii) Select the history questions to be asked of a patient suspected of having pulmonary emboli.

(b) (i) Describe the pathophysiological hemodynamic consequences of an acute pulmonary embolus based on size and location or of multiple disseminated emboli.

(ii) Explain the reasons for a ventilatory-perfusion deficit when primary or multiple emboli occur within the lungs.

(c) Identify the subtle to overt manifestations of an acute pulmonary emboli or disseminated emboli and describe the reason for each.

(d) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each in 13.(c).

(e) Describe and implement the priority management and provide the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for an urgent load and transport.

14. Identify the types of traumatic chest injuries.
15. (a) Differentiate the pathologies, causes and consequences and complications which can develop for each of the following:

- open pneumothorax
- close pneumothorax
- simple pneumothorax
- tension pneumothorax
- hemothorax
- spontaneous pneumothorax
- pulmonary contusion
- cardiac contusion
- rib fracture with or without costal cartilage separation
- traumatic asphyxia
- ruptured diaphragm
- cardiac tamponade
- mediastinal shift
- flail chest
- aortic rupture
- multiple traumatic chest injury

(b) Identify the manifestations and describe the rationale for each listed in 15.(a).

(c) Isolate and perform the priority assessments, interpret assessment findings and describe the rationale for each in 15.(a).

(d) Describe and implement the priority management and the rationale to support decision-making for each in 15.(a).

(e) Select the priority assessment findings which indicate the need for urgent load and transport.

16. Identify the data, including the dynamics of injury to be gathered and examined when determining the nature and severity of chest trauma.

17. (a) (i) Explain the rationale for auscultating every patient with chest trauma as part of the primary assessment.

(ii) Explain the reason for auscultation prior to transport.

(b) Explain the rationale for auscultation prior to positive pressure ventilation for a suspected pneumothorax.

(c) Explain the potential complications for using positive pressure ventilation in the treatment of a pneumothorax.

(d) Clarify the assessment findings which indicate that positive pressure ventilation must be used for a patient with a pneumothorax.
OXYGEN ADMINISTRATION

1. Describe oxygen in terms of colour, odour, taste and combustion properties.

2. State the approximate percentage of concentration of the two main gases in the atmosphere.

3. State the litre capacity of D & M oxygen cylinders.

4. Describe the pin index safety system and state its purpose.

5. State the purpose and identify the regulation governing the hydrostatic testing of an oxygen cylinder.

6. State the precautions used when handling, transporting and storing oxygen cylinders.

7. Describe the precautions and procedure for changing an oxygen cylinder.

8. Calculate the length of time for maintaining O\textsubscript{2} administration at a given litre flow using the following formula:

\[
\text{Duration of flow} = \frac{\text{P.S.I.} - 500 \times \text{factor}}{\text{number of litres/min.}}
\]

Factor = 0.16 for D cylinder
= 1.56 for M cylinder

9. (a) State the purpose of administering humidified oxygen to patients.

(b) Differentiate the situations requiring the administration of either humidified or non-humidified oxygen

10. Define fraction of inspired oxygen (FI O\textsubscript{2}) and the factors influencing FI O\textsubscript{2}.

11. (a) State the oxygen concentration delivered to the patient via the following devices:

- partial non-rebreather mask @ 10-15 LPM
- BVM with oxygen reservoir @ 12-15 LPM
- nasal cannula @ 1-6 LPM
- simple face mask @ 6-12 LPM
- pocket mask @ 12 LPM
- oxygen powered mechanical ventilation

(b) State the effects that an increase or decrease in tidal volume will have on the FI O\textsubscript{2} with a nasal cannula, simple face mask, and partial non-rebreathing mask.

12. (a) Summarize the indications and contraindications for the use of nasopharyngeal and oropharyngeal airways.
Identify the method of measuring to determine the appropriate airway size prior to insertion.

13. State the maximum oxygen concentration delivered to the patient with a bag valve mask unit in the following instances:

- when disconnected from oxygen tubing;
- connected to an oxygen source without a reservoir;
- connected directly to an oxygen source with a reservoir.

14. State the advantages and disadvantages of using the optimum volume when ventilating a patient with:

- oxygen-powered mechanical ventilation
- bag valve mask
- pocket mask
- mouth to mouth

15. (a) Summarize the indications and explain the rationale for oral, nasal, pharyngeal and tracheal bronchial suctioning of a patient.

(b) Describe the techniques, precautions and vacuum levels to be utilized with each type of suctioning listed in 15.(a).

(c) Differentiate between a catheter tip and a bronchial tip suction device.

16. Explain the rationale for pre- and post-oxygenation when suctioning a patient.

17. (a) Define:

- laryngectomy
- stoma
- tracheostomy

(b) Describe the means of ventilating a patient with a stoma or trachoestomy.

(c) Describe the method to be utilized when suctioning a patient with a tracheostomy/stoma.

18. Identify the potential (but rare) untoward consequences of long-term oxygen administration when delivered at maximum concentration.

Special Note:
The method and device selected for oxygen administration, suctioning, ventilating and airway insertion during each patient call is based on the clinical judgement of the Paramedic. This clinical judgement requires a functional knowledge base to interpret the patient’s assessment findings and decide the patient’s priority management needs for these therapies.
CARDIOVASCULAR SYSTEM

ANATOMY AND PHYSIOLOGY

1. Identify the location, and explain the function of the following:
   - pericardium
   - epicardium
   - myocardium
   - endocardium
   - right atrium
   - left atrium
   - right ventricle
   - left ventricle
   - interatrial septum
   - interventricular septum
   - atrial ventricular septum
   - superior vena cava
   - inferior vena cava
   - coronary arteries
   - pulmonary arteries
   - tricuspid valve
   - mitral valve
   - pulmonary veins
   - pulmonary valve
   - aortic valve
   - chordae tendineae
   - papillary muscle
   - apex and base

2. Trace the flow of blood from the vena cava to the aorta, and identify the arterial and venous pressure changes which occur when blood flows from the left ventricle back to the left atrium.

3. Describe the changes in blood flow that occur with each cardiac cycle.

4. Describe the function of the lymphatic system.

5. (a) Describe the structure and function of the following:
   - arteries/arterioles
   - veins/venules
   - capillaries

   (b) Identify the location point at which the coronary arteries branch off the aorta.

   (c) Identify the coronary artery branches and outline their distribution throughout the myocardium.

   (d) Identify the physiological factors which can increase/decrease coronary blood flow and therefore increase/decrease myocardial perfusion.

   (e) Describe the function of collateral arteries in the myocardium.
6. Locate the following major blood vessels:

- ascending aorta
- aortic arch
- common carotid artery
- internal/external carotid
- innominate artery
- subclavian artery & vein
- axillary artery & vein
- brachial artery
- radial artery
- ulnar artery
- thoracic aorta
- abdominal aorta
- mesenteric artery
- renal artery
- common iliac
- femoral artery & vein
- popliteal artery
- dorsalis pedis
- superior vena cava
- inferior vena cava
- jugular vein
- portal hepatic system
- saphenous vein

7. Explain the following properties of cardiac tissue:

- automaticity
- rhythmicity

8. (a) Outline the components of the conduction system of the heart.

(b) Identify the dominant pacemaker.

(c) Outline the flow of impulses through the conduction system and explain the influence on each cardiac cycle.

9. Identify the intrinsic firing rates for the following:

- sinoatrial (SA) node
- atrioventricular (AV) node
- Purkinje system

10. (a) Outline each division of the autonomic nervous system from the point of origin to the insertion point(s) in the myocardium and/or conduction system.

(b) Identify the sympathetic or parasympathetic nerves which innervate the SA node and AV node.
(c) Explain the effects of the sympathetic and parasympathetic nervous system on heart rate, blood pressure, myocardial blood supply and vessel diameter.

(d) Explain the term and the physiological outcomes of vagal dominance on the heart and subsequently on the cardiac output.

(e) Explain the effect of the sole autonomic nervous system division which innervates all arteries, including the coronary arteries.

11. (a) Describe the process of depolarization and repolarization of the myocardium.

(b) Explain the electrolyte shift and the role of calcium during the phases of depolarization and repolarization of the myocardium.

(c) Explain the significance of each configuration or complex in an electrocardiogram in relation to the process of depolarization and repolarization.

(d) Explain the hemodynamic relationship to each configuration of the ECG.

12. (a) Summarize the effect of the cardiac and vasomotor centres in the medulla oblongata (brain stem centre) on heart rate and vessel diameter of the arterioles.

(b) Summarize the role of aortic and carotid baroreceptors (pressoreceptors) in influencing heart rate and blood pressure.

(c) Summarize the effect of aortic and carotid chemoreceptors on blood pressure.

13. (a) State the normal values for stroke volume.

(b) Define cardiac output/minute in relation to stroke volume and heart rate.

(c) Interpret the significance of a decreased or increased:

   (ii) diastolic BP on pulse rate, volume, rhythmicity on cardiac output.

   (iii) systolic BP on pulse rate, volume, rhythmicity on cardiac output.

14. (a) Define and describe the effect of Starling’s law of the heart on cardiac output.

(b) Define ejection fraction in relation to cardiac output.

(c) Describe the relation of cardiac contractility on cardiac output and the ejection fraction.

15. Describe the factors which influence venous return and its effect on cardiac output, cardiac perfusion, and peripheral perfusion.
16. (a) Describe the factors which influence stroke volume, heart rate and myocardial perfusion with a compensating and decompensating heart.

(b) Identify the consequences of a decreased atrial kick on cardiac output.

(c) Identify the consequences of a reduced clearing of blood volume in the right or left ventricle.

17. Describe the effect of a varied peripheral resistance on cardiac output, heart rate and the contractile force of the ventricle.

18. (a) Define preload and afterload (postload) pressures

(b) Identify factors which influence the preload pressure.

(c) Identify factors which influence the afterload pressure.

(d) Explain the effect of increased preload and/or afterload on the workload and oxygen consumption of the myocardium.

19. (a) Identify the source of epinephrine production.

(b) Identify the stimuli which promotes the release of epinephrine into the blood.

(c) Describe the effect of epinephrine on blood vessels, blood pressure, heart rate, and cardiac output.

(d) Describe the effect of physiological (intrinsic) norepinephrine and dopamine on blood vessel diameter.

20. (a) Identify the sources for the production of each of the following:

- renin
- angiotensin I and II
- aldosterone

(b) State the factors which control renin production and release.

(c) Explain the sequences of hormonal influences which occur in response to renin secretion.

(d) Explain the outcomes of renin, angiotensin I and II and aldosterone on blood pressure and blood volume.

21. (a) State the functions of the blood.

(b) Identify the blood reservoirs in the body and their storage capacity.
22. (a) State the locations of erythrocyte (RBC) production in the adult and child.
   (b) State the influence erthropoietin has on RBCs.
   (c) Identify the reasons erthropoietin is produced and secreted.

23. State the blood volume of an average adult, toddler, 1-year old and newborn infant.

24. (a) State the normal values and functions of the following:
   * plasma
   * erythrocytes (RBC)
   * leukocytes
   * lymphocytes
   * thrombocytes (platelets)
   * plasma proteins - albumin, fibrinogen, prothrombin, globulins
   (b) Explain the clinical significance of altered values for each in 24.(a).

25. (a) Define hematocrit.
   (b) State the normal hematocrit value.
   (c) Identify the influence of a loss in blood volume on the hematocrit value.

26. (a) Describe the role of hemoglobin, iron and the RBC in maintaining oxygen transport to body cells.
   (b) State the normal hemoglobin value for the adult male and female, child and infant.

27. (a) Describe the required substances and the physiological events in the clotting process.
   (b) State the role of the liver in maintaining the clotting process.
   (c) Describe the factors which influence the amount of bleeding in damaged tissues and organs.
   (d) Describe the reasons(s) little or no bleeding may temporarily occur with an amputation of an extremity.

28. State the four blood types and identify the universal donor and the universal recipient.

29. Describe the reason(s) for bleeding tendencies occurring in major pathologies, such as haemophilia, advanced leukemia and liver failure.
QUALITATIVE ASSESSMENTS FOR PATIENTS WITH CARDIAC/CARDIOVASCULAR PROBLEMS

Vital Signs

1. (a) Define pulse.
   (b) Identify normal pulse rate ranges for the adult, child, infant and newborn.

2. Describe the following as they relate to heart function:
   - pulse rate
   - pulse volume
   - pulse regularity

3. (a) List the locations where an arterial pulse may be felt.
   (b) State which pulse location is best used for the adult, child and infant, in an emergency situation and state the reason.

4. Explain and utilize the technique for obtaining an accurate evaluation of an arterial pulse and apical rate.

5. (a) Identify normal and abnormal pulses in terms of rate, rhythm and volume for the infant, child and adult.
   (b) State possible causes for these variations and interpret each of the above, and indicate the effect that each has on heart function and cardiac output.
   (c) Explain the reasons for these variety of changes that occur in pulse rate, volume and rhythm, in relation to compensatory, decompensatory, or failing physiological responses of the heart.

6. Define the following and provide normal value ranges (where applicable):
   - blood pressure
   - systolic pressure
   - diastolic pressure
   - pulse pressure
   - mean arterial pressure
   - venous pressure
   - hypotension
   - hypertension
   - pulse deficit
   - apical pulse
   - paradoxical pulse
   - tachycardia
   - bradycardia
   - muffled heart sounds
   - BP - auscultation
   - BP – palpation

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7. Relate the physiological changes within the cardiac cycle to each phase of blood pressure measurement.

8. Describe and utilize the technique for blood pressure evaluation by palpation and auscultation.

9. Identify common sources of error when measuring blood pressure and state how each may be avoided.

10. List factors which affect blood pressure explaining the influence of each factor.

11. (a) Interpret the relationship of the systolic and the diastolic pressure to cardiac output and peripheral resistance.

   (b) Explain the reasons for changes in the systolic and diastolic pressures, in relation to compensatory, decompensatory and failing physiological responses.

12. State the relationship between mean arterial pressure and perfusion.

13. (a) Explain the reason for the range of skin colour changes in the periphery and body core as cardiac output decreases.

   (b) Explain the reason for circumoral pallor and/or cyanosis, central and/or distal mottling, distal and/or central cyanosis as cardiac output decreases.

   (c) Explain the reasons for the changes in the degree of diaphoresis in relation to compensatory, decompensatory, and/or failing physiological responses with a decrease in myocardial perfusion and cardiac output.

   (d) Assess and record the full dimensions of skin colour, temperature, and degree of diaphoresis.

14. Explain the physiologic regulation of body temperature.

15. List and explain factors, both internal and external which affect the regulation of body temperature.

16. Identify the criteria to be considered to obtain and interpret body temperature measurements by tactile method.

17. Identify the ranges which indicate:
   - elevated body temperature
   - normal body temperature
   - lowered body temperature
18. Define pyrexia.

19. Explain the reason for skin temperature changes in relation to cardiovascular disorders.

**Specific Cardiac Assessment**

1. Identify the types of chief complaints stated by patients which typically indicate coronary artery disease.

2. Describe the manifestations which are significant in the patient with coronary artery disease.

3. (a) Isolate and perform the priority assessments, and interpret the assessment findings for a patient with cardiac pain/distress and the rationale for each.

   (b) Identify the questions to be asked and gather the information concerning the patient’s chest pain to clarify the origin and determine severity.

   (c) Identify the questions to be asked and information to be gathered concerning the covert (less obvious) assessments to be made when chest pain or distress is not present, yet cardiac dysfunction is suspected.

   (d) Identify typical age and gender differences in the descriptions of chest pain experienced by the cardiac patient.

   (e) Explain the importance of chest auscultation for the patient with chest pain or a known cardiac disorder.

   (f) Interpret the assessment findings of auscultation, in relation to cardiac/respiratory function.

   (g) Explain the reasons for audible congestion and/or wheezes in a patient with a cardiac disorder.

   (h) Isolate and interpret those assessment findings which indicate cardiac compromise of a life threat nature.

4. (a) Interpret significant data from the patient’s medical history which suggest the development of symptomatic coronary artery disease.

   (b) Identify those specific allergies/sensitivities which, if present, will influence a patient’s management.
5. (a) Identify the main function of major drugs in the following categories which are commonly prescribed for a cardiac patient:

- antihypertensive agents  • beta blocking agents
- antianginal agents  • antiarrhythmic medications
- cardiogenic agents  • anticoagulants
- diuretics  • salicylates
- calcium channel blocking agents

(b) Describe the cardiac and systemic action of nitroglycerine and other nitrates.

(c) Identify the modes of administering nitroglycerine.

(d) List the factors which destroy the effectiveness of a patient’s supply of nitroglycerine. (See page 3.27, objective 8 (i), for further nitroglycerine competencies.)
PATHOPHYSIOLOGY RELATED TO CARDIAC AND CARDIOVASCULAR PROBLEMS: PATIENT ASSESSMENT AND MANAGEMENT

1. (a) Define atherosclerosis and arteriosclerosis and relate these pathological states to increased peripheral vascular resistance.
   
   (b) Explain the developmental process and the potential pathophysiological consequences of arteriosclerotic arteries and atherosclerotic plaques.
   
   (c) Identify the incidence and predisposing risk factors of chronic hypertension.
   
   (d) Describe the manifestations and provide the pathophysiological rationale for sustained/chronic hypertension.

2. (a) Differentiate the blood pressure values for mild, moderate, severe and crisis hypertension.
   
   (b) Identify the values at which a patient needs to receive antihypertensive medications.
   
   (c) Identify the most prevalent antihypertensive medications prescribed for patients.
   
   (d) Explain the mechanism by which the following classifications of antihypertensive agents lower blood pressure:
   
   - diuretics
   - beta blockers
   - alphaadrenergic inhibitors
   - angiotensin-converting enzyme inhibitor (ACE inhibitors)
   - calcium antagonists
   - vasodilators
   
   (e) Provide medication examples of each of the above categories.

3. (a) Explain the pathophysiological consequences and rationale for sustained hypertension causing:
   
   - an increased oxygen demand by the myocardium
   - a decreased oxygen supply to the myocardium
   - hypertrophy of the left ventricle
   - the development of fluid and sodium retention and subsequent further increase in vascular tone
(b) Explain the development of congestive heart failure from each of the above consequences.

(c) Explain the development of intramural and intravascular thrombi/emboli from each of the above consequences.

(d) Explain the pathophysiological consequences of acute and chronic systemic hypertension on kidney and brain function.

4. (a) Define an episodal hypertensive crisis, and identify the causative factors relating to its onset.

(b) Identify the manifestations of a hypertensive crisis and describe the reason for each.

(c) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each.

(d) Describe and implement the priority management and provide the rationale to support decision-making.

(e) Select the priority assessment findings which indicate the need for urgent load and transport.

5. (a) Define coronary artery disease (CAD), atherosclerotic heart disease (ASHD).

(b) Explain the pathophysiological processes involved in the development of coronary artery disease.

6. (a) List and explain the predisposing/risk factors which contribute to coronary artery disease.

(b) Describe the dynamics of development and consequences of myocardial ischemia in terms of imbalances in oxygen supply and oxygen demand.

7. (a) Identify the predisposing/risk factors which contribute to arterial and/or venous thrombus/emboli formation.

(b) Describe the pathophysiological consequences of arterial thrombosis and venous thrombosis.

8. (a) Differentiate the pathologies, causes and consequences of:

- stable angina pectoris
- unstable angina pectoris (pre-infarction syndrome)
- myocardial infarction
(b) Identify the oxygen deprivation in each of the injury zones secondary to a myocardial infarction.

(c) Identify the manifestations and describe the reason for each, including silent myocardial infarct.

(d) (i) Compare the assessment findings for stable angina pectoris, unstable angina pectoris and myocardial infarction in terms of:

- pain - intensity/location/radiation
- pain - quality/duration
- pain - precipitating factors/effect on level of awareness
- skin - moisture/temperature/colour
- pulse findings
- blood pressure findings
- nausea/vomiting
- typical respiratory patterns
- typical behavioural responses/subjective feeling expressed
- JVD
- adventitious lung sounds: wet/crackles/wheezes

(ii) State the pathophysiological or psychological rationale for each of the above.

(iii) Explain the consequences of a valsalva manoeuvre on a compromised myocardium in terms of:

- a patient with sustained retching and/or vomiting.
- a patient straining during stool passage.
- when the carotid artery(ies) is/are massaged.

(e) Define collateral circulation and state its purpose during infarct and post infarct stages.

(f) Summarize the major complications and the associated pathophysiological basis which frequently occur as a result of a major myocardial infarction.

(g) Isolate and perform the priority assessments, and interpret the assessment findings and describe the rationale for each in 8(a).

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(h) Determine and implement the priority management and provide the rationale to support decision-making.

(i) (i) Identify the criteria which must be present prior to the administration of nitroglycerine spray.

(ii) Identify contraindications for the administration of nitroglycerine spray.

(iii) Clarify side effects of nitroglycerine.

(iv) Identify the criteria and limits for providing more than one dose to the patient with chest pain.

(v) Identify the dosage of nitroglycerine to be administered by the Paramedic to a patient with chest pain.

(vi) Administer nitroglycerine according to the provincial protocol. (Ministry of Health; Symptom Relief; Nitroglycerine and ASA Protocols; EHS, current version).

