

Prehospital Emergency Care Syllabus

Version 3.0
February 2020

**Emergency Health Regulatory and Accountability Branch
Ministry of Health**

To all users of this publication:

The information contained in this document has been carefully compiled and is believed to be accurate at date of publication.

For further information on the *Prehospital Emergency Care Syllabus*, please contact:

Emergency Health Regulatory and Accountability Branch
Ministry of Health
5700 Yonge Street, 6th Floor
Toronto, ON M2M 4K5
416-327-7900
CertificationExams@ontario.ca

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Document Control

Version Number	Date of Issue	Comes into Force Date	Brief Description of Change
2.0	September, 2000	N/A	Full update
3.0	February, 2020	N/A	Full update

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Prehospital Emergency Care Syllabus

Version 3.0

Introduction

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Introduction

The Paramedic 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 practice.

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 standards for prehospital patient care as outlined in the Emergency Health Regulatory and Accountability Branch (EHRAB) of the Ontario Ministry of Health (MOH):

- Basic Life Support Patient Care Standards
- Advanced Life Support Patient Care Standards

This synopsis further assumes a theory and practical skill base acquired through successful completion of an approved Paramedic Program (or programs deemed equivalent by EHRAB, 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 possess a sound knowledge base and be proficient in deductive decision-making. They must utilize the elements of critical thinking and problem solving, not only to make sound clinical judgments, but judgments 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.

Description of 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, by assessing and interpreting findings while implementing approaches to communication and management, which benefit the situation. The systems and/or problem-focused approach serve as a convenient method to organize knowledge, application and judgment components.

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 supersede the effects of trauma,
- physical deterioration alters behaviour,
- crisis or behavioural maladaptations influence physical states,
- multiple victims have multiple injuries,
- the patient status deteriorates from compensatory to decompensatory or failing responses.

Section 1 - General Concepts

1

Professional Practice

1. Discuss the importance of adhering to the Paramedic Conduct Standard outlined in the MOH Basic Life Support (BLS) Patient Care Standards and the Advanced Life Support (ALS) Patient Care Standards.
2. Identify the characteristics of personal hygiene, appropriate dress and use of appropriate language for a paramedic.
3. Differentiate between appropriate and inappropriate personal interactions with patients.
4. Explain the impact of interpersonal relationships between team members on patient care.
5. Discuss the relevance of quality assurance and enhancement programs to paramedic practice.
6. Discuss the importance of promoting awareness of the emergency medical system and profession.
7. Identify current trends and issues impacting paramedicine and health and discuss how societal and professional efforts can be directed towards improving health care and a healthier society.
8. Discuss the enhancement of the profession through mentorship and preceptorship.
9. Discuss the role of the following as they pertain to the delivery of pre-hospital care in Ontario:
 - EHRAB of MOH
 - Base Hospital
 - Upper Tier Municipalities
 - Professional associations
10. Discuss the Canadian Free Trade Agreement (CFTA) as it pertains to paramedic employment mobility across Canada.
11. Define patient advocacy and discuss situations where patient advocacy is required.
12. Explain ways in which a practitioner can advocate for patients.
13. Identify resources which may aid patients in the community and recommend post-transport referrals to local community resource options to ensure continuity of care, where available.

14. Identify the various models of community paramedicine and the possible roles paramedics play in this setting.
15. Explain the importance of promoting health literacy for the well-being of the patient.
16. Discuss methods to promote injury prevention and health promotion strategies within the community.
17. Discuss the role of various specialized paramedic units such as:
 - tactical
 - Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)
 - bicycle/marine
 - Emergency Response Unit (ERU)
18. Explain the importance for continuing professional development.
19. Discuss the importance of reflective practice to promote on-going competence and identify areas of professional development.
20. Discuss methods for self-evaluating and setting goals for improvement, as related to professional practice.
21. Discuss the importance of continuing professional education and methods of identifying and implementing a professional development plan.
22. Discuss the importance of being accountable for one's own actions and how to practice due diligence in professional practice.
23. Integrate constructive feedback, performance evaluation/appraisal and peer review to improve performance.
24. Interpret evidence in medical literature and assess relevance to practice.
25. Identify sources of research evidence relevant to paramedicine and discuss the determination of validity and application to practice.
26. Explain the importance of research in emergency medical services.
27. Explain the role of the paramedic in research done in the field including strategies to follow research guidelines.
28. Discuss qualitative and quantitative research methodology.

29. Discuss ethical considerations in research.
30. Define evidence-based practice.
31. Discuss the importance of advancing the paramedic profession through evidence-based practice.
32. Discuss reasonable and prudent judgment and give examples of how it is incorporated into professional practice.
33. Discuss methods of effective problem solving.
34. Discuss the importance of collaboration and appropriate task delegation to allied agencies or the public on scene.
35. Apply principles of effective group dynamics to interactions among emergency services personnel and members of the inter/intraprofessional team.
36. Discuss the importance of collaboration with other health care members in providing care to the patient.
37. Discuss dignity and identify cultural characteristics that impact patient dignity.
38. Define respect and list examples of ways to demonstrate respect.
39. Identify cultural differences that affect the demonstration of respect.
40. Differentiate between empathy, compassion and sympathy.
41. Describe behaviours that convey empathy and compassion.
42. Discuss the impact of confidence on patient care.
43. Identify risks associated with over confidence.
44. Distinguish between assertive and aggressive behaviour.
45. Describe techniques of assertive behaviour.
46. Describe diplomacy, tact and discretion.
47. Give examples of behaviour which show diplomacy, tact and discretion.