(j) (i) Identify the physiological benefits for the administration of ASA.

(ii) Identify the indications and contraindications for the administration of ASA.

(iii) Clarify the potential side effects from the use and over use of ASA.

(iv) Identify the dosage of ASA to be administered to the patient with chest pain and/or manifestations of an MI without chest pain.

(v) Administer ASA according to the provincial protocol. (Ministry of Health; Symptom Relief; Nitroglycerine and ASA Protocols; EHS, current version).

(k) Select and perform the priority assessment findings which indicate the need for urgent load and transport.

9. (a) Describe the pathophysiological development of left-sided congestive heart failure (LSCHF) and state the consequences for each.

(b) Explain the predisposing factors and causes which contribute to the development of LSCHF.

(c) (i) Identify the acute/crisis manifestations of LSCHF and describe the pathophysiological reasons for each.
(ii) Identify the chronic manifestation of long standing left ventricular heart failure.

(d) Explain the sequential development and significance of paroxysmal nocturnal dyspnea (PND) as a significant manifestation of pre-crisis and/or pre-acute LSCHF.

(e) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each in 9(c).

(f) Describe and implement the priority management and the rationale to support decision-making.

(g) Select and perform the priority assessment findings which indicate the need for urgent load and transport.

10. (a) Differentiate the pathophysiology of chronic right-sided congestive failure, RSCHF, and acute/chronic cor pulmonale and associated pulmonary hypertension and the consequences for each.

(b) Explain the factors or causes that contribute to the development of acute or chronic RSCHF.

(c) Identify the manifestations and describe the reasons for each.

(d) Isolate and perform the priority assessments, interpret the assessment findings, and provide the pathophysiological rationale for each.

(e) Describe and implement the priority management and the rationale to support decision-making.

(f) Select and perform the priority assessment findings which indicate the need for urgent load and transport.

11. (a) Describe the interrelationship and sequence of the development of acute and chronic CHF (both right and left) and acute cor pulmonale and state the physiological consequences.

(b) Describe the interrelationship of the development of acute and/or chronic congestive heart failure as a result of chronic obstructive lung disease.

(c) Identify the manifestations and describe the reason for acute and chronic heart failure.

(d) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 11(c).
(e) Describe and implement the priority management and provide the rationale to support decision-making.

(f) Summarize the way in which the pathophysiological consequence of acute congestive heart failure poses a life threat.

(g) Identify the pharmacological purpose of the following classification of drugs utilized in the treatment of acute and chronic heart failure:

- cardiotonics/cardiaglycosides
- potassium replacement
- diuretics
- morphine sulphate

(h) Identify a list of major medications for each of the first three categories listed in 11.(g), in addition to hypertensive agents which are prescribed for patients with congestive heart failure (CHF).

12. (a) Identify the types of cardiac myopathy.

(b) Identify the pathophysiological reasons cardiac myopathy can precipitate acute heart failure.

(c) Identify the pathophysiological reasons cardiac myopathy can precipitate lethal cardiac dysrrythmias.

13. (a) Identify the pathophysiological reasons for the development of cardiac dysrrythmias e.g. ectopic foci, atrial stretch, hypoxia conduction system, etc.

(b) Analyze and interpret the following cardiac dysrrythmias from ECG tracings:

- sinus bradycardia
- sinus tachycardia
- paroxysmal atrial tachycardia (PAT)
- premature atrial contractions (PAC’s)
- supraventricular tachycardia (SVT) (paroxysmal PSVT)
- atrial flutter
- atrial fibrillation
- Stokes-Adam’s Syndrome
- vasovagal syncopal episode with bradycardia
- first degree heart block
- heart block (second degree block, Mobitz I and II)
- third degree heart block
• ventricular blocks: right bundle branch (RBBB)
  left bundle branch (LBBB)
• ventricular tachycardia
• premature ventricular contractions (PVC’s)
• ventricular flutter and fibrillation
• ventricular bigeminy/trigeminy/quadgeminy
• agonal rhythm
• pulseless electrical activity (electrical mechanical dissociation)

(c) Identify artifact capture/non-capture and pacemaker spikes on an Electrocardiogram tracing.

(d) Identify the manifestations and assessment findings, including subjective feeling for long standing episodes of the dysrhythmias listed in 13.(b), and provide the rationale for each.

(e) Describe the consequences of long standing episodes of the dysrhythmias listed in 13.(b) in terms of:
  • myocardial workload.
  • oxygen demand of the myocardium.
  • oxygen supply to the myocardium.
  • cardiac output.
  • systemic perfusion.
  • intraatrial/intraventricular/mural thrombi
  • potential for life threat.

(f) Identify and implement the priority management for a patient with a dysrrhythmia listed in 13(b).

(g) Identify frequently prescribed antiarrhythmic medications found during history taking of cardiac patients.

(h) Identify the purpose of an atrial/ventricular demand pacemaker and/or a rate responsive pacemaker.

(i) Identify the reasons for pacemaker failure.

(j) Describe the assessment findings indicative of pacemaker failure.
(k) Identify the purpose of an automatic implantable cardiovertor/defibrillator (AICD).

(l) Identify the precautions to be taken when caring for a patient with an AICD.

(m) Identify the adjustment of electrode placement to be made when external defibrillation is required by a patient with a pacemaker or an AICD.

(n) Identify the benefit of placing an external magnet over the AICD device should a patient require external defibrillation.

14. (a) Describe the causative factors for each of the following pathophysiological states:
   • cardiac contusion
   • ventricular rupture
   • pericardial tamponade
   • valvular regurgitation and/or incompetence
   • cardiogenic shock

   (b) Describe the assessment findings and consequences and provide the rationale for each of the above listed in 14.(a) on cardiac output, cardiac perfusion, systemic perfusion and the potential for life threat.

   (c) Isolate and perform the priority assessments, interpret the assessment findings and describe the rational for each in 14.(a).

   (d) Describe and implement the priority management and provide the rationale to support decision-making.

   (e) Select the priority assessment findings which indicate the need for urgent load and transport.

15. (a) Define aneurysm and dissecting aneurysm.

   (b) Identify the common sites for arterial aneurysms.

   (c) Describe the causative factors of arterial aneurysm.

   (d) Describe the pathophysiological consequences related to an intact aneurysm, dissecting aneurysm and ruptured aortic aneurysm.

   (e) Identify the obvious and covert manifestations of thoracic and abdominal aortic aneurysms and describe the reason for each.
(f) Isolate and perform the priority assessments, and interpret the assessment findings and describe the rationale for each in 15.(d) and (e).

(g) Identify the contraindication for abdominal palpation in the assessment for abdominal aortic aneurysms.

(h) Describe and implement the priority management of each type of aneurysm and provide the rationale to support decision-making.

(i) Select and perform the priority assessments which determine the need for urgent load and transport when a leaking/ruptured aneurysm is suspected.

16. (a) Identify predisposing factors for a ruptured cerebral aneurysm, transient ischemic attack (TIA), carotid occlusion, cerebral hemorrhage and cerebral arterial occlusion.

(b) Differentiate the pathologies and consequences for each of the following:
   • transient ischemic attack
   • carotid occlusion
   • cerebral hemorrhage and/or cerebral arterial occlusion (cerebral vascular accident - CVA)

(c) Distinguish between the pathophysiologies for insidious and sudden onset of cerebral hemorrhage and/or cerebral arterial occlusion symptoms.

(d) Describe the way in which thrombi, emboli, hemorrhage or vessel narrowing can destroy neuronal function within the brain.

(e) Describe the pathophysiological processes by which an intracerebral hemorrhage and vascular occlusion can lead to increasing intracranial pressure causing cerebral and brain stem compression, and subsequent life threat.

(f) Explain the basis for Cushing’s reflex, and its effects on assessment findings, as bleeding and clot expansion occur within the brain.

17. (a) Define aphasia and describe the types of aphasia.

(b) Identify the significance of brain damage in the dominant cerebral hemispheres and the occurrence of aphasia.

(c) Explain the relationship of the location of brain damage to the areas of the body having distorted motor and/or sensory function.

(d) Describe the reason for an elevated temperature with some CVA patients.

(e) Identify the subtle to overt manifestations and describe the reason for each in 16.(b).
(f) Isolate and perform the priority assessments and interpret the assessment findings and describe the rationale for each in 16.(b).

(g) Describe and implement the priority management and provide the rationale to support decision-making for each in 16.(b).

(h) Select the priority assessments which indicate the need for urgent load and transport.

(i) Identify the patient benefits from receiving a thrombolytic agent, such as Tissue Plasminogen Activator (t-PA) when a cerebral hemorrhage has occurred.

(j) Identify the reason that the availability of a thrombolytic agent may influence the speed of care delivery and transport.

(k) Identify an untoward effect that may occur with receiving the drug t-PA with a cerebral bleed.

(l) Identify the way in which retching and/or vomiting increase ICP.

(m) Describe and implement measures to reduce and/or support the conscious patient and/or unconscious patient when vomiting.

18. (a) Identify the reasons for and consequences of atherosclerotic narrowing of major arteries in the extremities.

(b) Identify and perform the priority assessments and describe the associated rationale for findings indicative of the partial to complete occlusion of blood supply to the extremities.

(c) Identify and implement measures to protect extremities with occlusive peripheral obstruction during management and transport.

(d) Describe the predisposing factors, pathophysiological rationale and consequences for varicose veins of the extremities and rectal area.

(e) Identify the manifestations related to 18.(d).

(f) Explain the reason for the development of leg ulceration secondary to varicosities.

19. (a) Describe the pathophysiological reasons for multi-system failure secondary to:

- a major myocardial infarct
- acute heart failure
- a massive intracerebral hemorrhage
(b) Identify the assessment findings, and the associated rationale which indicate multi-system failure.

(c) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for the patient in the failing state.

(d) Describe and implement the priority management and provide the rationale to support decision-making.

(e) Select the priority assessment finding which indicate the need for urgent load and transport.
CARDIOPULMONARY RESUSCITATION

1. The Paramedic will demonstrate competency in the theoretical basis and performance of Basic Life Support, according to the standards of the Ontario Heart and Stroke Foundation.
   Ontario Heart and Stroke Foundation:
   Basic Life Support Standards for Cardiopulmonary Resuscitation.
   (current version)

CARDIAC MONITORING AND DEFIBRILLATION

1. (a) The Paramedic will demonstrate competency in utilizing the Semi-Automatic Defibrillator (S-AED) for a patient in cardiac arrest according to Defibrillation Protocol Standards.
   Ministry of Health; Emergency Health Services Branch,
   Cardiac Monitoring and Semi-Automatic External Defibrillation Protocols,
   (current version).

(b) The Paramedic will demonstrate competency in lead application, monitoring and interpreting ECG tracings, which influence:
   - the implementation of care and/or treatment
   - the need for further medical observation and/or treatment
   - the feedback provided to patients concerning their cardiac status
FLUIDS & ELECTROLYTES

BALANCE AND IMBALANCE

1. Define and apply a percentage of total body weight and/or total fluid volume to:
   - intracellular fluid
   - interstitial fluid
   - extracellular fluid
   - total body water
   - intravascular fluid

2. Define:
   - electrolyte
   - cation
   - ion
   - anion
   - anion
   - mEq/L
   - colloid
   - crystalloid

3. Identify the anions and cations which are chiefly extracellular and those which are chiefly intracellular.

4. (a) State the causes and describe the manifestations associated with the following imbalances:
   - hypokalemia
   - hyperkalemia
   - hyponatremia
   - hypernatremia
   - hyponatremia
   - hyperchloremia

   (b) Explain the effect of each of the above imbalances on:
   - heart function
   - blood pressure control
   - peristalsis
   - skeletal muscles
5. Define:
   - isotonic solution
   - hypertonic solution
   - hypotonic solution

6. (a) Explain the process of osmosis, simple and facilitated diffusion, active transport, and filtration.
   
   (b) Explain the factors and mechanisms which maintain Sodium (Na\(^+\)), Potassium (K\(^+\)), Calcium (Ca\(^{++}\)), Bicarbonate (HCO\(_3\)^-), and Hydrogen (H\(^+\)) ions/radicals at their respective serum levels.
   
   (c) Explain the way in which colloids and/or crystalloids influence fluid balance in the body’s fluid compartments.

7. Define:
   - pH
   - buffer
   - acidosis
   - alkalosis

8. State the normal pH of body fluids.

9. (a) Describe the roles of carbonic acid and bicarbonate in maintaining acid base balance.
   
   (b) Identify prominent buffers or buffer systems.

10. Describe the role of the respiratory, renal and buffer systems in maintaining acid base balance.

11. Explain the normal influences for controlling fluid balance and pH.

12. (a) Define and describe the pathophysiology development of each of the following:
   
   - respiratory acidosis related to acute asthma, chronic COPD, and/or respiratory failure
   
   - respiratory alkalosis related to hyperventilation
   
   - metabolic acidosis related to profound hypoxia (from any major pathology eg: acute hypo/hyperglycemia, major myocardial infarct, etc.)
   
   - metabolic alkalosis related to prolonged vomiting

3.37
(b) Explain the consequences of metabolic acidosis on the displacement of potassium from the cell.

(c) Explain the consequence of K+ shifting out of its cellular location and being replaced by H+ during metabolic acidosis.

(d) Explain the consequence of acidosis on serum calcium levels and its control of cell wall permeability.

13. Describe the manifestations of each of the conditions listed in 12.(a).

14. Describe the physiological consequences of those listed in 12.(a) on the central and/or peripheral nervous systems.

15. Identify the causes of dehydration and resulting consequences.

16. Describe the manifestations which are directly associated with dehydration.

17. State the causes of overhydration and resulting consequences.

18. List the manifestations which are directly associated with overhydration.

19. Explain Starling’s Law of the Capillaries in terms of forces causing fluid movement.

20. Define edema and state its causes and manifestations.

21. Explain the process of edema formation in terms of:
   - colloidal osmotic pressure
   - capillary hydrostatic pressure
   - capillary permeability
   - lymphatic blockage

22. Explain the reason for edema formation in states of profound acidosis.

23. Compare the volume of daily fluid intake with the volume of fluid loss and the normal avenues for fluid intake and loss.

24. (a) Identify and perform the priority assessments to be made and provide the rationale for each related to a patient with dehydration, overhydration and edema.

(b) Describe and implement the priority management and provide the rationale for decision-making for patients with the above problems listed in 24.(a).
INTRAVENOUS THERAPY

1. Select the best locations to utilize for a venapuncture and IV infusion site.

2. List the reasons for which IV infusions are administered.

3. (a) State and perform the calculations required to maintain the appropriate flow rate when a specific IV volume is ordered.

   (b) State and set the drip/minute rate and per hour volume required to maintain a TKO infusion.

4. Identify and implement the safety precautions which must be taken to maintain the flow of the IV infusion.

5. (a) Identify and assess for the manifestations of an interstitial IV and explain subsequent measures to be taken.

   (b) Identify the reasons for avoiding the discontinuance of an IV by removing the IV intracath/cannula.

   (c) Identify measures to be utilized to support the flow of IV fluid during transport.

6. Identify the information to be gathered before assuming responsibility for maintaining an IV infusion during a transfer.

7. Identify the commonly used solutions for an IV infusion.

8. Identify the drops (gtts)/ml when using a macrodrip, or a microdrip of the Burrette type.

9. Identify the advantages of utilizing a heparin or saline lock for infusions.

10. Identify the potential local and systemic complications that may occur from IV therapy.

11. Describe and perform the responsibilities for maintaining asepsis while:

    • preparing the site for venapuncture

    • preparing or changing an IV bag

    • managing a dislodged or loosened IV tubing connection.

12. Identify the types of infusions that patients may have infusing which necessitate a more highly skilled medical/nursing personnel to accompany the patient during an interfacility transfer.
13. Record the details on the Ambulance Call Report (ACR), and verbally report the information to the receiving facility concerning an infusing IV.

14. Venapuncture and Cannulation:

The Paramedic will demonstrate competency in performing a venapuncture, cannulation, preparation of the IV equipment, and commencing an infusion according to current EHS protocols.
(Ministry of Health; Advanced Life Support Patient Care Standards, current version)
SHOCK

PATHOPHYSIOLOGIES, ASSESSMENTS AND MANAGEMENT

1. (a) Define shock.

   (b) Explain the dynamics of shock in terms of the interrelationship of an inadequate circulatory volume, and/or expansion of the peripheral capillary volume, and/or ineffective pumping force of the heart to the development of inadequate oxygen perfusion and impaired cellular metabolism.

2. Explain the causes and rationale for the development of each of the following types of shock:
   - cardiogenic
   - neurogenic – spinal
   - vasogenic - septic, toxic shock syndrome, anaphylactic
   - hypovolemic – hemorrhage, oligemic, burn
   - psychogenic
   - vasovagal

3. (a) Explain the progressive pathophysiological responses, consequences and complications, including multi-system failure for each type and stage of shock under the following headings:
   - compensatory
   - transitory
   - decompensatory
   - failure/irreversible (including the development of ARDS, renal and kidney failure, systemic and brain stem hypoxia, dehydration and acidosis, and the subsequent failure of life-sustaining centres)

   (b) Identify the manifestations and describe the rationale for each of the above responses.

   (c) Explain and interpret the progressive development of manifestations and related assessment findings during each stage of shock in terms of changes in:
   - diastolic blood pressure
   - systolic blood pressure
   - pulse - rate
     volume
     rhythmicity

3.41
• pulse pressure
• respiratory pattern - rate
  volume
  rhythmicity
  abnormal patterns
  apneic episodes

• skin - degree of diaphoresis
  colour
  temperature
  condition

• LOA - orientation
  memory
  purposeful/non-purposeful

• pupils and vision

• protective reflexes - intact
  decline
  absence

• behavioural pattern - maintaining focus
  variety of responses
  anxiety
  belligerence, restlessness/agitation
  subjective expressions

• abnormal posturing - present
  absent
  seizing
  decerebrate
  decorticate

• gastrointestinal function - nausea
  vomiting
  cramps

(d) Describe and interpret the typical subjective responses of patients during the early development of each type of shock.

(e) Explain the pathophysiological rationale for each of the changes in the assessment findings listed in 3.(c).

(f) Relate the above changes to the progressive development of hypoxia, cellular dehydration and metabolic acidosis.
4. (a) Identify sources from which gross bleeding most frequently occurs in the following structures/areas:
   - scalp
   - neck structures
   - chest cavity
   - abdominal cavity
   - pelvic/retroperitoneal structures
   - extremities

   (b) Explain the trauma and non-trauma causes and the reasons for the vulnerability to bleeding/hemorrhaging for each listed in 4.(a).

   (c) Identify the potential blood volume loss with a hemorrhage occurring from sources listed in 4.(a).

   (d) Relate the classifications of blood volume loss to the development of changes in vital signs, levels of awareness, and other hypovolemic shock manifestations.

   (e) Identify those sources from which exsanguination can occur rapidly.

   (f) Identify those mechanisms of injury which indicate a required anticipation for a patient’s exsanguination.

5. (a) Differentiate and perform the priority assessments for each type and each stage of shock, and describe the rationale for their selection.

   (b) Differentiate the assessment findings which are early signals of each type of shock.

   (c) Isolate those assessment findings which indicate hemodynamic compromise of a life threat nature.

   (d) Describe and implement the priority emergency management and provide the rationale to support decision-making for each response and type of shock.

   (e) Identify the type of shock in which prehospital field management may include commencing an intravenous infusion and providing fluid replacement.

   (f) Select the priority assessments findings which indicate the need for urgent load and transport when shock manifestations are profound.
ANAPHYLACTIC SHOCK

1. Define antigen, allergen, and antibody.

2. Identify the types and specific allergens which cause anaphylactic reactions.

3. Explain the allergen/antibody hypersensitivity responses and associated pathophysiological consequences in an anaphylactic reaction/shock.

4. (a) Differentiate local vs. systemic allergic reactions and identify the manifestations and describe the pathophysiological reason for each.

   (b) Differentiate between the early and late stage manifestations of anaphylaxis.

5. Identify and gather the specific history information to be solicited during the initial encounter with the patient or from bystanders.

6. (a) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each in 4. (a) & (b).

   (b) Describe and implement the priority management and provide the rationale to support decision-making.

   (c) Select the priority assessment findings which indicate the need for urgent load and transport.

7. (a) Identify the indications and contraindications for the administration of epinephrine.

   (b) Describe the pharmacological action and side effects of epinephrine administration.

   (c) Identify the dosages and method of administration for epinephrine.

   (d) Administer epinephrine according to the established provincial protocols. (Ministry of Health, Symptom Relief Standards Epinephrine Protocol, current version)

8. State the role of the following in the treatment of anaphylactic reaction:
   - oxygen
   - epinephrine injections/IV
   - antihistamines (oral/IV) medications
   - steroidal agents (IV)
   - volume expanders (eg. Ringer’s Lactate IV Solution)

9. (a) Identify the trade names of antihistamine most commonly available as non-prescription medications.

   (b) Identify the generic and trade names of the most commonly prescribed oral/nasal, and ocular antihistamines for adults and children.
CENTRAL NERVOUS SYSTEM

ANATOMY AND PHYSIOLOGY

1. (a) Describe the location, structure and functions of the following:

Cerebrum (Forebrain)
- Cerebral fissures
- Cerebral lobes – frontal, parietal, occipital, temporal
- Motor strip and premotor strip cortex
- Sensory strip cortex
- Visual centres (interpretation)
- Speech areas – Broca’s area and Wernicke’s area
- Dominant cerebral hemisphere vs. non-dominant
- Corpus collosum
- Grey matter

White Matter (Association Tracts) and/or cerebral nuclei
- Basal ganglia
- Internal capsule
- Extrapyramidal system
- Limbic system

Diencephalon
- Thalamus
- Epithalamus
- Hypothalamus

Midbrain
- Colliculi centres
- Red nuclei and Substantia nigra
- Cerebral peduncles

Hind Brain
- Brainstem: Medulla oblongata, Pons, Reticulo-activating centres (RAS)
- Cranial nerve nuclei for V, VI, VII, VIII, IX, X, XI, XII.
- Cerebellum
Meninges
- Membranes and Spaces by name

Ventricles
- Cerebral Spinal Fluid (CSF)
- Choroid Plexus C.F.S.
- Arachnoid villi
- Interventricular foramen (Munroe)
- Cerebral Aqueduct
- Median Aperture

Cranial Nerves
- I-XII with specific names
- Foramen Magnum

Spinal Cord
- Meningeal layers and spaces
- White matter/grey matter
- Spinal nerves
- Intervertebral foramen
- Spinal canal
- Cerebral canal
- Spinal tracts

Nerve Fibres
- Efferent nerves (motor)
- Afferent nerves (sensory)
- Nerve tracts
- Neuron
- Axon
- Dendrite
- Synapse
- Myelin Sheath
- Neurilema
- Ascending tracts
- Descending tracts
• Upper Motor Neuron
• Lower Motor Neuron
• Reflex arcs

(b) Differentiate the location and unique structure of the frontal, parietal, temporal occipital, sphenoid and ethmoidal bones of the skull.

(c) Identify the cranial bones which are the least dense and thinnest.

(d) Identify the relationship of the ethmoid to the meninges.

2. (a) Describe the way in which the life sustaining nuclei in the medulla oblongata’s function to control heart rate, blood pressure and respiratory rate and volume.

(b) Describe the influence exerted by the pons and medulla oblongata in controlling respiratory rhythm.

3. (a) Identify the arterial supply (including the Circle of Willis) and the venous structures of the brain, meninges and spinal cord.

(b) Describe the consequences of weakened arterial walls at points of bifurcation.

4. (a) Identify the role of the sodium–potassium pumps and calcium (Ca++) ions in nerve impulse conduction.

(b) Explain the role of the sodium-potassium pumps in terms of depolarization, repolarization, refractory period, resting potential and action potential.

(c) Explain the role of Na+, K+ and Ca++ ions, at the myoneural function and motor-end plate, in causing a muscle contraction.

(d) Identify the function of the following neurotransmitters:
   • Acetylcholine
   • Norepinephrine
   • Serotonin
   • Dopamine
   • Endorphines
   • Enkephalins

5. (a) Contrast the function and distribution of the sympathetic and parasympathetic divisions of the autonomic nervous system (ANS) to each structure innervated.

(b) Identify the neurotransmitters of the autonomic nervous system.
Identify the function and distribution of adrenergic $\alpha_1$ and $\alpha_2$, $\beta_1$ and $\beta_2$ receptor sites and cholinergic receptor sites.

6. (a) State the function and origin in the brainstem of the following cranial nerves:

- olfactory (I)
- optic (II)
- oculomotor (III)
- vagus (X)
- spinal accessory (XI)
- facial (V)
- abducens (VI)

(b) Deduce the consequences of irritation, compression, hypoxia, acidosis and anoxia of the nuclei (origin) of each cranial nerve within the brain stem listed in 6.(a).

7. (a) State the location of the cerebral ventricles.

(b) Describe the formation, circulation, and location of CSF.

(c) Describe the function of CSF.

(d) Identify the constituents found in CSF.

8. (a) Explain the physiology of the pupillary response to light.

(b) Identify the normal pupillary variations.

(c) Describe and perform the technique for assessment of pupillary response to light.

9. State the origin, location and function of the following spinal nerves: cervical, thoracic, lumbar, sacral and specifically the phrenic, brachial plexus, internal/external intercostals, and sciatic.

10. (a) Identify the major sensory (afferent/ascending) and major motor (efferent/descending) nerve tracts of the spinal cord.

(b) Identify the spinal cord nerve tracts which decussate at the brainstem level or at the cord level.

(c) Explain the significance of nerve tract decussation.

11. (a) Explain the function of the intervertebral disc.

(b) Explain the cause and consequences of a ruptured intervertebral disc.
PATHOPHYSIOLOGY RELATED TO CENTRAL NERVOUS SYSTEM DYSFUNCTION: PATIENT ASSESSMENT AND MANAGEMENT

1. Select and gather the data concerning the dynamics of injury and determine the potential for head and/or spinal injury.

2. Isolate and interpret those manifestations which indicate the severity, extent, type, and site of damage created by head/spinal trauma.

3. Select and perform the priority assessments to be made and the reason for each for a patient with a suspected head and/or spinal trauma.

4. (a) Describe, differentiate, and interpret the assessment findings which determine the type and degree of severity of head trauma or CNS pathologies in relation to the following:
   - behavioural changes/agitation/cognitive dysfunction
   - altered levels of responsiveness/awareness/consciousness according to the Glasgow Coma Scale
   - orientation/memory dimensions e.g. time, place, person/distant past, recent past, present/incident
   - changing pulse pressures
   - BP and pulse changes
   - eye deviations
   - photophobia/visual impairment
   - pupillary response
   - respiratory changes and patterns
   - otorrhea
   - rhinorrhea
   - periorbital ecchymosis
   - mastoid bruising
   - altered motor and sensory responses/interpretation
   - vomiting/projectile in nature
   - abnormal posturing: decorticate/decerebrate/opisthotonus/trismus
   - nuchal rigidity
   - incontinence

   (b) Explain the way in which any expanding cranial lesion, as with head trauma and/or pathological state can lead to alteration in the assessment findings listed in 4.(a).
HEAD INJURIES/INTRACRANIAL PATHOLOGIES

1. Differentiate the causes, distinguishing features, and manifestations of a closed head injury, depressed skull fracture, open skull fracture, and basilar skull fracture.

2. (a) Differentiate and compare the location of the pathophysiologies and consequences for each of the following:
   - subdural hemorrhage/acute/subacute (chronic) hematoma
   - extradural (epidural) hemorrhage
   - subarachnoidal hemorrhage including cerebral aneurysms
   - intracerebral hemorrhage
   - concussion
   - contusion
   - basilar skull fracture
   - brainstem infarcts and/or hemorrhage
   - expanding intracranial and brainstem tumors

   (b) Select the components of incident and patient history which are relevant in each in 2.(a).

   (c) Identify and explain the influence of predisposing factors in the development of a chronic subdural hemorrhage and cerebral aneurysms.

   (d) Differentiate the manifestations and describe the rationale for each in 2. (a).

   (e) Isolate and perform the priority assessment, interpret the assessment findings and provide the rationale for each in 2. (a).

   (f) Explain the coup and contrecoup effect which complicates the degree of trauma-induced brain damage.

3. (a) Describe the dynamics, consequences and progression of increasing intracranial pressure due to:
   - arterial bleed
   - venous bleed
   - edema formation
   - tumors
   - shunt blockages

3.50
(b) Explain the influence of hypoxia and rising levels of carbon dioxide on the development of increasing intracranial pressure and neuron function.

(c) Describe the reason for histamine release, its effect on the formation of cerebral edema, and the subsequent increased intracranial pressure effects on neuronal function.

(d) Describe the reasons for, the consequences and the way in which expanding intracranial pressure causes neuron compression, brain stem torsion and compression, tentorial and uncal herniation.

(e) Describe the ways direct or indirect brain stem insult, compression, torsion, or hemorrhage pose a potential for life threat.

(f) Identify manifestations of expanding/increasing intracranial pressure and provide the physiological basis for their development and progression in severity.

4. (a) Identify the types of head injuries which may develop latent manifestations.

(b) Describe the manifestation of post-concussion syndrome.

(c) Describe the rationale for the possibility of seizures occurring after a head injury.

5. (a) (i) Describe the pathophysiological basis and manifestations for decompensating and failing responses in the patient with a traumatic and non-traumatic head/brain injury in the following listed below.

(ii) Relate each of the following to the level of compression, degree of hypoxia and metabolic acidosis.

- altered levels of awareness/consciousness
- altered neuro muscular responses
- vasomotor instability responses
- respiratory depression/breathing patterns/dysphagia
- decerebrate, decorticate or other abnormal posturing
- seizure activity
- projectile vomiting
- pupil constriction/(pontine compression) unilateral pupil dilation/fixating and/or deviation of pupils

(b) Isolate and perform the priority assessments and interpret the assessment findings and provide the rationale for each in 3. (a).
(c) Describe and implement the priority management and provide the rationale to support decision-making.

(d) Explain the rationale for treating patients with head trauma as having a potential spinal cord injury.

(e) Select the priority assessment findings which indicate the need for urgent load and transport.

6. (a) Describe, implement and provide the rationale for the administration of high concentrations of oxygen to a patient with any type of head injury.

(b) Determine and implement those situations in which providing assisted ventilations and/or hyperventilation is advisable.

7. (a) Identify the purpose of a patient with brain trauma and/or brain pathology receiving a CT scan or an MRI.

(b) Describe the rationale for the precautionary measures to be taken when a patient with a head injury requires oral and/or nasal suctioning.

(c) State the reason for the precautions/risks associated with the insertion of a nasopharyngeal airway into a patient with a basilar skull fracture.

8. (a) Identify the most common causes of meningitis/encephalitis.

(b) Identify the virulence, mode of transmission, and communicable features of bacterial and viral meningitis.

(c) Identify the types of bacteria which typically cause meningitis in children/young adults/young and older adults.

(d) (i) Differentiate the pathophysiology of bacterial/viral meningitis and encephalitis.

(ii) Identify the manifestation of meningitis/encephalitis.

(e) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 8.(d).

(f) Categorize those assessment findings which tend to differentiate bacterial from viral type meningitis.

(g) Describe and implement the priority management and provide rationale to support decision making.
(h) Describe and implement measures and precautions for self-protection during care and transport of a patient with meningitis.

(i) Identify the rationale for informing hospital personnel of suspicion of the patient having meningitis. (See Section 4. - Communicable Diseases).

9. (a) Explain the pathophysiological basis, the causative, precipitating factors and/or triggering mechanisms for each of the following types of headaches:
   - tension induced, episodic or chronic in nature
   - migraine – with or without an aura
   - cluster and paroxysmal hemicrania

(b) Differentiate the manifestations of the above headaches from those caused by:
   - intracranial bleeding – ruptured cerebral aneurysm with acute subarachnoid bleeding, chronic subdural bleeding
   - acute hypertension
   - metabolic disorders – hypoglycemia
   - sinusitis
   - meningitis/encephalitis
   - expanding intracranial tumors

(c) Formulate and utilize selective history-gathering to assist in differentiating the origin/type of headache experienced by the patient.

(d) Select and perform priority assessments, interpret the assessment findings, and provide the rationale for each listed in 9.(a) and (b).

(e) Describe and implement the priority management and provide the rationale to support decision-making for each in 9.(a) and (b).

(f) Select the priority assessment findings which indicate the need for urgent load and transport.
SPINAL INJURIES

1. (a) Describe the type of cord damage which may result from a torsion, burst, wedge or compression fracture of a vertebra or group of vertebrae.

(b) Identify the type of damage which occurs with a hyperflexion/hyperextension/vertical compression/rotational force type injury.

2. Differentiate between stable and unstable spinal fracture.

3. Describe the importance of considering all unconscious or head injury patients as having potential for spinal cord injury.

4. (a) Define spinal shock.

(b) Explain the pathophysiological basis and potential consequences for the development of spinal shock.

(c) Identify the potential outcomes of spinal shock.

(d) Describe the pathophysiological development of neurogenic shock in relation to cord damage and spinal shock.

(e) Describe the rationale for cervical cord compromise causing respiratory depression or failure and vasomotor instability.

(f) Describe the consequences of neurogenic shock on heart function and oxygen perfusion.

5. (a) Identify the general manifestations of spinal cord injuries and describe their pathophysiological basis.

(b) Differentiate the degenerative and traumatic type injuries of the cervical, thoracic and lumbar spine.

(c) Identify the specific manifestations of lumbar, thoracic and cervical level injuries, and describe their rationale and the basis for the exaggeration of these manifestations during hours to days post-trauma.

(d) Explain the manifestations, the consequences and pathophysiological basis for each of the following:

- cord concussion
- cord contusion
- cord compression
- partial transection of the cord
• complete transection of the cord
• central cord syndrome
• Brown-Sequard syndrome as with penetrating injuries of the cord

(e) State the reasons for early or late onset, and/or early or latent resolution of a patients’ manifestations from a spinal cord injury.

6. (a) Differentiate between:
• hemiplegia
• paraplegia
• quadriplegia

(b) Describe the pathophysiological basis for impaired diaphragm, bowel and bladder functions due to cord trauma and/or cord transection.

(c) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each type of cord trauma listed in 5.(d).

(d) Describe and implement the priority management and the rationale to support decision-making.

(e) Identify the rationale for transporting the patient with a potential traumatic injury of the cord as quickly as possible to a trauma centre.

7. (a) Describe the dynamics of a whiplash injury and consequences in causing neuromuscular, brain, and/or spinal cord damage.

(b) Identify the manifestations based on the degree of damage and describe the pathophysiological rationale for each in 7.(a).

(c) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 7.(a).

(d) Describe and implement the priority management, therapeutic interaction and support, and provide the rationale to support decision-making.

8. (a) (i) Describe the pathophysiology of herniation of an intervertebral disc.

(ii) Identify the most common vertebral levels at which intervertebral discs rupture or herniate.

(b) (i) Identify the manifestations and describe the reason for each in 8.(a).

(ii) Differentiate the location and radiation pattern of pain in relation to the vertebrae level of the herniated or ruptured disc.
(c) Isolate and perform the priority assessments and provide the rationale for each in 8.(a).

(d) Describe and implement the priority management for the problem listed in 8.(a) and provide the rationale to support decision-making.

(e) Select the priority assessment findings which indicate the need for urgent transport.

9. (a) (i) Describe the pathophysiology processes/causes of chronic vertebral degeneration and disc displacement.

(ii) Identify the predisposing factors which influence vertebral degeneration.

(b) Describe the manifestations and describe the pathophysiological rationale for each listed in 9.(a).

(c) Identify and perform the priority assessments and provide the rationale for each.

(d) Describe and implement the priority management and provide the rationale to support decision-making for each in 9.(a).

10. (a) Describe the desired effects and provide the rationale for the administration of high concentration oxygen to a patient with a spinal injury.

(b) Describe the implement measures to ensure adequate cervical spine immobilization.

(c) Describe and implement the measures to ensure adequate cervical spine immobilization during extrication, using the long spinal board, scoop stretcher and EHS approved extrication devices.

11. (a) Differentiate the pathophysiological degenerative processes of the following:
- Parkinson’s disease
- Multiple Sclerosis (MS)
- Amyotrophic Lateral Sclerosis (ALS)
- Myasthenia Gravis
- Huntington’s Chorea

(b) Identify the progression of the above diseases listed in 11.(a).

(c) Describe the early to late manifestations and the basis for their development.

(d) Select and perform the priority assessments and interpret the assessment findings when assisting the patient in crisis with any of the above pathologies listed in 11.(a).

(e) Describe and perform the priority and supportive management and provide rationale for decision-making for each listed in 11(a).
SEIZURES

1. Differentiate the following, in terms of origin, spread, general onset, location and characteristics:

   Partial Seizures:
   • Focal
   • Jacksonian

   Complex Partial Seizures:
   • Temporal lobe
   • Psychomotor – autonomic seizures, automatism

   Generalized Seizures:
   • Grand mal – tonic - clonic
   • Petit mal - absent
   • Minor motor
   • Clonic
   • Myoclonic
   • Atonic

2. (a) Describe the pathophysiological basis for seizure activity from epilepsy and other pathological states.

   (b) Describe the pathophysiological basis for seizures developing in the following:

   • space occupying lesions (tumors)
   • scar tissue (within brain)
   • metabolic disorders (eg. hypoglycemia, etc.)
   • biochemical disorders
   • hypoxemia (acute/prolonged)
   • profound metabolic acidosis
   • drug/alcohol overdose/withdrawal
   • toxins
   • pyrexia
   • congenital
   • delayed psychological development

   (c) Identify precipitating factors related to the occurrence of seizures.
3. Describe the sequence of events involved in a generalized motor seizure including prodromal (pre-ictal), tonic, clonic and post-ictal states.

4. (a) Identify the history details and gather information pertinent to a seizuring patient.

   (b) Identify and perform the priority assessments which are specific to a seizuring patient, interpret the assessment findings and provide the rationale for each, during the prodromal, ictal and post-ictal stages of a seizure.

   (c) Describe and implement the priority and supportive/protective management and provide the rationale to support decision-making, in the prodromal, ictal and post-ictal stages.

      (See Section 4. – Pediatrics: Febrile convulsions).

5. (a) Define status epilepticus.

   (b) Describe the pathophysiological basis and/or cause(s) of status epilepticus and isolate the pathological consequences.

   (c) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each during status epilepticus.

   (d) Describe and implement the priority management and provide the rationale to support decision-making for status epilepticus.

   (e) Select the priority assessment findings which indicate the need for urgent load and transport.

   (f) State the reason for using a nasopharyngeal airway in managing a status epilepticus patient.
SPECIAL SENSES

EYE

1. Describe the location and functions of the following:

- retina
- vitreous humor
- ciliary body
- macula lutea
- fovea centralis
- pupil
- conjunctiva
- aqueous humor
- ciliary muscles
- optic disc
- rods/cones
- iris
- cornea
- choroid layer
- sclera
- lacrimal apparatus
- optic chiasm
- canal of Schlemm
- lens
- inner/outer canthus

2. Describe the pathway of visual stimuli from its source to the occipital lobe of the cerebral cortex, naming each structure through which the stimuli passes.

3. (a) Describe the way in which the optic nerve and occulomotor nerve influences vision and eye function.

   (b) Identify the origin (cell bodies) for the optic and occulomotor nerves.

4. Define and describe the influence on vision, and provide the reasons for each of the following:

- strabismus
- tunnel vision
- photophobia
- cataract
- nystagmus
- disconjugate gaze
- colour blindness
- ptosis
- diplopia
- reduced peripheral field
- dark adaptation disorder
5. (a) Differentiate the pathologies, and/or causes and consequences for each of the following:

- flash/chemical burns
- acute glaucoma
- hyphema
- retinal occlusion/detachment
- blowout fractures
- enucleation
- impaled/imbedded material
- avulsion
- globe or scleral rupture

(b) Identify the manifestations and describe the pathophysiological rationale for each in 5.(a).

(c) Select and perform the priority assessments, interpret the assessment findings in each in 5.(a).

(d) Determine and implement the priority management and provide the rationale to support decision-making.

6. Select and perform specific priority assessments to be made of the eyes and describe the rationale for performing these assessments, related to the following:

- areflexive states
- head trauma
- intracranial bleeding
- ruptured cerebral aneurysm
- CVA’s
- diabetes
- globe or scleral rupture

7. (a) Identify the situations when loss of conjunctival moisture occurs.

(b) Identify the consequences of an absence of moisture of the conjunctiva.

(c) Determine and perform measures to reduce conjunctival drying.

8. (a) Describe and implement bandaging of:

- an injured eye
- an injured eye with an impaled object
- an avulsed eye
- an orbit (including blowout) fracture.

(b) Identify the situations and state the rationale and implement bandaging of the uninjured eye when injury has occurred to the opposite eye.

(c) Describe the rationale and describe and implement the technique for removal of hard or soft contact lenses when treating eye injuries.
EAR

1. Describe the functions of the following:
   - outer ear: auditory canal, tympanic membrane
   - middle ear: malleus, incus, stapes
   - inner ear: cochlea, vestibule, semicircular canals, organ of corti, otholights, maculae, crista amputaris

2. Describe the physiology of hearing.

3. (a) Describe the function of the eustachian tube and provide its explicit anatomical connections.

   (b) Explain the reason for otitis media being caused by an inflammatory process in the pharynx.

4. Describe the pathway of auditory stimuli to the interpretive areas of the cerebral cortex.

5. Identify the cranial nerves which control hearing.

6. (a) Differentiate the pathology and/or causes and the consequences of the following:
   - otorrhea
   - tinnitus
   - gross bleeding from the ear
   - middle ear infection
   - loss of balance from inner ear dysfunction including Meniere’s disease
   - infection

   (b) Describe the manifestations and describe the pathophysiological rationale for each in 6.(a).

   (c) Isolate and perform the priority assessments and provide the rationale for each.

   (d) Determine and implement the priority management and provide the rationale to support decision-making.
NOSE

1. Describe the location, structures and function of the following:
   - turbinates (concha)
   - nasal cartilage
   - cilia
   - nasal bones
   - septal cartilage
   - cribiform plate

2. State the cranial nerve which controls the sense of smell.

3. (a) Define:
   - rhinorrhea
   - epistaxis

   (b) Identify the manifestations and describe the pathophysiological rationale for each in 3.(a).

   (c) Differentiate the manifestations of anterior and posterior epistaxis.

   (d) Select and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 3.(a) and (c).

   (e) Determine and implement the priority management and provide the rationale to support decision-making.

4. Describe the specific assessment findings of nose and nasopharynx dysfunction which can be related to central nervous system dysfunction.
GASTROINTESTINAL SYSTEM

ANATOMY AND PHYSIOLOGY

1. (a) Describe the location and function of the muscle layers, the serum layer and the mucosa layer of the gastrointestinal tract.

   (b) Explain the ways in which mucus serves to protect the GI tract.

2. Describe the location and function of the following:
   - esophagus
   - stomach - cardiac orifice/sphincter, fundus, body, atrum, pylorus, pyloric sphincter.
   - small intestine – duodenum, jejunum, ileum, pyloric sphincter
   - mesentery – mesenteric arteries/veins
   - large intestine – ascending, transverse, descending, cecum, verniform appendix, sigmoid colon, rectum.
   - anus – internal/external sphincters
   - liver – Glisson’s capsule, hepatocytes, Kupffer cells, hepatic duct
   - gall bladder – cystic duct common hepatic duct ampulla of Vater
   - pancreas – pancreatic duct
   - spleen
   - peritoneum – parietal/visceral layers

3. (a) Identify the substances/enzymes which contribute to the chemical breakdown of food constituents thereby facilitating their absorption in the:
   - mouth
   - stomach
   - small intestine including pancreatic and hepatic enzymes/substances.
(b) Identify and clarify the function of the digestive hormones released from the stomach and/or small intestinal mucosa.

4. (a) Describe the structure and function of the hepatic-portal system.
   (b) Clarify the relationship of the portal vein to the esophagus and the hepatic vein to the inferior vena cava.

5. (a) Explain the importance of the pancreas’ volumous production of bicarbonate to the stability of acid/base balance and mucosal integrity of the intestinal tract.
   (b) Explain the endocrine and exocrine functions of the pancreas.
PATHOPHYSIOLOGY RELATED TO GASTROINTESTINAL PROBLEMS:
PATIENT ASSESSMENT AND MANAGEMENT

1. Differentiate the pathophysiological processes and consequences for the following:
   - esophageal varices
   - Mallory-Weiss syndrome
   - hiatus hernia
   - esophageal reflux
   - abdominal, inguinal hernia
   - ulcers - gastric/duodenal perforation
   - bowel obstruction/perforation
   - appendicitis
   - cholecystitis
   - hepatitis, cirrhosis and associated portal-hepatic hypertension
   - pancreatitis
   - gastroenteritis
   - peritonitis
   - colitis – ulcerative, Crohn’s disease
   - diverticulitis
   - hemorrhoids

2. (a) Explain the malfunction, obstructive and parasitic consequences of malignant tumors within the throat, stomach, mesentery, intestine, colon, pancreas, and liver.
   (b) Explain other types of obstructions and their consequences which may occur within the:
       - throat
       - esophagus
       - stomach
       - biliary duct
       - pancreatic duct
       - ampulla of Vater site
       - intestine
(c) (i) Identify the manifestations and explain the pathophysiological rationale for each in 1, 2.(a) and (b).

(ii) Clarify the type, pattern, and referral points of pain associated with each of the above in 1., 2.(a) and (b).

3. Identify the obvious and subtle evidences of bleeding from the:
   - esophagus
   - small intestine
   - stomach
   - colon
   - rectum

4. (a) Describe the need for and the consequences of surgical removal of a portion of the duodenum, ilium, jejuneum, and/or colon.

(b) Describe the implications of the above in the following:
   - end to end anastomosis
   - iliostomy
   - jejunostomy
   - colostomy

(c) Describe the care for a patient with any of the above, should a disruption occur in the adherence of the appliance.

5. (a) Describe the types of abdominal pain, the reason for each of the problems listed in 1., 2.(a) and (b), and the way each may be described by the patient.

(b) Formulate and utilize a repertoire of pointed questions to be used for a patient whose chief complaint is acute abdominal pain and/or bleeding and/or vomiting.

(c) Determine and perform the priority assessments, interpret the assessment findings and provide the rationale for each listed in 1., 2.(a), 2.(b) and 3.

(d) Identify the potential for and the rationale for the chief complaint being chest pain vs. abdominal pain when the origin of the pain is within the abdomen or esophagus.

6. (a) Describe the importance of, and the features to determine during visualization, abdominal palpation and testing for rebound tenderness.
(b) Explain the reasons for avoiding abdominal palpation upon finding a pulsating abdominal mass.

(c) Describe the most effective method to use when palpating the abdomen and testing for rebound tenderness.

(d) Explain the purpose and determine the timeliness of abdominal auscultation.

(e) Explain the significance of distention, rebound tenderness, board-like rigidity and ascites.

(f) Describe the priority management and provide the rationale to support decision-making for each situation in 1., 2.(a), 2.(b), and 3.

(g) Select the priority assessment findings which indicate the need for urgent load and transport.

7. (a) Differentiate the pathophysiological processes and consequences of blunt or penetrating abdominal trauma to the spleen, liver, mesentery, evisceration and bowel rupture.

(b) Describe the manifestations and explain the pathophysiological rationale for each.

(c) Isolate and perform the priority assessments and interpret the assessment findings and provide the rationale for each in 7.(a).

(d) Determine and implement the priority management and provide the rationale to support decision-making.

(e) Select the priority assessment findings which indicate the need for urgent load and transport.
RENAL SYSTEM

ANATOMY AND PHYSIOLOGY

1. Describe the location, structure and function of the following:
   - renal capsule
   - kidney cortex
   - kidney medulla
   - kidney hilum
   - nephron
   - Bowman’s capsule
   - glomerulus
   - afferent and efferent arterioles
   - descending/ascending/distal tubule/collecting tubule
   - peritubular capillaries
   - renal tubules
   - ureter
   - bladder
   - bladder trigone
   - detrusor muscle
   - urethra
   - internal sphincter
   - external sphincter
   - urinary meatus

2. Explain the way in which the process of glomerular filtration is affected or influences:
   - blood volume – hypo/hypervolemia
   - urine production
   - blood pressure
   - erythropoiesis and red blood cell maturation
   - regulatory hormones – antidiuretic hormone (ADH), aldosterone, angiotensin/rennin
   - blood osmolarity

3. (a) Explain the processes by which urine is produced.
   (b) Identify the normal urinary output per hour, and per day for the adult, child and infant.
   (c) Identify the normal constituents of urine.
4. (a) Identify the division of the autonomic nervous system (ANS) which innervates the bladder and internal urethral sphincter.

(b) Explain the role of the presso-receptors (mechano), the ANS, and the spinal cord reflex in emptying the bladder.

(c) Explain the way in which the learned response of bladder control or emptying relates to the lower sacral neuronal reflex.

5. (a) Identify the substances and ions which are passively transported, selectively reabsorbed, actively transported, secreted, or transported via osmosis by each division of the kidney tubules.

(b) Describe mechanisms by which the kidney controls fluid and acid/base balance.

(c) Describe the means by which glucose is reabsorbed and/or excreted in the kidney tubules.

(d) Identify the ions which are excreted in the urine when glucose is excreted in large amounts or when a loss is occurring over a day to several days.

6. (a) Identify the types of diuretics.

(b) Identify the way in which each diuretic type (category) exerts its influence on kidney tubule functioning.
PATHOPHYSIOLOGY RELATED TO RENAL PROBLEMS: PATIENT ASSESSMENT AND MANAGEMENT

1. Explain the causative factors and/or reasons for the pathophysiological manifestations of:
   - anuria
   - dysuria
   - hematuria
   - oliguria

2. Describe the causative factors, pathophysiological processes and consequences associated with the following conditions:
   - hypoxia
   - hypovolemia
   - renal colic
   - blunt trauma injuries to kidney area
   - trauma to pelvic area
   - obstructive tumors of kidney/bladder
   - neurogenic bladder
   - urinary tract infection (UTI)
   - glomerulonephritis
   - nephrosis
   - tubular necrosis
   - Acute/Chronic Renal Failure (ARF/CRF)
   - uremia

3. (a) Differentiate the manifestation of each of those listed in 2. and describe the rationale for each.

   (b) Isolate and perform the priority assessments and interpret the assessment findings and provide the rationale for each listed in 2.

   (c) Identify the interpretation of finding costal vertebral tenderness (CVT) during assessment.

   (d) Describe and perform the method of assessing for costal vertebral tenderness.

   (e) Identify the types of injury in which costal vertebral tenderness would be anticipated.
4. (a) Identify the function of dialysis for the patient with kidney failure.

(b) Differentiate the mechanisms of hemodialysis and peritoneal dialysis.

(c) Explain the ways in which access to the patient’s blood is achieved for both dialyzing approaches.

(d) Identify the manifestations and the rationale for each occurring as a post dialysis complication during transport to or from hospital to home:
   - hypotension
   - hyperkalemia
   - fistula/graft or shunt hemorrhage
   - chest pain
   - hypertension
   - acute CHF
   - dysrrhythmias

(e) Select and perform priority assessments, interpret the assessment findings and provide the rationale for each in 4.(d).

(f) Describe and implement priority management and provide the rationale for decision-making for each complication listed in 4.(d).

(g) Select the priority assessment findings which indicate the need for urgent load and transport.

5. (a) Identify the way in which urinary tumors can obstruct urinary function.

(b) Identify the variety of chief complaints typically expressed by a patient with an obstructive urinary tract tumor.

(c) Differentiate the manifestations of an obstructive tumor of the kidney, bladder, or surrounding the urethra or ureter.

(d) Identify the various re-constructive urinary surgeries, radiation and/or chemotherapy patients may have due to an obstructive tumor.

(e) Identify the complications and assessment findings the patient may demonstrate with the problems listed in 5.(d).
(f) Select the priority assessment, interpret the assessment findings and provide the rationale for each in 5.(d).

(g) Describe and perform the priority management and provide the rationale for decision-making for the patient with the problem listed in 5.(d).

(h) Select the priority assessment finding which indicate the need for urgent transport.

6. (a) Identify the pathophysiological reasons for urinary incontinence of a child, adult, and elderly patient.

(b) Explain the psychological reactions of the above patients to having been incontinent of urine.

(c) Describe and provide the psychological and supportive care required for the incontinent child, adult or elderly patient.

7. (a) Identify reasons and/or purposes of suprapubic and indwelling urinary urethral catheters.

(b) Identify the discomforts that may be expressed by patients with an indwelling urinary catheter and identify the associated reasons for such discomfort.

(c) Describe and implement the techniques to maintain urinary flow in the direction of the drainage system and prevent tension/trauma to the indwelling site.

(d) Explain the potential for the development of infection of a patient with an indwelling catheter.

8. (a) Identify the fluid components to be measured when determining the urinary output.

(b) Identify the importance of recording and reporting the urinary output.
METABOLIC DISORDERS

DIABETES MELLITUS

1. (a) Explain the functions of insulin in the body.
   (b) Identify the body’s preferred fuel sources, in order of priority, for metabolic functions.
   (c) Relate the function of the pancreas to insulin and glucagon production, and cellular metabolism.
   (d) Isolate the role of the liver in maintaining the required blood glucose level.
   (e) State the normal blood glucose levels in mmols/L.
   (f) Identify the specific cells of the pancreas which produce insulin and glucagon.
   (g) Define:
      - glycolysis
      - glycogenolysis
      - gluconeogenesis
   (h) Describe the influence of insulin, glucagon and other hormones on:
      - maintaining a normal blood glucose level
      - releasing/storing glucose from stored sources
      - formation of glucose from fatty acids and amino acids
   (i) Identify those body cells which must have glucose actively transported across their cell membrane walls vs. those which can utilize free glucose without an active transmitter substance.
   (j) Clarify the role of insulin in the active transport of glucose across semi-permeable cell membranes.

2. (a) Identify the predisposing factors which contribute to the development for each of Insulin dependant diabetes mellitus – IDDM (Type I) and non-insulin dependant diabetes mellitus – NIDDM (Type II).
   (b) Differentiate IDDM and NIDDM as they relate to the intrinsic production of insulin and/or glucagon.

3. (a) Explain the pathophysiological processes and consequences which occur in IDDM and NIDDM.
(b) Describe the early and late manifestations of IDDM and NIDDM, and explain the rationale of each.

(c) Identify the progressive vascular changes which occur in IDDM and NIDDM.

4. Compare the normal range of blood glucose levels to those found in acute hypoglycemic and acute hyperglycemic states.

5. (a) Describe the pathophysiological developmental processes involved in the development of each of the following:
   - juvenile diabetes
   - 'brittle' diabetic
   - gestational diabetes
   - diabetic ketoacidosis (DKA)
   - hyperosmolar hyperglycemia non-ketotic acidosis (HHNK)
   - mature onset diabetes

(b) Describe the reasons for the development in each listed in 5.(a).

6. (a) Describe the pathophysiological processes, consequences and rationale for dehydration, hypovolemia, ketoacidosis and ketonuria in the acute hyperglycemic patient with IDDM or non-regulated NIDDM.

(b) Differentiate the pathophysiological processes and consequences of acute diabetic ketoacidosis from acute hyperglycemic non-ketotic acidosis.

(c) Explain the way in which a non-ketotic hyperglycemic patient develops acidotic and hypoxic states with life threatening consequences.

(d) Describe the pathophysiological processes and consequences as acute hypoglycemia develops.

7. Explain the pathophysiologic reasons for the potential life threat in:
   - acute hyperglycemia
   - acute hypoglycemia

8. (a) Compare the manifestations and differentiate the assessment findings of acute hyperglycemia (ketotic and non-ketotic) and describe the pathophysiological basis for each.
(b) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 8.(a).

(c) Describe and implement the priority management and provide the rationale to support decision-making.

9. (a) State the reason for testing blood glucose levels of patients with a decreased level of awareness, and presenting as hypo/hyperglycemic or a CVA.

(b) State the blood glucose ranges which indicate hypo and hyperglycemia.

10. (a) Identify the circumstances under which oral glucose gel is administered to the hypoglycemic patient.

(b) Identify the circumstances under which glucagon is administered to the hypoglycemic patient.

(c) Identify the circumstances under which glucagon is not to be administered to the patient.

11. (a) Identify the types of insulin utilized to control diabetes mellitus.

(b) (i) Identify the common oral hypoglycemic agents utilized by non-insulin dependant diabetic patients.

(ii) Identify the reason for the conversion of the patient with NIDDM to an IDDM state.

(c) Identify the dosage of oral glucose gel and glucagon according to the approved protocols for the adult and child.

(d) Outline the method and implement the administration of glucagon according to the approved provincial protocol.
(Ministry of Health: Emergency Health Services Branch: Symptom Relief Diabetic Protocol; current version)
OTHER METABOLIC PATHOPHYSIOLOGICAL PROBLEMS

1. (a) Describe the pathophysiological processes involved, and the predisposing factors which contribute to the development of the following metabolic conditions:
   - Hyperthyroidism (Thyroid crisis)
   - Hypothyroidism
   - Cushing’s Syndrome
   - Addison’s Disease
   - Pheochromocytoma
   - Diabetes Insipidus
   - Hyperaldosteronism

   (b) Outline the major manifestations and describe the pathophysiological rationale for each condition listed in 1.(a).

   (c) Identify the priority assessments, interpret the assessment findings and provide the rationale for each condition listed in 1.(a).

   (d) Determine the priority management and provide rationale to support decision making for each condition listed in 1.(a).

   (e) Identify the chief clinical concern which contraindicates the administration of glucagon to a patient with a history of pheochromocytoma.
REPRODUCTIVE SYSTEMS

MALE

1. Identify the location and describe the function of the following male reproductive structures:
   - urethra
   - prostate gland
   - external meatus
   - scrotum
   - testes
   - penis
   - vas deferens
   - epididymis
   - seminiferous tubules

2. Describe the reproductive structures and hormones which regulate the functions of the male reproductive system.

3. (a) Identify the types of soft tissue injuries and the manifestations that may occur to the external/internal male genitalia.
   (b) Identify and perform priority assessment and interpret the assessment findings for the injuries in 3.(a).
   (c) Summarize and implement the supportive and priority management for the above injuries involving bleeding, edema formation and avulsive wounds, and provide the rationale for decision-making.

4. (a) Describe the pathophysiological processes and consequences of:
   - benign/malignant prostatic hypertrophy
   - testicular carcinoma
   - typical areas of metastatic spread from the carcinoma of (i) prostate and (ii) testes
   (b) Identify the manifestations/chief complaint and/or assessment findings for those listed in 4.(a).
(c) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 4.(a).

(d) Describe and implement the priority and supportive management and provide the rationale to support decision-making for each in 4.(a).

5. (a) Identify the possible complications post-prostatectomy, which may prompt the patient to require assistance from a Paramedic.

   (b) Identify and perform the priority assessments and provide the rationale for the above.

   (c) Describe and perform the priority management and provide the rationale for decision-making.
FEMALE

1. Identify the location and describe the function of the following female reproductive structures:
   - ovaries
   - fallopian tubes
   - uterus
   - endometrium
   - myometrium
   - cervix
   - vagina
   - vaginal orifice
   - perineum
   - urinary meatus
OBSTETRICS

1. (a) Explain the physiological process of ovulation, fertilization and implantation.
   (b) Explain hormonal influence on those processes listed above.
   (c) Identify the structure and function of the placenta, cord, amniotic sac and fluid.

2. (a) Identify the manifestations of normal pregnancy.
   (b) Describe the events of each trimester of pregnancy.
   (c) Differentiate between Braxton-Hick’s contractions, false labour, and true labour.

3. Describe the function and events of each stage of labour.

4. (a) Identify and gather the pertinent information which should be obtained from a pregnant woman.
   (b) Explain the importance and describe the method of assessing the following for a woman in labour:
      - engagement
      - timing, intensity, and duration of contractions
      - prima, para, multipara, gravida,
      - singular/multiple births
      - ruptured membranes, show
      - urgency to push/urgency to defecate
      - bulging perineum
      - crowning
      - fetal heart rate
   (c) Identify and implement measures to protect the privacy of the pregnant woman during assessment/labour and delivery.
   (d) Differentiate between the presentations of cephalic, frank breech, and footling breech.
   (e) Isolate and perform the priority assessments and interpret the assessment findings which indicate an imminent delivery.
   (f) Isolate and perform the priority assessments and interpret assessment findings which indicate the likelihood of the imminent delivery of a large/over-mature newborn, as with a mother with gestational diabetes.

3.80
(g) Identify and perform the criteria to determine if a woman in labour should be:

- prepared for delivery at home
- transported immediately

(h) Describe and utilize supportive, therapeutic communication and/or instructive coaching to the mother and/or family/support persons during:

- active labour
- delivery
- post-delivery

(i) Identify and implement the procedures and preparations for a delivery which occurs:

- enroute to hospital
- in a motor vehicle
- in a public place

5. (a) Explain the pathophysiological reasons for the consequences of venacaval hypotension in the pregnant woman and the fetus in utero.

(b) Identify the manifestations and rational for venacaval hypotension.

(c) Identify and perform the priority assessments and interpret the assessment findings for venacaval hypotension.

(d) Describe and implement measures to relieve the symptoms of venacaval hypotension and provide the rationale for decision-making.

6. (a) Explain the importance of and implement measures to be utilized for each of the following during delivery:

- support of perineum
- control of the head
- shoulder tilt
- cord around the neck
- patency of newborn’s airway
- support and massage of the fundus
- blood loss estimation
- newborn to the breast
(b) Describe and implement the priority management and provide the rationale for decision-making for each of the following, immediately after delivery, to:

- the mother
- the newborn
- the placenta/cord

(c) Identify situations in which the cord may need to be clamped and cut.

(d) Identify the priority measures for care of the mother, in relation to non-delivery or delivery of the placenta in the prehospital environment.

7. 
(a) Identify the elements of Apgar scoring for a newborn.

(b) State the normal ranges of respiration and apical rate for the newborn.

8. 
(a) Isolate and perform the priority assessments and interpret assessment findings for the care of the newborn, including resuscitation.

(b) Describe and implement the priority management, and describe the rationale for decision making, for the care of the newborn.

(c) Describe the pathophysiological consequences of cold stress on all newborns.

(d) Describe and implement measures to prevent the effects of cold stress.

9. 
(a) Identify those situations in which the priority is to give high concentration of $O_2$ to the newborn.

(b) State the rationale for the conservative use of $O_2$ for the newborn during long distance transfers.

10. 
(a) Identify the manifestations of fetal distress.

(b) Explain the consequences of meconium aspiration in the birthing process.

(c) Identify the importance of noting the presence of meconium during delivery and of reporting the above to the receiving hospital team.

11. 
(a) Describe the consequence of a prolapsed cord to the fetus.

(b) Isolate and perform the priority assessments and interpret assessment findings for a prolapsed cord according to the potential life threat for the fetus.

(c) Describe and implement the emergency management and provide the rationale to support decision-making.
12. (a) Identify the reasons for a premature delivery.

(b) Identify and perform the priority assessments, and interpret the findings in the premature infant, which indicate respiratory distress, cardiac insufficiency, neurological deficits and episodal apnea.

(c) Describe and implement the priority management and provide the rationale to support decision-making which is directed toward maintaining life of the premature infant while in transport.

13. (a) Define:

- abortion/miscarriage
- therapeutic abortion
- spontaneous abortion
- incomplete abortion
- threatened abortion
- age of viability
- self-induced abortion

(b) Select and perform priority assessments and interpret assessment findings for the fetus and/or mother who may have called for help for any of the situations in 13.(a).

(c) Describe and implement the priority management and provide the rationale to support decision-making for a fetus and/or mother in any of the situations in 13.(a).

14. (a) Identify the reasons and/or causes of antepartum bleeding and/or hemorrhage.

(b) Differentiate the pathologies of placenta previa and abruptio placenta and describe the consequences of each to mother and fetus.

(c) Identify the pathological reasons and consequences of a uterine rupture.

(d) Identify the manifestations and describe the reasons for each, in the above pathologies in 14.(a-c).

(e) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 14.(a-c).
15. (a) Describe the reasons for the development and the consequences of pregnancy induced hypertension.

(b) Identify the relationship of pregnancy-induced hypertension to the development of preclampsia.

(c) Describe the pathophysiological events and consequences to fetus and/or mother during severe eclampsia.

(d) Identify the consequences of the development of the HELLP Syndrome (Hemolysis, Elevated Liver enzymes, Low Platelet count).

(e) Identify and describe the physiological rationale for the manifestations of preeclampsia/eclampsia and the HELLP syndrome.

(f) Identify and perform the priority assessment findings and interpret the assessment findings for each of the above in 15.(a-e).

(g) Describe and implement the priority management and provide the rationale to support decision-making.

(h) Select the priority assessment findings which indicate the need for urgent load and transport.

16. (a) Identify the major causes of postpartum hemorrhage (PPH).

(b) Differentiate the pathophysiological responses and consequences of a PPH.

(c) Identify the manifestations and describe the reason for a PPH.

(d) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for a PPH.

(e) Describe and implement the priority management and provide the rationale to support decision-making.

17. (a) Identify those situations in which the Midwife at a home delivery may request the assistance of the Paramedic.

(b) Describe the role and the delineation of responsibilities of the Midwife and the Paramedic.
(c) Describe and demonstrate ways to effectively collaborate with a Midwife to meet the needs of the mother and/or newborn.

(d) Identify, record, and report the details which should be documented on the ACR and provided to the receiving hospital.

18. (a) Describe the potential maternal/fetal consequences which may result from:
   - blunt/penetrating abdominal trauma
   - head injury with increasing intracranial pressure
   - trauma-induces hypoxia/hemorrhage

   (b) Isolate and perform priority assessments, interpret assessment findings, and provide the rationale for each in 18.(a).

   (c) Describe and implement the priority management and provide the rationale to support decision-making for each in 18.(a).

19. (a) Describe the potential consequences of maternal drug abuse to the mother and the fetus or newborn which may result from:
   - alcohol
   - narcotics
   - crack/cocaine
   - CNS stimulants/depressants
   - hallucinogens
   - inhalants

   (b) Isolate and perform priority assessments, to mother and/or fetus and/or newborn, interpret assessment findings, and provide the rationale for each in 19.(a).

   (c) Describe and implement the priority management and provide the rationale to support decision-making.

   (d) Select the priority assessment findings which indicate the need for urgent load and transport.
GYNECOLOGY

1. (a) State the causes of vaginal bleeding for the non-pregnant female.
    (b) Select and gather the pertinent history components for the patient with vaginal bleeding.
    (c) Isolate and perform the priority assessments, interpret the assessment findings and describe the rationale for each in 1.(a).
    (d) Describe and implement the priority management to be utilized and provide the rationale to support decision-making.
    (e) Select the priority assessment findings which indicate the need for urgent load and transport.

2. (a) Describe the typical abdominal or perineal pain for the patient with:
    • dysmenorrhea
    • ruptured or intact ovarian cyst
    • pelvic inflammatory disease (PID)
    • perineal trauma
    • endometriosis
    (b) Select and gather pertinent history components, and interpret assessment findings that relate to each listed in 2.(a).
    (c) Describe and implement supportive management for each in 2.(a).

3. (a) Explain the process of the development of an ectopic pregnancy.
    (b) Explain the various consequences of an ectopic pregnancy.
    (c) Select and gather the pertinent history components related to a suspected ectopic pregnancy.
    (d) Identify and perform the priority assessments which are suggestive of an ectopic pregnancy.
    (e) Describe and implement the supportive management and provide the rationale to support decision-making for the woman with a suspected ectopic pregnancy.

4. (a) Identify the possible complications post-vaginal or abdominal hysterectomy which may prompt the patient to require assistance from the Paramedic.
(b) Identify and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 4.(a).

(c) Describe and perform the priority management and provide the rationale for decision-making for each in 4.(a).

5. (a) Describe the physiological events which occur in relation to menopause.

(b) Identify the potential and pathological reasons for a vaginal hemorrhage related to menopause.

(c) Identify those types of situations in which a woman who is bleeding vaginally may require the assistance of the Paramedic.

(d) Identify and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 5.(a-c).

(e) Describe and implement the priority management and provide the rationale for decision-making for each in 5.(a-c).

(f) Select the priority assessments which indicate the need for urgent load and transport.

6. (a) Identify the incidence, and describe the pathophysiological consequences of cancer developing in the:

- cervix and vagina
- uterus (endometrial)
- ovaries

(b) Identify the types of medical therapies utilized for each listed in 6.(a).
(Refer to Section 4 – Oncology)
MUSCULOSKELETAL SYSTEM

ANATOMY AND PHYSIOLOGY

1. Identify the location and distinguishing features of the following:
   - skull bones
   - facial bones
   - cervical spine
   - pelvis - ilium
     ischium
     os pubis
   - thoracic spine
   - lumbar spine
   - sacral spine
   - coccygeal spine
   - clavicle
   - scapula
   - sternum
   - ribs
   - humerus
   - radius
   - ulna
   - carpals
   - metacarpals
   - phalanges
   - femur
   - tibia
   - fibula
   - patella
   - tarsals
   - metatarsals

2. State the functions of the skeletal system.

3. (a) Explain the significance, function and differences in structure and/or distribution in the child vs. adult of the following:
   - periosteum
   - endosteum
   - articular surface
   - diaphysis
   - epiphysis
   - epiphyseal plate
   - compact bone
   - spongy bone
   - medullary cavity
   - red bone marrow
   - yellow bone marrow

   (b) Describe the process of bone growth and repair.

4. (a) Identify the sutures and fontanelles of the skull.
   (b) Identify the age at which the fontanelles close and sutures ossify.
5. Explain the significance of the following:
   - capsule
   - synovial membrane
   - synovial fluid
   - muscle origin
   - muscle insertion
   - tendon
   - bursae
   - ligaments
   - cartilage

6. Describe the structure and location of the joints in the body according to the following classifications:
   - ball and socket
   - hinge
   - limited motion (slightly moveable)
   - fused (immoveable)
   - gliding

7. (a) Describe the physiological dynamics of a muscle contraction and relaxation.
    (b) Identify the chemical mediators (neurotransmitter substances) which are liberated at the motor end plate.
    (c) Explain the role of Ca++ ions and the Na+ and K+ pumps in the transmission of a nerve impulse and contraction and relaxation of a muscle.

8. (a) Explain the physiological mechanism of a muscle spasm and associated pain.
    (b) Describe the relationship of oxygen debt to the development of muscle pain.
PATHOPHYSIOLOGY RELATED TO MUSCULOSKELETAL PROBLEMS: PATIENT ASSESSMENT AND MANAGEMENT

1. (a) Differentiate between the following:
   - strain
   - sprain
   - fracture
   - dislocation
   - subluxation

   (b) Describe the mechanism of injury which leads to each of the above in 2.(a).

2. (a) Define the following types of fractures:
   - greenstick
   - transverse
   - spiral
   - oblique
   - impacted
   - comminuted
   - simple
   - compound

   (b) Describe the mechanism of injury which leads to each of the above in 2.(a).

3. (a) Differentiate the consequences of simple and compound fractures.

   (b) Identify the manifestations and describe the reason for each in 3.(a).

   (c) Isolate and perform the priority assessments and provide the rationale for each.

   (d) Describe and implement the priority management and explain the rationale to support decision-making.

4. Identify the assessment findings indicative of neurovascular compromise, in relation to an extremity fracture.
5. (a) Describe the mechanisms of injury which lead to fractures of each of the following bones:

- skull – occipital, frontal, parietal, temporal
- facial bones – zygomatic arch, orbital, nasal, mandible, maxilla
- vertebrae – atlas/axis/cervical, thoracic, lumbar, sacral, coccygeal
- clavicle
- scapula
- sternum
- ribs/costal separation
- humerus
- elbow
- radius
- ulna
- wrist
- hand
- finger
- pelvis – anterior, posterior, lateral
- femur – head, neck, shaft
- patella
- tibia
- fibula
- ankle
- foot
- multiple fractures
- bilateral fractures – femurs, lower leg, feet, forearms, humerus

(b) Explain the manifestations, consequences and/or complications unique to each fracture listed in 5.(a) and provide the rationale for each in terms of:

- location of the fracture – e.g. distal end, mid or proximal end
- potential for joint involvement/displacement
- distortion of weight bearing
- nerve proximity and impingement
• blood vessel proximity and impingement
• stable vs. non-stable type injury
• loss of bone density/porosity
• patient age
• the presence of degenerative bone process
• bone impaction/fragmentation
• potential for blood loss
• potential for airway compromise
• potential for compartmental syndrome development

(c) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 5.(a) and (b).

(d) Determine and implement the priority management and explain the rationale to support decision-making.

(e) Identify the assessment findings of the above fractures which indicate the need for an urgent load and transport.

(f) Identify the principles of immobilization and splinting of a fracture(s).

(g) Describe and select the most effective immobilization method for each type of fracture listed.

(h) Identify and perform neurovascular assessments pre and post immobilization.

(i) Describe and implement the appropriate method of straightening an angulated fracture(s) prior to immobilization.

(j) (i) Explain the reasons for utilizing traction prior to immobilizing and the rationale for using traction devices (such as the Sager and/or Hare splints).

(ii) Identify the factors and implement the guidelines governing the amount of traction to be utilized when utilizing a traction device (such as the Sager splint).

(k) (i) Determine and implement the management priorities including comfort measures during:

• movement of the patient for access prior to management
• alignment/straightening and/or traction application
• the immobilization process
• during transfer, loading and transport.

(ii) Describe and implement measures to reduce swelling and pain.

(l) Differentiate the priority assessment findings which indicate the need for urgent load and transport for the following:

• facial fracture
• pelvic fracture
• femur fracture/bilateral femur fractures
• multiple fractures

(m) Differentiate the specific complications (including systemic) for each of the above fractures.

6. (a) State the local and systemic complications of infection with a compound fracture.

(b) Identify and implement those measures that may be utilized to reduce the risk of infection.

7. (a) Describe the pathophysiological causes, manifestations, the development and progression for each of the following:

• rheumatoid arthritis – juvenile and adult
• Lupus erythematosis
• osteoarthritis
• osteomyelitis
• osteoporosis

(b) Explain the way in which each of the above contribute to limitations of mobility and subsequent falls and fractures.

(c) Identify the major manifestations and assessment findings, and describe the reason for each of the above in 7.(a).

(d) Describe and implement supportive management and provide the rationale to support decision-making.

(e) Describe the comfort measures to be provided for the patient with each of the above in 7.(a).
SOFT TISSUE INJURIES

1. State the major functions of the skin.

2. Describe the function of the:
   - epidermis
   - dermis
   - blood vessel
   - sebaceous gland
   - stratum germinativum
   - sweat gland
   - nerve endings
   - hair follicle

3. Describe the rationale for assessing colour, temperature, turgor and degree of moisture of the skin.

4. Explain the reasons for and the way in which the following skin colours should prompt the Paramedic to:
   (i) focus history gathering for specific pathophysiological causes
   (ii) perform problem-specific assessments
   (iii) implement immediate and problem-specific treatment/management
   - flushed
   - chalk white
   - ashen
   - jaundiced
   - cyanotic
   - pallor
   - central mottling
   - rubor
   - distal mottling

5. (a) Describe the phases of the physiological process of the inflammatory response to injury.
   (b) Identify the manifestations of inflammation and describe the pathophysiological basis for each.
   (c) Describe the rationale for the body’s physiological responses, including acute swelling with an open tissue injury, or traumatized closed tissue injury.
   (d) (i) Explain the rationale for and the circumstances for which the injured person requires tetanus toxoid.
(ii) Explain the body’s response after receiving tetanus toxoid and after receiving a booster dose of tetanus toxoid.

6. Describe the appearance of the following types of traumatized tissue:
   - puncture
   - hematoma
   - abrasion
   - ecchymosis
   - incision
   - petechia
   - laceration
   - purpura
   - avulsion
   - contusion
   - amputation
   - venous bleed
   - arterial bleed

7. (a) Describe the pathophysiological consequences of trauma causing blunt, penetrating or amputation injuries.

(b) (i) Identify the types of amputation manifestations and assessment findings, and describe the reason for each.

(ii) Explain the physiological rationale for initial lack of bleeding from a stump amputation followed by gross bleeding.

(c) Isolate and perform the priority assessments, interpret the assessment and provide the rationale for each in 7.(a).

(d) Describe and implement the priority management and provide the rationale to support decision-making.

(e) (i) Describe and implement the priority management specific to open and/or closed neck, face trauma or extremity amputation.

(ii) Describe and implement methods to control bleeding of the stump.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

(g) (i) Explain the reason for search and transport of an amputated body part and avulsed tissue to the emergency department.

(ii) Describe and implement the prescribed method to preserve the integrity of amputated or avulsed body parts during transport.

(iii) Identify the types of tissues and/or body parts which should be retrieved at the time of injury.
8. (a) Explain the principles to be followed when bandaging an extremity.
   (b) Describe and implement the techniques for controlling bleeding.
   (c) Identify and implement the criteria for application of a pressure dressing.
   (d) Identify and implement the criteria for application of an occlusive dressing.
   (e) Differentiate between the purpose of a pressure bandage and a tourniquet.
   (f) Describe the possible adverse effects on the soft tissue distal to a tourniquet.
   (g) State the specific situation(s) and limitation(s) for applying a tourniquet.
   (h) (i) Describe the advantages and precautions for using the blood pressure cuff as a bleeding control device, especially for amputations of extremities.
      (ii) Isolate the specific assessments to be performed and the appropriate pressure to use when the BP cuff is used as a bleeding control device.

9. (a) State the arterial pressure points of the body and identify their anatomical landmarks.
      (b) State precautions to be considered when applying direct pressure on the carotid artery.

10. Identify those situations and provide the rationale for implementing the flushing of soft tissue injuries.

11. Describe and implement measures to reduce the risk of wound infection.

12. Describe and implement the precautions to be considered when a patient’s clothing is adhered to a wound.

13. (a) Describe and implement a method of securing and dressing a wound involving an impaled object.
      (b) Identify the specific situation(s) in which an impaled object should be removed.

14. (a) Identify the factors which determine the severity of a crush injury involving the:
      - upper or lower extremities
      - lower extremities and pelvis
      - extremities with torso
      (b) Describe the manifestations, consequences, and complications of each listed in 14.(a) when the compression time is short vs. prolonged.
(c) Describe the specific pathophysiological consequence of the release of:

- myoglobin from a massive crush injury
- cellular potassium from a massive crush injury

(d) Explain the rationale for the sudden development of hypovolemia when the compression force is released in a massive crush injury.

(e) Select and perform the priority assessments, interpret the assessment findings and provide the rationale for each of the above in 14.(a).

(f) Describe and implement the priority management and provide the rationale to support decision-making.

(g) Explain the factors to be considered and the criteria for determining the need for additional emergency services during extrication when the release of the compression is implemented.

(h) Select the priority assessment findings which indicate the need for urgent load and transport.
SECTION FOUR

AQUIRED PATHOPHYSIOLOGICAL PROBLEMS
ENVIRONMENTAL INDUCED PATHOPHYSIOLOGICAL PROBLEMS

HEAT/COLD EMERGENCIES

1. (a) Identify the causative factors and describe the influence of each in the development of the following:
   - heat cramps
   - heat exhaustion
   - heat stroke

(b) Explain the reasons for the vulnerability of the elderly to heat stroke.

(c) Differentiate the pathophysiological processes and the consequences of each in 1.(a).

(d) Differentiate the manifestations and explain the rationale for each in 1.(a).

(e) Select and perform the priority assessments, interpret the assessment findings and provide the rationale for each in 1.(a).

(f) Determine and implement the priority management and describe the rationale to support decision-making.

(g) Select the priority assessment findings which indicate the need for urgent load and transport when untreated heat exhaustion and heat stroke are profound.

2. (a) Differentiate the pathophysiological responses and the progressive consequences for the following:
   - localized frostbite – superficial, deep
   - systemic hypothermia
   - immersion hypothermia

(b) Describe the initial physiological compensatory responses to each of the above listed in 2. (a).

3. (a) Differentiate the progression of the manifestations and explain the reason for each development in 2.(a).

(b) Relate the manifestations of hypothermia to core body temperature values.

(c) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 2(a).
(d) Determine the priority management and describe the rationale to support decision-making.

(e) Explain the reason for implementing passive re-warming versus active re-warming in the prehospital field setting.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

4. (a) Identify the precautions to be taken to prevent systemic complications in the management of the hypothermic patient.

(b) Relate the utilization vs. precautions for instituting CPR and defibrillation of the unresponsive patient prior to active re-warming.

(c) Describe and implement the protocols for defibrillating a hypothermic patient. (Ministry of Health: Emergency Health Services Branch: Cardiac Monitoring, Defibrillation Protocols, current version)
DROWNING

1. Define near-drowning.

2. (a) Describe the pathophysiological events which take place in drowning.

   (b) Describe the physiological effects of diver’s response in children.

   (c) Identify the effect of the mammalian diving response in children.

   (d) Describe the way in which hyperventilation prior to submersion can lead to drowning in underwater swimmers.

3. (a) Differentiate the pathophysiological consequences of freshwater drowning and salt water drowning.

   (b) Describe the manifestations and explain the pathophysiological rationale for each.

   (c) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each.

   (d) Describe and implement the priority management and describe the rationale to support decision-making.

4. (a) Explain the rationale in maintaining CPR for the victim who has drowned in cold water.

   (b) State the reasons for transporting the patient to hospital for follow-up care in a near-drowning incident.

   (c) State the precautions to be taken during the defibrillation of the drowned/hypothermic victim.

5. (a) State the causes which predispose the near-drowning victim to the development of adult respiratory distress syndrome (ARDS).

   (b) Explain the immediate and latent pathophysiological consequences of near drowning.

   (c) Describe the manifestations and explain the rationale for each in 5.(a).

   (d) Isolate and perform the priority assessments and interpret the rationale for each.

   (e) State the significance of reduced lung compliance.

   (f) Describe and implement the priority management and provide the rationale to support decision-making.
6. (a) Describe the pathophysiological events, consequences and complications of descent and ascent barotrauma injuries.

(b) Describe the manifestations and provide the pathophysiological rationale for each.

(c) Explain the reasons for recompression treatment being needed by the barotraumatized patient.

(d) Select and perform the priority assessments, interpret assessment findings, and provide the rationale for each in 6.(a).

(e) Determine and implement the priority management and provide the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

7. (a) Explain the pathophysiological process and consequences of:

   - decompression sickness
   - nitrogen narcosis

(b) Describe the manifestations and provide the rationale for each.

(c) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 7.(a).

(d) Describe and implement the priority management and provide the rationale to support decision-making.

(e) Select the priority assessment findings which indicate the need for urgent load and transport.
BURNS

1. Identify the types of common causes of burns.

2. Define the following burn depths:
   - first degree burn
   - second degree burn
   - third degree burn
   - fourth degree burn
   - superficial partial thickness burn
   - deep partial thickness burn
   - full thickness burn

3. Describe the local tissue response, the degree of damage and the pathophysiological systemic response to burn trauma for each depth classification.

4. Describe the significance of blister and eschar formation.

5. Differentiate the criteria of critical, moderate and minor burns according to the surface areas involved, depth, age and medical condition of the patient.

6. (a) Explain the pathophysiological responses and consequences in the development of:
   - pain vs. lack of pain
   - major alterations in electrolyte balance/fluid shifts and losses
   - edema formation and cellular dehydration
   - hypovolemia
   - renal shut down
   - susceptibility to severe infection/septicemia
   
   (b) Explain the pathophysiological sequence which leads to the development of cardiac and respiratory depression.

7. (a) Differentiate the potential depth and severity of a burn caused by:
   - dry caustic chemicals
   - wet caustic chemicals
   - alkali
   - acids
(b) Identify common sources of the above chemicals.

8. (a) Identify the specific history information that should be obtained from a burn patient.

(b) Select and perform the primary priority assessments for all burn patients, interpret the assessment findings, and describe the rationale for each.

(c) Determine and perform the priority secondary assessments, interpret the assessment findings, and provide the rationale for each.

(d) Describe and utilize the assessment criteria to determine burn depth.

(e) State the Rule of Nines as it applies to the adult, child and infant.

(f) Calculate the percentage of burn surface for the adult, child and infant in the following:
   - head
   - front
   - arm
   - back torso
   - leg
   - genitals

9. (a) Describe and implement the priority management and provide the rationale to support decision-making for each of the following heat, scalds, or chemical:
   - first degree burns
   - second degree burns
   - third degree burns
   - fourth degree burns

(b) State the importance of rapid fluid replacement in the critically burned patient.

(c) Explain the Parkland Formula for calculating the fluid replacement volume.

10. (a) State the specific precautions to be taken and the rationale for using cool normal saline dressings on burns.

(b) Describe the method of applying wet or dry dressing for bandages to a burned area or extremity.

(c) State the rationale for avoiding applications of petroleum base ointments on a severe burn.
(d) (i) Identify the chemical burns which should be water flushed as a priority treatment.

(ii) Identify those chemical burns for which water flushing is contraindicated.

11. (a) Describe the local and systemic pathophysiological responses and early/latent consequences and complications to inhalation of smoke, heat and/or toxic gases (including carbon monoxide).

(b) Describe the specific manifestations for the burn patient with a suspected compromised upper or lower airway and the reasons for each.

(c) State the specific information that must be obtained from the medical history and the surrounding environment for a patient who has inhaled toxic gases.

(d) Select and perform the priority assessments, interpret the assessment findings and provide the rationale for those indicative of smoke, heat and toxic gas inhalation.

(e) Determine and implement the priority management for smoke, heat and/or toxic gas inhalation and provide the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

12. (a) Describe the pathway of current through the body and the resultant pathophysiological consequences and tissue damage associated with high vs. low voltage electrical burn, arc injuries and flash electrical burns.

(b) Describe the local and systemic complications of the injuries listed in 12. (a).

(c) Describe the manifestations and provide the pathophysiological rationale for each.

(d) Outline and gather the specific information required in an electrical burn situation.

(e) Select and perform the assessment priorities, interpret the assessment findings, and provide the rationale for each type of electrical burn.

(f) Describe and implement the priority management and provide the rationale to support decision-making.

(g) Select the priority assessment findings which indicate the need for urgent load and transport.
RADIATION

1. (a) Differentiate the following radiation particles in terms of energy and penetrating power:
   - alpha
   - beta
   - gamma
   - x-rays

   (b) Identify the type of sunrays which cause radiation burns.

2. Identify the potential sources for each type of radioactive materials, residues, wastes and/or leaks.

3. (a) Identify the shielding required for each type of ionizing radiation.

   (b) Describe the precautions to be taken to avoid exposure to radiation.

4. Identify the factors which will reduce and/or protect the individual from the effects of radiation.

5. (a) Describe the immediate and delayed responses as well as the local and systemic responses of accidental radiation.

   (b) Differentiate the manifestations of radiation sickness for a patient receiving radiation therapy and an accidental radiation victim.

6. Describe and implement the management features involved when caring for:
   - a victim of accidental radiation
   - a trauma or medical emergency victim of a transportation accident with radioactive materials

7. Describe and implement the features of decontamination procedures which apply to the obligations of the Paramedic.

8. (a) Identify the other emergency and/or disaster personnel who would likely participate in an accidental radiation situation.

   (b) Identify the specific reasons for notifying hospital emergency staff concerning the arrival of a potential radiation victim.
TOXICOLOGY/POISONING/OVERDOSE

See Unit I on Therapeutic Approaches and Maladaptive Behavioural Responses, and Unit VI on Pediatric Overdose/Poisoning.

1. (a) Differentiate the toxic substances within each category utilized in an intentional and/or accidental overdose in terms of:
   
   i. product name, common name, and source
   
   ii. pathophysiological reaction
   
   iii. substance amount required to produce mild to severe body responses
   
   iv. manifestations (mild and severe)
   
   v. toxic effects and/or complications
   
   vi. long term use consequences
   
   vii. effect(s) on life sustaining centers and/or potential life threat

**Ingestants**

- strong acids and alkalis
- hydrocarbons/petroleum based distillates, methanol, ethylene glycol, isopropanol
- cyanide
- organophosphates and carbamates
- toxic plants
- food poisoning – salmonella, staphylococcal bacteria, Escherichia coli (E. coli), Clostridium botulinum

**Inhalants – Accidental and/or Recreational Use (Sniffing)**

- hydrocarbons – carbontetrachloride, methylene chloride
- soluble gases – ammonia, chlorine, polyvinyl chloride
- low solubility/insoluble chemically produced gases – Nitrogen dioxide (silogas)
- hydrogen sulfides
- metal fumes – Arsine (arsenic)
- carbon monoxide
Surface Absorbed Poisons

- organophosphates and carbamates

Injectants

- venom of reptiles/snakes
- ticks and spiders as vectors or those insects secreting venom or toxins

(b) Identify and gather the essential information for each patient overdose/exposure situation listed in 1. (a).

(c) Isolate and perform the priority assessments, interpret the assessment findings for each situation, and provide the rationale for each listed in 1. (a).

(d) Select the situations, based on each type of overdose/exposure and the interpretation of the patient’s assessment findings which indicate the need or the appropriateness for contacting the Poison Control Centre for direction.

(e) Determine and implement the priority management pertinent to each situation and describe the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

2. Differentiate the substances, prescribed or non-prescribed, within each drug category utilized in drug abuse, accidental or deliberate overdose in terms of:

i. product name and street name

ii. route of entry

iii. physiological reaction

iv. substance amount required to produce mild to severe response (where applicable)

v. manifestations (mild to severe)

vi. toxic effect and/or complications

vii. long-term use consequences

viii. effects on life sustaining centres and/or potential life threat
CNS Depressants

- narcotics
- sedatives
- hypnotics
- anti-depressants (including tricyclics)
- anti-anxiety agents anti-convulsants
- analgesics
- salicylates
- acetaminophen
- cannabis
- alcohol

CNS Stimulants and/or Hallucinogen

- cocaine/free base crack
- caffeine
- amphetamines
- phencyclidene
- cannabis
- LSD
- mescaline
- MDMA (methylenedioxymethaphetomine – “Ecstacy”)
- crystal methamphetamine
- ketamine hydrochloride (“Special K”)
- gamma hydroxy butyrate (GHB)
- toluene (volatile hydrocarbon)
- psilocybin

Diuretics

Insulin

Anticoagulants

Cough Syrups – alcohol based, antihistamines based, narcotic-based, eg: codeine.

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3.  
   (a) Define synergism.
   
   (b) Identify synergistic effect of alcohol, CNS depressants and other drugs when used in combination.
   
   (c) Identify and gather the essential information for each patient overdose situation listed in 2. (a).
   
   (d) Isolate and perform the priority assessments, interpret the assessment findings and provide the rationale for each patient overdose situation listed in 2. (a).
   
   (e) Select the situations based on each type of overdose (or substance used) and the interpretation of assessment findings which indicate the need or appropriateness for contacting the Poison Control Centre for direction.
   
   (f) Describe and implement the priority management for each patient overdose situation and provide the rationale to support decision-making.
   
   (g) Select the priority assessment findings which indicate the need for urgent load and transport.
   
   (h) Provide the rationale for collecting a sample of the overdose substance, emesis, medication or chemical containers, and drug paraphernalia evident at the scene.

4.  
   (a) Explain the rationale for inducing or not inducing vomiting in patients.
   
   (b) Explain the criteria which must be present before responding to directions of a poison control centre and/or base hospital Physician, to dilute the ingested substance.
   
   (c) Describe the function of:
       
       - syrup of ipecac
       - activated charcoal
COMMUNICABLE DISEASES

Refer to Section 3 - CNS for viral/bacterial meningitis

1. Describe the factors which affect the virulence of a pathogen and the ability to produce a disease in a host (individual).

2. Explain the innate mechanisms and barriers which constitute resistance of a host to a virulent pathogen.

3. (a) Explain the relationship between the degree of virulence of a pathogen to the response, in whole or in part, of the immune system.
   
   (b) Describe the phases of an inflammatory process.
   
   (c) Differentiate between antigen-antibody responses and potential outcome which result in B-Lymphocyte activation and in T-lymphocyte activation.

4. (a) Explain the mechanisms by which immunity develops according to the following types:
   
   - naturally acquired active immunity
   - naturally acquired passive immunity
   - artificially acquired active immunity
   - artificially acquired passive immunity

   (b) Differentiate the responses and the type of immunity produced by a:
   
   - vaccine
   - toxoid
   - antitoxin
   - gamma globulin
   - heptovac

   (c) Identify the purpose of evaluating their antibody titre volume when the Paramedic is exposed to a patient in an active clinical stage of TB and hepatitis B.

   (d) Identify the specific immunization required by all Paramedics functioning in the prehospital and hospital areas.
Identify the length of time protection of the individual is assured with each immunization substance and/or collective immunization substance. (e.g. quadruple vaccine)

Identify the factors which can reduce the Paramedic’s susceptibility to communicable and/or infectious diseases.

5. (a) Identify the following components for each communicable disease listed:

(i) the causative pathogenic microorganism (bacterial or viral)

(ii) the mode of transmission

(iii) the portal of entry

(iv) the portal of exit

(v) the incubation period

(vi) the communicable period of time

- hepatitis A, B, C (HAV, HBV, HCV)
- Human Immunodeficiency Viral infection – HIV – and its stages
- Epstein-Barr virus
- genital herpes
  - chlamydia
  - venereal warts
  - gonorrhea
  - syphilis
  - infectious mononucleosis
  - tuberculosis
  - mumps
  - chicken pox
  - shingles
  - rubella
• rubeola
• pertussis
• diptheria
• polio
• malaria

(b) Identify from the above those microorganisms which may remain dormant for periods of time but become serologically active and symptomatic.

(c) Identify the term ‘carrier’ as applied to the infectious diseases.

(d) Select from the above those disease(s) which may be transmitted through a ‘carrier’.

(e) Select from the above those illnesses which may be present, yet not constitute, the reason for a call for Paramedic services.

6. (a) Describe the differentiating manifestations and provide the pathophysiological basis of the communicable/infectious diseases listed in 5.(a).

(b) Describe the pathophysiological consequences and complications for each communicable/infectious disease listed in 5.(a).

(c) Isolate and perform the priority assessment, interpret the assessment findings, and provide the rationale for each.

(d) Determine and implement the priority management and describe the rationale to support decision-making.

(e) Select the priority assessment findings which would indicate the need for urgent load and transport.

7. Explain the influence of age, degree of wellness, virulence and chemotherapy on the occurrence of systematic infections caused by staphlococci, streptococci, pseudomonas, E. Coli, hemolytic streptococci and prominent bacterial organisms resistant to conventional antibiotics, eg: VRE, MRSA

8. (a) Define isolation and reverse isolation.

(b) Explain the adaptations for isolation and reverse isolation which should be used by the Paramedic when caring for an infected, communicable or susceptible patient.
(c) Explain the features of an infestation of pediculosis and scabies under the following:

- distribution
- appearance
- mode of transmission
- manifestations
- method of control
- precautions to be utilized by the paramedic

9. (a) Identify safety measures to protect yourself and others based on your knowledge of the portal of entrance and exit of the pathogenic organisms or viruses listed in 5.(a) and 7.

(b) Explain the way in which universal precautions should be applied to each patient care situation.

10. (a) Identify the measures to be utilized prior to transfer of a patient with a known communicable or infectious disease.

(b) Identify infectious control (isolation) procedures to be instituted within the ambulance during and after transport.

(c) State the reasons for informing hospital personnel when transporting a patient with virulent infectious or communicable disease to the receiving facility.

(d) Identify personal follow-up protections to take when the Paramedic has been exposed to a communicable or infectious disease.

(e) (i) Identify the information to be recorded and reported when transporting a patient with a communicable disease.

(ii) Explain the reporting mechanism for the Paramedic when exposed to a patient with a communicable disease.

11. (a) Describe the reasons to support the need for hand washing before and after each patient transport.

(b) Describe and implement the acceptable method of hand washing before and after each patient care situation.
ONCOLOGY

1. Define neoplasm, benign, malignant, tumor, primary tumor, secondary tumor, metastasis, and precursory lesions.

2. Identify the predisposing factors suggestive of a developing cancer.

3. (a) Describe consequences of the obstructive and parasitic nature of tumor growth and expansion, e.g. brain, lungs, throat, breast, abdomen, pancreas, bladder, prostate, testes, uterus, spine and bone.

   (b) Identify the developmental site, spread, consequences and manifestations of:
       - acute leukemia
       - chronic leukemia
       - Hodgkin’s lymphoma
       - acute lymphoma (non-Hodgkin’s)
       - chronic lymphoma
       - multiple myeloma

4. Identify the means whereby cancer is spread from one body area to another.

5. (a) Identify the traditional and non-traditional methods utilized in the treatment of cancer.

   (b) Identify the most common side effects experienced by a patient receiving long term chemotherapy and/or radiation therapy.

6. (a) Utilize and describe the therapeutic and supportive communication approaches to assist the patient receiving long term cancer treatment, who is in the terminal stages of cancer, from initial encounter to termination of transport.

   (b) Identify reasons a Paramedic should encourage patients to relate their feelings about their diagnosis of cancer.

   (c) Explain the importance of accepting the reality of the patient’s perception of his/her degree of disability, reaction to therapy, diagnosis, and/or life expectancy during therapeutic interactions with the patient.

7. Relate the stages of grieving to the reactions of the patient with cancer.

8. Describe the ways in which cancer and/or therapy causes eventual life threat.

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9. (a) Identify the means of reverse isolation that must be employed to protect the cancer patient during transport.
(b) Summarize protective measures of communicable disease control the Paramedic should be attentive to when transporting cancer patients.
(c) Utilize and describe physical comfort measures, which may assist the patient depending on the type and stage of cancer during transport.

10. (a) Explain the influence of the significant others to the patient with cancer when their actions or stages of grieving may or may not be similar to that of the patients’.
(b) Provide and describe the supportive communication approaches, which can be helpful to the significant other(s).

11. (a) Describe the role of palliative care units, hospices and/or home care, in the care of the patient with cancer.
(b) Describe the role of the Paramedic in providing realistic support to a patient, family, and/or support person(s), when called to the home of the dying or terminally ill patient.

12. (a) Describe the means by which pain control is administered for the terminal stages of cancer.
(b) Describe and utilize those supportive measures which may be considered to ease or compensate for the patient’s pain, weakness, dizziness, and/or nausea during assessment, management and transport.
SECTION FIVE

AGE-RELATED CONSIDERATIONS
GERONTOLOGY

1. (a) Identify the major physical and physiological degenerative changes which occur as the elderly person advances in age, in relation to:
   • cardiovascular and blood system
   • respiratory, ventilatory efficiency, and vital capacity
   • gastrointestinal and digestive capability
   • renal and bladder systems
   • immunity and resistance
   • skin, sensory perception and sweat production
   • neurological, including visual and auditory acuity
   • musculoskeletal system

   (b) Explain the possible reasons for the changes in 1. (a).

   (c) Describe the influence of age on the manifestations of pathologies which develop in relation to those listed in 1. (a).

2. (a) Identify the major psychological and emotional changes which may be anticipated as the elderly person advances in age, and which will influence assessment findings, in relation to:
   • cognitive function and judgement
   • memory; retention and accuracy
   • loneliness/depression/despair/suicidal thoughts
   • self-sufficiency/dependency
   • social skill decline and subsequent isolation
   • sense of self worth and worthiness
   • perception of body image

   (b) Explain the possible reasons for the changes described in 2. (a).
3. Differentiate the subtle to overt changes in the assessment findings of the older adult in the age ranges of the sixties, seventies, eighties and beyond, in relation to:

- breathing rate, rhythm, volume and pattern
- blood pressure values
- pulse and apical rate rhythm
- pupillary responses, visual and auditory acuity
- ability to perceive and/or describe the dimensions of pain
- the prevalence of weakness, fatigue, dizziness, not feeling well, or feeling “funny” vs. a refined chief complaint
- defenses against infection
- mobility and stability of bone and muscle structures

4. (a) Identify the common misinterpretations Paramedics may make with the elderly when attempting to gain an accurate:

- chief complaint or problem
- incident history
- past medical history

(b) Explain the reasons for a lack of definitiveness of some elderly patient’s explanation of their chief complaint or current problem.

5. (a) Identify reasons that elderly persons may be non-compliant in correctly taking their prescribed medication, supplements or over-the-counter medication.

(b) Identify the types of responses related to hypersensitivity or idiosyncratic reactions of the elderly to medications, particularly CNS depressants, mood altering drugs, diuretics, beta-blockers, cardiotonics, and hypertensive agents.

6. (a) Describe the incidence of and the pathological changes which occur in the brain of the patient with Alzheimer’s disease.

(b) Identify the early manifestations of decline in cognition memory and judgement in patients with Alzheimer’s disease.

(c) Identify ways patients may interact with care providers and family to cover up their deficiencies during the early stages of Alzheimer’s disease.
(d) Describe the range of behaviours and responses which patients may demonstrate due to an awareness of their decline in the early stages of Alzheimer’s disease.

(e) Identify the physical changes and the emotional decline which occur from the end of the early to the terminal stages of Alzheimer’s disease.

(f) Identify the obvious needs and range of responses of family members who are involved in caring for the patient with Alzheimer’s disease.

7. (a) Describe and utilize the modifications in communication approaches which may be needed by the patient and or support person in relation to:

- the speed of your interaction
- the extended time required by the patient
- the need for repetition
- tactile support
- reducing patient resistance, anxiety or fear.

(b) Identify medications which may be prescribed as memory enhancers during the early stages of Alzheimer’s disease.

(c) Identify community resources for supportive care to patients with Alzheimer’s disease and their family.

8. (a) Identify other degenerative causes for a decline in function in the elderly person’s cognition, memory and physical ability.

(b) Explain the pathophysiological alteration caused by atherosclerotic changes in brain, heart, and kidney function.

9. Determine and utilize the communication adaptations which may need to be utilized when assessing, gathering information, realistically reassuring and/or therapeutically interacting with the elderly patient, family members and/or support person(s).

10. (a) Identify the reasons an elderly person may delay seeking medical assistance or seeking help.

(b) Identify the reasons an elderly person may frequently avoid or over-use the Paramedic services.

11. Identify unique comfort needs of the elderly which should be implemented during assessment, management, and transport.

12. Identify ways and implement measures the Paramedic can use to respect the privacy and dignity of the elderly patient during their care.
13. Describe the observations which should prompt a Paramedic to be suspicious of distress and/or abuse of an elderly patient.

14. (a) Identify the incidence of suicide in the elderly, compared to other age groups.
   (b) Describe the behavioural manifestations of suicidal gestures and for self-neglect.
   (c) Describe the possible reasons for an elderly person to consider suicide as a plausible life-ending solution.
   (d) Identify the incidence and rational for elderly anorexia and the way it can cause/complicate illness or lead to suicide.

15. Identify factors which should prompt a Paramedic to report about the elderly patient’s home environment which could assist in discharge planning.

16. Identify factors from the elderly patient’s home situation, which should prompt reporting a need for assistance from community resources.
PEDIATRICS

The Paramedic must be able to select and apply the pertinent pathophysiological processes from other areas of the syllabus to determine priorities of assessment and priorities of management as they relate to the child, in addition to the material in this section.

1. (a) Distinguish the factors related to developmental tasks which need to be considered to individualize care for each of the following age groups:
   - neonate – birth – 1 mos.
   - young infant – 1-5 mos.
   - infant 6-12 mos.
   - toddler – 1-3 years
   - preschooler – 4-5 years
   - school age – 6-10 years
   - preadolescent – 10-12 years
   - adolescent – 13-16 years
   - late adolescent – 16-19 years

   (b) (i) Differentiate the ages in which separation anxiety is a dominant characteristic.

   (ii) Devise and implement ways of incorporating the mother/father or significant care provider, during the assessment, management and transport to reduce separation anxiety.

   (iii) Identify the positive ways that can be suggested to parents to reduce their child’s separation anxiety, should they be required to leave or be separated from their child during an emergency situation or examination.

2. (a) Identify the growth and physical characteristics for each of the above age groups listed in 1. (a).

   (b) Select from all of the above, those factors which need to be considered and incorporated when individualizing the care of a pediatric patient.

3. (a) Utilize effective therapeutic approaches for pediatric patients in non-emergency, potential life threat (emergent) and emergency situations according to the age and developmental stage for each age group listed in 1. (a).

   (b) Devise and utilize therapeutic strategies to assist in gaining trust, confidence and cooperation of an infant, child or adolescent appropriate to each age group before beginning the assessment process.
(c) Devise and implement diversionary tactics appropriate for each age group, which will assist in gaining trust, decreasing anxiety/fear, as well as providing data for interpreting the pediatric patient’s degree of distress.

(d) (i) Utilize effective therapeutic strategies to provide realistic support and reduce the fear and anxiety of the mother, father or significant care provider of an infant, child or adolescent.

(ii) Utilize effective therapeutic approaches for the mother, father, or significant care provider to gain an accurate incident or past medical history.

4. (a) Describe the way in which the age of an infant or young child influences or alters the interpretation of the assessment and observation components for the overall general appearance in relation to:

- alertness
- distractibility
- consolability
- speech/cry
- spontaneous activity
- colour
- respiratory effort
- eye contact

(b) Compare the methods, state the rationale and perform the criteria for the assessment components of the primary survey for the age groups listed in 1.(a).

(c) Determine and perform the criteria modifications of assessment when utilizing the Glasgow Coma Scale specific to the following age groups:

- birth to 23 mos.
- 2 years to 5 years
- beyond 5 years

(d) State and evaluate the normal values for the age groups listed in 2. (b) for:

- respiratory rate
- heart rate

(e) State the age at which blood pressure readings become an accurate reflection of peripheral blood flow and systolic output.
5. (a) Describe the adaptations and approaches which need to be implemented during therapeutic exchanges, assessment, treatment and transport, for the following types of “special needs” pediatric patients in all age groups:

- Down’s Syndrome
- cerebral palsy
- muscular dystrophy
- blindness
- deafness
- autism
- delayed development (developmentally delayed)
- cognitive deficits (cognitively challenged)
- Gilles de la Tourette’s Syndrome
- hyperactivity with or without an attention deficit disorder (ADHD)
- physical deficits including congenital defects (physically challenged)

(b) Identify and implement psychological and physical support specifically needed for each of the above “special needs” child.

6. Select and implement therapeutic communication approaches and comfort measures appropriate to the infant, child and adolescent as outlined in Section 2: Therapeutic Approaches; Maturational Crisis; Maladaptive Behaviour.

7. (a) Describe the types of cues/indicators which may trigger a suspicion of possible child neglect, deprivation and/or abuse.

(b) Describe and assess the overt or subtle behaviour of the abused and abuser which may indicate an abusive situation.

(c) Gather information in a non-intrusive manner concerning factors and/or crisis within the lines of the abused and/or abuser which may have precipitated the abuse.

(d) Describe the type of manifestations including individual, physical and behavioural assessment findings for each age group which are suggestive of:

- physical abuse
- emotional abuse
- sexual abuse
- neglect
(e) Describe, implement, and provide the rationale for the priority management for each type of psychological, physical or sexual abuse.

(f) Outline the legal obligations in reporting suspected child abuse.

(g) Outline the details to be documented in a written and verbal report for hospital personnel, police, ambulance service managers and the child and family service agency.

8. (a) Define the factors which appear to have a potential for contributing to Sudden Infant Death Syndrome (SIDS).

(b) Identify the risk factors associated with the occurrence of SIDS.

(c) Describe the pathophysiological processes/manifestations related to SIDS.

(d) Describe and implement priority management including infant CPR for the SIDS patient.

(e) Describe and utilize therapeutic approaches to be utilized when supporting the parents of a SIDS patient.

9. (a) Identify the predisposing factors and/or causes for each of the following:

- bronchiolitis
- acute epiglottitis
- acute laryngotracheobronchitis (viral croup) (LTB)
- acute tracheitis
- pneumonia – viral/bacterial
- acute newborn Respiratory Distress Syndrome (IRDS or HMD)
- cystic fibrosis

(b) Differentiate the pathophysiological processes, consequences and potential for life threat for each listed in 9.(a).

(c) Differentiate and describe the manifestations and describe the reason for each listed in 9.(a).

(d) Isolate and perform the priority assessments, interpret assessment findings and describe the rationale for assessment findings for each listed in 9.(a).

(e) Describe and implement the priority management and provide the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.
10. (a) Identify the predisposing factors or triggering stimuli related to asthma in the infant, child, or adolescent.
   
   (b) Identify other causes of a hyper-reactive airway response in the young infant or child.
   
   (c) Differentiate the pathophysiological processes, consequences and potential for life threat in the young child to adolescence with asthma or a hyper-reactive airway.
   
   (d) Describe the manifestations and explain the rationale for each as they occur in asthma and a hyper-reactive airway response.
   
   (e) Isolate and perform the priority assessments, interpret the assessment findings, and provide the rationale for each in 10.(d).
   
   (f) (i) Describe and implement the priority management and provide the rationale for decision-making.
   
       (ii) Administer salbutamol (Ventolin) according to the Ministry of Health; Emergency Health Service Branch: Provincial protocol, current version.
   
       (iii) Administer Epinephrine according to the Ministry of Health; Emergency Health Service Branch: Provincial protocol, current version.
   
       (iv) Identify the various types of inhalation (aerosol) delivery devices commonly used by the pediatric patient.
   
   (g) Select the priority assessment findings which indicate the need for an urgent load and transport for the pediatric patient with asthma/hyperactive airway.

11. (a) Identify the causes, predisposing factors and pathophysiological consequences for febrile convulsions and seizures occurring in the infant or child.
   
   (b) Describe the features of each type of seizure that may occur in the infant to adolescent age group.
   
   (c) Identify the manifestations and describe the pathophysiological rationale for each.
   
   (d) Select and perform the priority assessments, including important history elements, interpret the assessment findings, and provide the rationale for each in 11.(a-b).
   
   (e) Describe and implement the priority management and provide the rationale to support decision-making.
   
   (f) Select the priority assessment findings which indicate the need for urgent load and transport.
12. (a) State the reasons for the rapid development of dehydration in the neonate, infant and young child.

(b) Identify the causes, predisposing factors and pathophysiological consequences of dehydration.

(c) Describe the manifestations of dehydration and pathophysiological reasons for each.

(d) Identify and perform the priority assessments, including pertinent history, interpret assessment findings, and provide the rationale for each in 12.(a).

(e) Describe and implement the priority management and provide the rationale to support decision-making.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

13. (a) Identify the possible causes, the developmental pattern, the pathophysiological consequences and manifestations associated with:

   - meningitis – viral and bacterial
   - Reye’s Syndrome

(b) Identify the elements of history to be gathered, perform the priority assessments, interpret the assessment findings and provide the rationale for each in 13.(a).

(c) Describe and implement the priority management and provide the rationale for to support decision-making.

(d) Describe the protective precautions to be taken by the Paramedic when caring for a pediatric patient with meningitis.

(e) Select the priority assessment findings which indicate the need for urgent load and transport.

14. (a) Identify the types of cancer which occur with the greatest frequency in each pediatric age group.

(b) Identify the incidence of leukemia, lymphoma – non-Hodgkin’s and Hodgkin’s, CNS malignant tumors, neuroblastomas, soft and connective tissue sarcoma, Wilm’s tumors, and bone tumors in pediatric age groups.

(c) Identify the pathophysiological rationale for pain, fatigue, weakness, anemia, and susceptibility to infection in children according to the cancer type they have.

(d) Describe the general responses of a child to chemotherapy and/or radiation therapy.
(e) Describe and interpret the subtle and overt physical and behavioural assessment findings which indicate pain, fatigue, weakness, nausea, fear, and anxiety in a child.

(f) Determine and implement supportive physical and psychological measures to provide comfort and support of the child with cancer.

15. (a) Explain the reasons for children being accident-prone according to their developmental age.

(b) Identify common accidents which often occur with children.

16. (a) Identify fractures to the extremities which most commonly occur in childhood.

(b) Differentiate the assessment findings for a fracture, strain or sprain for each type of extremity injury common to a child.

(c) Describe the complications which may occur as a result of a fracture or sprain in a child.

(d) Isolate and explain the pathophysiological rationale for those fractures of the axial skeleton in a child which can result in a potential life threat.

(e) Isolate the priority assessments to be performed in fracture, strain or sprain injuries in a child.

(f) Describe and implement the priority management and provide the rationale for to support decision-making.

(g) Isolate those situations in which an urgent load and transport is indicated for a child with a fracture.

17. (a) Explain the reasons for trauma-induced separation and/or displacement of the epiphyseal plate of long bones which occur in prepubescent children.

(b) Describe the manifestations and associated assessment findings of epiphyseal displacement.

(c) Identify the complications of a non-detected epiphyseal displacement (slipped epiphysis).

(d) Describe and perform the priority assessments and provide the rationale for assessment findings for the child with an epiphyseal displacement.

(e) Describe and implement the priority management and provide the rationale for decision-making for a child with an epiphyseal displacement.

18. (a) Identify the causes and types of trauma-related injuries which are most common to children.
(b) Describe the reasons for the vulnerability of pediatric patients to the following types of trauma-related injuries:

- airway obstruction
- head injuries
- hyperextension-flexion and/or rotational force of vertebral spine (especially C-spine)
- cardiac and lung contusion
- splenic, liver and mesenteric ruptures/tears

(c) Explain the reasons for the vulnerability of the pediatric patient to blood loss according to age.

(d) Determine the adaptations to be made when performing priority assessments and interpreting assessment findings, for the single or multiple trauma-induced injury listed in 18.(b), for the pediatric patient of all age groups.

(e) Describe and implement the priority management and provide the rationale for decision-making.

(f) Select the priority assessment findings which indicate the need for urgent load and transport.

19. (a) Explain the pathophysiological reasons for shock manifestations developing more rapidly in the child than in the adult.

(b) State the pathophysiological reason for a delayed lowering of blood pressure when a child is manifesting shock signs.

(c) Explain the rationale for the differences in the manifestations of compensatory, decompensatory and failing stages of shock in the child compared to the adult.

(d) Apply the above differences in interpreting the assessment findings for each of the following types/cause of shock in the child:

- anaphylactic
- burns
- hemorrhagic

(e) Determine the adaptations to be made when performing priority assessments and interpreting assessment findings for the pediatric patient who is experiencing each of the type of shock listed in 19.(d).
(f) Describe and implement priority management and provide the rationale for decision-making.

(g) Select the priority assessment findings which indicate the need for urgent load and transport. (See Section 3: Shock; Anaphylaxis Protocol).

20. (a) Explain the reasons for the vulnerability of young children to the development of hypothermia, and heat-related emergencies.

(b) Identify the causes, manifestations and the pathophysiological consequences of hypothermia and heat-related emergencies in an infant, toddler, and pre-schooler.

(c) Determine and perform the priority assessments, interpret the assessment findings and provide the rationale for each.

(d) Describe and implement the priority management and provide the rationale for decision-making.

(e) Isolate the priority assessment findings which indicate the need for an urgent load and transport.

21. Explain the rationale for maintaining prolonged resuscitation efforts for a pediatric patient who is a victim of cold water drowning, (see Section 3: Drowning).

22. (a) Describe the pathophysiological consequences for each age group of children including the potential for life threat from intentional or accidental inhalation, ingestion or injection of each of the following substances:

- acetaminophen
- cyclic antidepressants
- salicylates
- benzodiazepines
- opiates
- cocaine/crack
- strong alkalis/aceties
- hydrocarbons (aerosols, solvents – methanol, ethylene glycol and other petroleum-based products).
- organophosphates
- alcohol
- cyanide
- plants (poisonous)
- silo gas
(b) Identify the physical and behavioural manifestations for the ingestion, inhalation or injection of each substance.

(c) Identify and perform the priority assessment and provide the rationale to support assessment findings for the accidental poisonings listed in 22.(a).

(d) Describe and implement the priority management and provide the rationale for decision-making.

(e) Identify the assessment findings which indicate the need for urgent load and transport.

(f) (i) Identify the explicit on-scene information that should be gathered and provided to a poison control centre.

(ii) Identify the type of prehospital treatments a poison control centre will recommend.

Cardiopulmonary Resuscitation

The Paramedic will demonstrate competency in the theoretical basis and performance of Basic Life Support for the infant and child in all age groups according to the Standards of the Ontario Heart and Stroke Foundation (current version).
SECTION SIX

UNIFYING CORE COMPETENCIES
PERFORMANCE CORE COMPETENCIES

The following performance competencies serve as an integrative summary to broadly meld the theoretical components with the technical skills. This blend is essential for determining priority patient assessments and priority patient management within a prehospital patient care setting.

The following competencies and the stated performance core elements are to be selectively applied in each patient care situation. This selection requires interpretive and problem solving-skills to prioritize and individualize patient care.

(Refer also to the Integrative Competencies, Section I. These are a summary, in part, of those competencies)

ASSESSMENT AND MANAGEMENT

The Paramedic will:

- determine and/or ensure the safety of the patient’s environment prior to and during patient care.

- adapt interpersonal and therapeutic communication to be appropriate to each patient situation.

- select those elements of the primary assessment and immediate priority management which are to be implemented in patient situations of:
  
  (i) obvious life threat.
  
  (ii) potential for life threat.
  
  (iii) non-compromised/stable.

- differentiate and interpret those elements of history which are significant in the:
  
  (i) presenting chief complaint, problem or ascribed problem.
  
  (ii) information from the environment surrounding the patient, e.g. dynamics of injury, medication prescribed or taken, other suggestive sources of data.
  
  (iii) presenting manifestations of the patient.
  
  (iv) type of trauma or pathological condition of the patient.
  
  (v) progression/deterioration of the patient’s pathophysiological status.
• discriminate those patient situations in which:
  (i) a complete secondary assessment (inc. vital signs) is to be performed.
  (ii) only priority elements of a secondary assessment (including vital signs) are to be selectively performed.
  (iii) secondary assessments are to be performed prior to transport or during transport.
  (iv) specific qualitative diagnostic/differential assessments are to be performed.

• provide the rationale to support the interpretation and discrimination used in selecting the priority and/or diagnostic/differential assessments which are performed.

• interpret the significance of assessment findings pertinent to the:
  (i) patient’s physical behavioural and physiological manifestations
  (ii) potential for deterioration in the patient’s status.
  (iii) obvious manifestations of a life threat.
  (iv) the need for further reassessment.

• implement and adapt the management priorities, basing the selection on the relevance to the:
  (i) presenting manifestations of the patient(s).
  (ii) pathology or trauma involved.
  (iii) priority management required in the patient situation.
  (iv) measures required to provide psychological support and appropriate therapeutic communication in each situation.
  (v) patient’s age, comprehension ability, coping ability and/or crisis state.
  (vi) potential for deterioration and/or life threat.
  (vii) need for minimal stabilization and immediate transport.
  (viii) legal implications related to patient care, the patient’s environment, and need for transport.

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need for on scene symptom relief according to the established approved, current protocols.

need for cardiac monitoring, defibrillation, oxygen saturation monitoring according to established protocols.

need for commencing an intravenous infusion with an associated venapuncture according to established approved, current protocols.

- provide the rationale to support the decision making and judgements used in selecting and implementing the priorities in patient management.

- implement those measures to ensure safe lifting, transferring and transporting patients and equipment.

- report and record those elements of history assessment and management which are significant and which are required in legal written documentation and/or verbal reports. (See Section on Documentation, Verbal Reporting and Radio/Telecommunication).

- evaluate the effectiveness of each element of patient assessment and management and determining the need for reassessment and/or readapting management approaches.

- apply the principles of assessment and management to the triage situation in which multiple patients are involved.
PATIENT CARE DOCUMENTATION

1. Describe and complete each element of the Ambulance Call Report (ACR) according to the criteria required by the Ministry of Health, Emergency Health Services Branch. (Manual for Ambulance Call Report Completion: Ministry of Health, Emergency Health Services Branch, current version).

2. (a) Clarify the reasons for selecting and recording the following within a patient call report:

- concise description of scene observations
- statement of patient’s chief complaint (as stated or described)
- synopsis of the incident history
- cryptic and pertinent summary of past medical history
- concise and pertinent description of assessment findings
- inclusion of significant negative assessment findings
- implemented management and interventions
- response to assessment processes and/or management interventions
- clarification of changes in clinical status
- refusals of assessment/treatment and/or Paramedic services
- list of others assisting in care (including signature and/or identifiers, e.g. Badge #)
- documentation of assessments and/or interventions omitted or not performed and the reasons for each
- significant social factors from the patient’s environment related to the patient’s support and/or self-care ability
- administrative data (billing, service numbers, etc.)

(b) State the rationale for utilizing medical terminology and accepted standardized abbreviations.
(c) State the reason for the attending Paramedic signing each treatment and/or intervention as well as the total report.

(d) Summarize the legal responsibilities involved with the distribution of patient care documents.

(e) Identify the minimum information to be included on the ACR for a non-patient carrying call.

(f) Differentiate and utilize the types of codes to be utilized for efficiency of time and document space when completing the ACR.

3. (a) Describe and implement the legal responsibilities and professional duties to protect and honour the confidentiality of patient documents.

   (b) Identify the legal consequences for a Paramedic, should confidential obligations be ignored or mismanaged.

4. Summarize the legal responsibilities for accurate and complete documentation related to prehospital emergency care.

5. Summarize the reasons for documenting patient data in a way which is non-judgmental and objective.

6. (a) Identify the circumstances and patient care situations which require documentation in an incident report.

   (b) Summarize the pertinent information which should be included in an incident report.
VERBAL REPORTING

1. Select and present to a triage Nurse a succinct summarization of the most critical data concerning a patient’s clinical status which is focused on:
   - a statement of the chief complaint or ascribed problem.
   - the most relevant assessment findings reflective of physiological deterioration or psychological disintegration.

2. Describe and present to an Advanced Care Paramedic, Critical Care Paramedic, receiving Nurse or Physician a functional summation of the most critical information concerning a patient’s clinical status which is focused on:
   - a statement of the chief complaint or ascribed problem.
   - a synopsis of the incident history.
   - a summation of relevant past medical history, medications and allergies.
   - a concise description of pertinent assessment findings, including significant negative findings.
   - an account of the management interventions.
   - a statement of the response to assessment processes and management interventions.
   - a statement of pertinent social factors related to non-support and/or self-care inability.

3. Utilize descriptive succinct language and medical terminology to present time-efficient reports.

4. Utilize positive non-verbal and verbal language during reports which connotes a respect for the dignity and worth of patients and/or support persons.
RADIOTELEPHONE COMMUNICATIONS

1. Describe the radio and telephone procedures to be utilized in the prehospital environment according to the Emergency Health Services’ RadioTelephone Communications Manual and the Restricted Radio Operators (RRO) License.

2. Identify the critical information to be included in a radio or phone patch to the receiving hospital of patients given a Code 4 or Code 3 call designation.

3. Summarize the federal regulations which apply to prehospital use of a federal designated radio frequency.
HEALTH/EMERGENCY RESPONSE TEAM
COLLABORATION

1. The Paramedic will function as an extension of the health team in the prehospital setting by:

   (i) recommending community resources to aid patients in the community.

   (ii) reporting a patient’s significant home and/or environmental factors which could influence discharge planning.

   (iii) communicating with other community health members to:
       • collect information related to patients’ condition.
       • assist other health care members with patient care, i.e. Midwives, community Nurses, hospice workers, etc.

2. The Paramedic will collaborate as a member of the Emergency Response team by:

   (i) utilizing police assistance for protection and safety of self/patient/family and/or support persons/patient’s property/possessions.

   (ii) utilizing information and assistance from fire personnel and/or first response teams.

   (iii) utilizing and/or supporting fire personnel and/or police services during triage of multiple patient incidents, fire, and/or complex disaster situations.
DRIVING PRACTICES AND MANOEUVERS

1. (a) Describe the importance of maintaining an emergency vehicle in optimum operating condition.
(b) Identify the components of a vehicle check to ensure safe operation for patient transportation.

2. Identify the legislation and/or EHS policy where pertinent and describe the legal obligations, constraints, and precautions for the following:

   • safety belts – driver, passenger, patient(s)
   • child restraint device
   • incubator stabilization
   • passing on the right or left of the traffic lane
   • posted speed limits
   • right of way at intersections
   • proceeding through red lights
   • pedestrian crossings
   • vehicle breakdown
   • driving speed
   • following distance
   • driving in reverse
   • railroad crossings
   • warning system and lights
   • parking, standing, stopping
   • school bus stops, unloading
   • streetcar passing, unloading
3. (a) (i) State and explain the factors which affect stopping distance and safe braking distance.

(ii) Explain brake fading and the reasons for its development.

(b) Describe factors which affect road conditions for safe transport.

(c) Describe the factors which affect safe negotiating of a curve.

4. (a) Define hydroplaning and skidding.

(b) Explain the way each listed in 4.(a) may be prevented.

(c) Describe the corrective procedure to be utilized when hydroplaning or skidding or when rapid air loss from a tire occurs.

5. (a) Describe the responsibilities of the Paramedic in the event of a vehicle engine fire.

(b) Describe the effective utilization of a fire extinguisher.

6. (a) Identify the situations when an accident report must be completed.

(b) Identify the components to be considered and included in an accident report.

7. Identify the regulations regarding ambulance movement when entering and/or traveling on a federally governed airport for the purpose of patient transport to or from an airplane.

8. (a) Explain and implement driving modifications that should be made during patient transport based on the patients' conditions.

(b) Isolate and explain the negative effects of transportation on the patients’ condition and/or well-being.
MUL TIPLE CASUALTY INCIDENTS

1. Select and provide the information which must be communicated to dispatch by the first Paramedic crew on the scene of a multiple casualty incident, (MCI).

2. Select and utilize the most effective methods and communication directives when faced with crowd panic, counter-productive and/or out of control behaviour at a multiple casualty incident.

3. (a) Identify the activities which must be performed by emergency service personnel, other than Paramedics, when safety/security issues are evident or have the potential to become problematic.

   (b) Differentiate the features of a situation for which the presence of police and/or firefighters is essential.

4. (a) Define triage as it applies to a multiple/mass casualty situation.

   (b) Summarize and perform the individual and/or combined Paramedic crew’s responsibility in a multiple/mass casualty situation in relation to:

      • primary triage
      • secondary triage
      • site coordination
      • communication coordination
      • medical coordination
      • transportation coordination
      • treatment/patient holding site coordination

   (c) Identify and perform the priority assessments and sequence of sorting mass or multiple victims of injury.

   (d) Explain the triage criteria or tagging process and the types of injuries and/or illnesses constituting a/an:

      • immediate priority
      • secondary priority
      • delayed priority
      • VSA or obviously deceased

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(e) Explain the reason for designating the following sites as part of the triage process in mass casualties or multiple injury situations:

- incident site
- treatment site
- staging site

(f) Explain the criteria and precautions to be exercised with victims who are categorized as ambulatory (walking wounded).

5. Identify the features of self and vehicle protection and safety which must be adhered to at any multiple/mass casualty situation.

6. (a) Describe the rationale for coordinating and providing advance information to treatment facilities in the area of a multiple/mass casualty incident.

(b) Explain the need for determining the hospital and/or type of treatment facility which will be required for each type of casualty/injury.

(c) Identify the criteria for the selection of treatment facility or hospital location based on immediacy of the casualty’s need for care.

(d) Identify the criteria for determining when casualty air transportation will be required.

(e) Identify the features of a safe helicopter landing site.

7. Identify ways to ensure personnel and casualty safety when in the vicinity of a helicopter during:

- landing
- loading
- take-off

(See Section 2: Integrative Concepts; Stress/Anxiety; Critical Incident Stress and Panic Anxiety)
SECTION SEVEN

ELEMENTS OF PERFORMANCE
ELEMENTS OF ASSESSMENT COMPETENCIES

The Paramedic will selectively utilize the following elements based on their judgement and the appropriateness for each non-trauma and trauma patient care situation.
(For further reference, consult Basic Life Support, Patient Care Standards Manual; Ministry of Health and Long Term Care, Emergency Health Service Branch, current version)

ELEMENTS OF PRIMARY ASSESSMENT

The Paramedic will:

**Assume control of the situation/scene by selectively:**

- projecting a confident and calm affect
- utilizing assertiveness in giving directions.
- being decisive in instituting a plan of action
- utilizing compassion and empathy in approaches to patient and/or support person(s)
- assuming the role of patients’ advocate
- directing other emergency service personnel
- directing by-standers/support person(s)

**Ensure environmental safety for patient care by:**

- securing weapons
- removing obstacles
- requesting assistance from allied agencies
- removing the patient from hazard
- reducing noxious or detrimental stimuli

**Evaluate the environment for:**

- mechanism of injury
- number of patients
- suggestive physical/social indicators

**Establish a baseline level of awareness:**

- evaluating the patient response to verbal, tactile, or painful stimuli
Assess the airway by:

- opening and inspecting the airway for patency and/or listening for the quality of air exchange and/or chest movement
- inspecting the mouth for obstruction or potential obstructions

Assess the breathing by:

- inspecting and/or listening and/or feeling for chest wall movement
- auscultation of air movement in all lung fields
- inspecting for obvious manifestations of respiratory distress, cyanosis, tracheal deviation, subcutaneous emphysema, J.V.D

Assess the cervical spine by:

- palpation and/or inspection of the posterior neck for deformity, pain, and/or spasm
- questioning the mechanism of injury

Assess the circulatory status by:

- palpation of a radial and/or central pulse
- visualization and hands-on inspection for gross bleeding
- determining the need for immediate defibrillation or cardiac monitoring

Assess for specific life threatening injuries by selectively palpating and inspecting the:

- anterior and posterior chest
- abdomen
- pelvis
- femurs
ELEMENTS OF HISTORY TAKING

The Paramedic will:

**Obtain information regarding:**

- the patient’s chief complaint
- incident history
- present medical history
- past medical history
- medications
- allergies
- medic alert
- Physician’s name

**Ascribe a priority problem when:**

- patient’s perception of the problem is unclear
- patient’s complaint is incongruent with the presenting problem
- patient’s conditions precludes ascertaining the patient’s chief complaint
ELEMENTS OF INITIAL DIAGNOSTIC ASSESSMENTS

The Paramedic will utilize and interpret the following elements for each trauma, non-trauma patient, or trauma with a medical problem care situation.

**Assess the initial pulse and reassess as required, including the:**
- rate
- rhythm
- volume
- pulse deficit (when pulse irregular)

**Assess the initial respirations and reassess as required, including the:**
- rate
- rhythm
- volume
- air entry evaluation – bilaterally, apices to bases.
- lung sounds
- chest wall symmetry.

**Assess and reassess as patient situation dictates:**
- blood pressure
- systolic and diastolic blood pressure
- pulse pressure
- paradoxical pulse

**Assess the initial status of the skin and reassess as required, including the:**
- colour
- moisture
- temperature
- mucous membrane colour
- nail bed colour
- capillary refill

**Assess the initial status of the pupils and reassess as required, including the:**
- size
- equality
- reactivity
Assess and reassess as required the:
- eye opening response
- best verbal response
- best motor response
- determine a Glasgow Coma Scale (GCS) score

Assess patients’ initial orientation and reassess as required, to:
- person
- place
- time

Assess the patient’s initial memory and reassess as required including the:
- incident history
- recent history
- past history

Elicit initial responsiveness and re-elicit as required by using:
- verbal commands (stimuli)
- loud verbal commands (stimuli)
- tactile stimulus with loud verbal commands
- painful stimulus with loud verbal commands
ELEMENTS OF SECONDARY PHYSICAL ASSESSMENT

The Paramedic will selectively utilize and interpret the normality and abnormality of physical assessment in part or in total depending on their professional judgement of each trauma or non-trauma patient care situation.

**Palpate and/or inspect the head including the:**
- cranium
- face
- ears
- nose
- mouth

**Palpate the neck including the:**
- trachea for mid-line position or deviations
- jugular vein distention (JVD)
- subcutaneous emphysema

**Palpate the spine including the:**
- cervical vertebrae
- thoracic vertebrae
- lumbar vertebrae
- sacrum
- coccyx
- lateral spinal muscle groups

**Palpate the thorax including the:**
- clavicles
- sternum
- anterior ribs
- lateral ribs
- scapulas
- posterior ribs
- symmetrical movement of the chest wall
- entire thoracic area
Palpate the abdomen including the:

- right upper quadrant
- left upper quadrant
- right lower quadrant
- left lower quadrant
- right posterior flank
- left posterior flank

Palpate the pelvis including the:

- anterior plane
- lateral plane
- posterior plane
- buttocks

Palpate the right and left arm including the:

- shoulder
- upper arm
- elbow
- lower arm
- wrist
- hand

Palpate the right and left leg including the:

- hip
- upper leg
- knee
- lower leg
- ankle
- foot
Select assessments of each arm and each leg to demonstrate:

- sensation
- circulation
- mobility
- strength and equality of strength
- reflexes
ELEMENTS OF SPECIFIC DIAGNOSTIC AND/OR DIFFERENTIAL ASSESSMENTS

The Paramedic will identify the following and interpret the significance and relevance of the findings in each of the non-trauma and trauma patient care situation.

Observe and/or test for physical abnormalities of the head and neck for:

- eye deviations
- periorbital ecchymosis
- corneal/blink reflexes
- glass eye
- blindness
- visual fields
- visual disturbances and acuity
- ptosis
- nystagmus
- rhinorrhea
- otorrhea
- 'bulls-eye' test
- mastoid bruising
- deafness
- tinnitus
- tongue deviation
- drooling
- speech abnormalities
- breath odours
- trismus
- tracheal deviation
- jugular vein distention
- subcutaneous emphysema
- carbon deposits in and around the nose and mouth
- nasal flaring
- epistaxis
• facial drooping
• inability to clench teeth
• inability to smile
• dysphagia

Auscultate the chest for:
• apical rate
• heart sounds
• asymmetry of air entry
• crackles-coarse/fine (wet-dry)(rales)
• rhonchi
• wheezes

Assess audible breathing sounds for:
• snoring
• stridor
• wheezing
• coughing
• voice muffling

Percuss the thorax for:
• hyporesonance
• hyperresonance

Assess breathing patterns for:
• hyperventilation
• hypoventilation
• air-hunger
• cheyne-stokes respirations
• biot’s breathing
• apneustic respirations
• agonal respirations
• ataxic respirations
• dyspnea
• word-dyspnea
• orthopnea
• paroxysmal nocturnal dyspnea
• tachypnea
• bradypnea
• pursed-lip breathing
• grunting expirations
• prolonged ratio of expiratory time: inspiratory time
• use of accessory muscles
• supraclavicular/sternal retractions
• assumed position for forced inspiration and/or expiration
• apnea

**Inspect and/or palpate the thorax for:**

• subcutaneous emphysema
• asymmetry of chest wall movement
• costal angle measurement
• increased anterior/posterior diameter-barrel chest, funnel chest

**Inspect respiratory exudate/secretions for:**

• hemoptysis (blood streaked mucous)
• rusty sputum, blood-tinged sputum
• frothy sputum
• greenish, yellow coloured sputum
• thick tenacious mucus
• offensive/abnormal odour

**Inspect and/or palpate the abdomen for:**

• distention
• rigidity
• guarding
• pulsating masses
• rebound tenderness
• evisceration
• pain of varying types: eg, diffuse/localized/deep/chronic/spasmodic/
radiating/burning/piercing/dull/aching etc.
• nausea
• vomiting

**Auscultate the abdomen for:**

• bowel sounds

**Inspect the perineum for:**

• vaginal bleeding
• priapism
• urinary incontinence
• bowel incontinence/absence of flatus
• prolapse of the uterus
• rectal bleeding
• hematuria

**Inspect and/or palpate and/or auscultate the abdomen of a pregnant patient for:**

• fetal heart rate
• uterine size
• engagement
• duration of contractions
• frequency of contractions

**Inspect the perineum of a pregnant patient for:**

• bloody show
• leakage of amniotic fluid
• evidence of presenting part
• tears or lacerations
• vaginal bleeding
• prolapse of the cord
Inspect and/or palpate the extremities for:

- deformity
- range of motion
- capillary refill
- abnormal posturing including-decerebrate, decorticate, other combinations
- opisthotonus
- asymmetry of arms/hands/legs/feet
- altered peripheral pulses
- altered arm strength (i.e. grip)
- altered leg strength (i.e. push-pull)
- planter reflex for Babinski sign
- venipuncture marks
- altered sensation
- sensory deficits
- paresis/partial paresis
- hyperreflexia

Inspect and/or palpate the skin and mucous membrane for:

- pallor (ashen)
- cyanosis
- flushing
- rubor
- jaundice
- mottling-distal and/or central
- turgor
- pyrexia
- coolness
- diaphoresis
- clamminess
- dryness (as with dehydration)
- cracked lips
• strawberry tongue
• edema – dependent/pitting

**Inspect for soft tissue and mucus membrane alteration including:**

• laceration
• bruising
• contusion
• avulsion
• abrasion
• burns
• hematoma
• edema
• decrease skin turgor
• frostbite
• incision
• amputation
• avulsion
• puncture wound
• impaled object
• petechiae
• urticaria
• skin eruption-rashes-fungal infestations
• ulcerations

**Inspect and/or estimate the volume, and/or nature of fluid loss including:**

• blood
• emesis
• feces
• amniotic fluid
• cerebral spinal fluid
• urine
• diaphoresis
ELEMENTS OF PATIENT MANAGEMENT

The Paramedic will:

**Immediately manage an obstructed/partially obstructed airway by:**

- removing visible object or material from the oropharynx by manual means
- performing abdominal thrusts on the conscious/unconscious patient as per CPR standards and protocol
- performing a jaw thrust while maintaining cervical spine alignment to open the airway
- hyperextending the head and neck after ruling out a cervical spine injury to open the airway
- ensuring that the airway is maintained on an ongoing basis
- re-establishing an airway that has become compromised
- suctioning material from the oropharynx and/or nasopharynx
- placing the head to one side, after ruling out a cervical spine injury to allow material to drain from the mouth/nose
- placing the patient in a recovery (semi-prone) position, after ruling out a spinal injury to ensure a patent airway
- sizing an oropharyngeal/nasopharyngeal airway
- inserting an oropharyngeal/nasopharyngeal airway

**Immediately manage absence of breathing by:**

- performing mouth-to-mask ventilation(s)
- using a bag valve mask ventilator
- using an oxygen driven ventilator

**Ensure adequate breathing by:**

- ensuring an air-tight seal between the patient and resuscitation mask
- using a sufficient volume for each ventilation
- maintaining at least a minimum rate of ventilation of 12-16 per minute
- coaching the patient towards a normal respiratory rate, rhythm and volume
- assisting the patient to assume the orthopneic position when appropriate
- inclining the patient towards the injured side when appropriate
• immobilizing an unstable chest wall by positioning, hand mobilization, bulky dressing
• re-breathing from a reservoir of carbon dioxide (eg. paper bag)
• occluding a penetrating wound(s) of the chest wall according to established standards (eg. bulky dressings)
• administering salbutamol (Ventolin) according to established protocol.
• administering epinephrine according to established protocol

Immediately manage potential cervical spine injury by:

• instructing and/or explaining to the patient the need to keep still
• immobilizing the head and neck by manual stabilization
• applying traction (tension) and/or realigning the neck in preparation for approved cervical collar application
• applying an approved cervical collar keeping the neck in alignment
• applying additional cervical immobilization by using towel rolls, tape, straps, etc.

Immediately manage absence of pulse by:

• landmarking on the chest as per CPR standards and protocol
• compressing the sternum as per CPR standards and protocol
• defibrillating according to provincial standards and protocol

Immediately manage gross bleeding by:

• applying direct pressure to the wound site
• applying direct pressure to the appropriate pressure point
• applying direct pressure around the wound site
• applying a blood pressure cuff at pressure sufficient for venous compression
• applying a tourniquet only when arterial bleeding cannot be controlled by other means

Ensure bleeding control by:

• maintaining direct pressure manually
• applying pressure dressings
• reinforcing existing dressing
Select an oxygen delivery device with the appropriate litre low, to provide:

- high concentration (90–100%), (BVM, Genesis II)
- high concentration (80–95%), (non-rebreather mask)
- medium concentration (40–60%), (simple face mask)
- low concentration (24%-40%), (nasal cannula)

Assess the patient’s need for oxygen then promptly determine the oxygen concentration and select the appropriate device and flow rate to ensure adequate oxygen delivery with:

- intermittent positive pressure device
- non-rebreathing mask
- simple face mask
- nasal cannula

Adapt the means of oxygen delivery to accommodate the patient’s:

- age (e.g. mask size)
- anxiety level
- comfort/discomfort
- need for oxygen humidification

Stimulate responsiveness by:

- using patient’s name and loud verbal commands
- using loud verbal commands with painful stimuli

Dress soft tissue injuries by:

- ensuring aseptic application of the dressing
- ensuring adequate size of the dressing to cover the injury site(s)
- securing the dressing firmly over the injury site
- securing the dressing loosely over the injury site
- ensuring aseptic (clean) application of a moist dressing
- ensuring aseptic (clean) application of a dry dressing
• selecting an adequate type of dressing for the injury
• removing (a) loosely embedded object(s) prior to dressing application
• ensuring the separation of digits when dressing burns/frostbite
• assessing the distal circulation and sensation before and after applying a circumferential bandage.

Manage specific soft tissue injuries by:

• regloving
• irrigating the eye
• irrigating open wound
• applying a cold pack
• applying cooling fluid
• bandaging both eyes when one is injured
• leaving clothing adherent to a wound
• removing jewellery from an affected area
• placing a wrapped (waterproof) severed body part in a clean container with ice water/saline
• maintaining elevation of an injured extremity
• leaving a firmly embedded object in place and stabilizing the object in place

Manage the musculoskeletal injury by:

• inspecting and assessing the injury site
• selecting an appropriate immobilization device
• selecting an appropriate immobilization method
• applying the selected immobilization device correctly
• applying the selected immobilization device to prevent further injury and/or pain
• securing the selected immobilization device adequately
• elevating the immobilized extremity
• asking the patient for feedback regarding his/her comfort with the immobilization
• realigning and applying traction during immobilization appropriately
• maintaining elevation of the immobilized extremity
• applying cold pack(s)
• realigning and/or applying tension/traction to re-establish circulation (pulse) to a pulseless fractured extremity
• modify the immobilization method as dictated by the patient situation

**Reassess the distal circulation after management by:**

• palpating a pulse
• testing capillary refill
• palpating skin temperature
• inspecting skin colour
• inspecting and/or palpating skin moisture

**Reassess the distal sensation and mobility after management by:**

• applying tactile/pain stimulus
• asking the patient if he/she have abnormal or lack of sensation in the extremity (eg. fingers/toes)
• asking the patient if he/she can move the distal extremity (eg. fingers/toes)

**Retain body heat/privacy by:**

• removing unnecessary bystanders and ancillary personnel
• covering immediately after the primary assessment
• exposing one body part at a time during secondary assessment
• maintaining the cover once applied
• adding additional covering
• removing wet clothing
• covering the head of a patient, especially newborn, infant
• drying newborn, infant
• swathing newborn
• using mother as warmth for newborn
Follow the established procedure/protocol for:

- CPR
- triage
- radio communication
- ACR documentation
- infectious disease transport
- defibrillation
- cardiac monitoring
- blood glucose measurement via glucometer
- glucagon administration
- ASA administration
- nitroglycerine spray administration
- epinephrine administration
- nebulized salbutamol (Ventolin)
- intravenous fluid monitoring
- cannulation for IV start
- pulse oximetry (approval pending)

Administer:

- a glucose-based gel per os
- salted fluid per os
- water per os
- nitroglycerine spray sublingually after blood pressure assessment
- salbutamol by nebulizer
- epinephrine subcutaneously
- ASA per os
- glucagon subcutaneously
- intravenous fluid as per protocol
- cooling of head with tepid sponging for febrile infant/child
**Withhold when advisable:**

- water
- medications
- alcohol
- oxygen
- blanket (covering)

**Remove when advisable and/or provide safekeeping when applicable:**

- blanket (covering)
- contact lenses
- loose dentures
- clothing
- oxygen

**Remove items from the scene, provide care and/or security where applicable:**

- personal medications
- non-personal medications/drugs
- containers (i.e. pill bottles)
- medical information (i.e. charts vials, records)
- drug paraphernalia
- a sample of vomitus
- products of conception
- severed body part
- personal effects of significance or pertinent to patient’s request
- personal identification
- relatives/bystanders when obstructive or intrusive
- unprotected evidence when scene is not secure

**Utilize therapeutic communication by:**

- introducing self and partner to the patient
- utilizing the patient’s name while speaking to him/her
• acknowledging the distress experienced by the patient
• utilizing touch as a comfort measure when assessed to be appropriate
• respecting the private space (social distance) of the patient
• assuming a non-threatening posture
• including and assisting the patient in decisions re his/her care
• achieving and maintaining eye contact
• demonstrating congruence between verbal and non-verbal messages
• explain actions to patient

(See Section 2: Therapeutic Communications to be implemented in situation-specific circumstances. i.e. crisis specific, age specific, anxiety, etc.)

**Lift and/or move the patient by:**

• protecting the injured part
• positioning the equipment to facilitate the move
• utilizing an adequate base of support
• utilizing large muscle groups
• keeping the patient’s weight close to the Paramedic’s own centre of gravity
• maintaining a straight back
• coordinating lift with patient, partner and bystander
• handling with care and smoothness
• providing support to body curvatures
• providing adequate and/or appropriate warmth
• selecting the most appropriate lifting moving method/device, eg. log rolling, fore & aft lifting, sheet pull, stairchair, backboard, #35a, #30, #9 or scoop stretcher

**Assure Patient Safety By:**

• elevating side rails
• applying safety straps
• securing and safely storing equipment
• selecting the appropriate equipment for transport
• ensuring a clear area prior to lifting
• securing blankets, sheets, etc.
Position the patient to:

- protect and/or maintain the airway
- promote breathing
- promote peripheral venous return in hypotension
- promote cerebral venous return in increased intracranial pressure
- assure his/her comfort
- protect an injured extremity
- prevent venacaval hypotension for full term pregnant women
- deliver a newborn in a position of comfort for the pregnant woman, and convenience of the paramedic

Prepare For Specific Impending Problems By:

- clearing patient care area
- assuring the availability of suction equipment
- readying an obstetrical kit
- draping the women to ensure privacy during delivery
- positioning the patient to protect the airway
- obtaining an oropharyngeal/nasopharyngeal airway
- setting up ventilation devices
- placing the patient on a firm surface for CPR
- utilizing burn kit materials
- having defibrillation pads and defibrillator unit set up
- applying monitoring leads
- using elements of reverse isolation for infection prone patients e.g. those on anti-cancer-chemotherapy

Assist Advanced Care Paramedics with:

- intubation
- IV initiation
- administration of IV fluids
- administration of IV medications
- rhythm interpretation