48. Define conflict and identify situations of potential conflict.
49. Discuss basic conflict resolution strategies.

Crisis Intervention

1. Define crisis and crisis intervention.
2. Differentiate between conflict and crisis.
3. Identify common types of crisis experienced in paramedicine.
4. Identify unpredictable types of crisis in paramedicine.
5. Outline the characteristics and typical evolution of a crisis.
6. Describe overt and covert methods in which people behave in crisis situations.
7. List and explain the way in which internal and external resources can assist or be activated to help the person in crisis.
8. Identify pre-crisis, crisis and post-crisis factors to assess in a patient.
9. Define conflict and describe ways in which crisis can evolve to conflict.
10. Summarize principles of non-violent crisis intervention.

Stress and Critical Incident Stress

1. List the components of a balanced, healthy lifestyle.
2. Describe personal activities / habits which promote a balanced, healthy lifestyle.
3. Describe strategies to promote physical and mental health.
4. List personal support systems that promote the maintenance of physical and mental health.
5. Describe the benefits of a personal support system.
6. Discuss methods to create an environment of collegial support within the paramedic team to promote and advocate for the improvement of the psychological health and well-being of the paramedic.
7. Define stress and stress disorder.
8. Describe factors that typically contribute to personal stress.
9. Discuss techniques to manage stress.
10. Evaluate a diverse range of resiliency and stress management strategies to prevent or mitigate negative responses to stressful situations.
11. Define critical incident stress (CIS).
12. Identify the characteristics of critical incident stress on those affected.
13. List examples of critical incidents that have the greatest impact on emergency personnel.
14. Identify the possible reactions to critical incident stress for each of the following domains:
 - physical
 - cognitive
 - emotional
 - behavioural
15. Explain the concept of CIS management.
16. Discuss CIS management programs for the paramedic services with consideration for each of the following:

- courtesy phone call
 - defusing
 - debriefing
17. Define post-traumatic stress disorder (PTSD) and identify its relationship to critical incident stress.
 18. Discuss potential health outcomes for paramedics who suffer from CIS/PTSD.
 19. Discuss methods of building resiliency in paramedics to avoid or lower the risk of developing PTSD.
 20. Discuss paramedics' rights under the *Supporting Ontario's First Responders Act* (Post-traumatic Stress Disorder), 2016 and workplace policies targeting paramedics' psychological health and well-being.
 21. Evaluate the resources available to respond to stressors affecting members of the paramedic team (i.e., critical incident debriefings, employee assistance program, peer-support program).
 22. List the effects of shift work on physical and mental well-being.

Communication

1. Describe the characteristics of effective therapeutic verbal and non-verbal communication including:
 - paramedic's disposition
 - acknowledgement of patient's degree of distress
 - active listening techniques
 - use of understandable language
 - empathy, compassion
 - explanation of assessments and management
2. Explain the rationale and utilize therapeutic approaches 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 age
 - patient's ethnicity, culture and religion
 - 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 behavior
 - need to validate the patient's responses, clarify the incident and collect information concerning the medical history
3. Identify the relationship of the quality of listening to the effectiveness of therapeutic interaction.
4. Identify those situations in which reducing environmental stimuli may be supportive to the patient's comfort and safety.
5. Discuss techniques to communicate health care plans with the patient and/or family/substitute decision maker including consequences of health care decisions.
6. Identify those situations where including the patient's family and caregivers in decision making would be supportive to the patient's welfare.
7. Describe the stages of the grieving process.
8. Describe and demonstrate supportive care for the terminally ill patient and their family.

9. Describe and demonstrate supportive care for the patient's family affected by sudden or unexpected death.
10. Discuss methods of providing death notification to the patient's family.

Ethics

1. Define or explain the following:
 - ethics
 - morals
 - moral agent
 - cultural norms
 - values
 - veracity
 - justice
 - fidelity
 - autonomy
 - utilitarianism
 - egoism
 - altruism
 - beneficence
 - non-maleficence
2. Identify the following types of values:
 - personal
 - organizational
 - professional
3. Explain how a person learns their values and how conflicts in values can arise.
4. Explain the purpose of a code of ethics.
5. Identify sources of conflict and the steps of conflict resolution.
6. Explain the differences between the following moral problems:
 - moral uncertainty
 - moral dilemma
 - moral distress
7. Discuss the process of ethical decision making.
8. Explain the concept of benefit versus burden in ethical decision making.
9. Discuss the following as they apply to ethical problem solving in paramedicine:
 - impartiality test
 - universal test

- justifiability test
10. Discuss the following approaches to be considered when presented with an ethical dilemma:
 - utilitarian approach
 - rights approach
 - fairness approach
 - common good approach
 - virtue approach
 11. Differentiate between the concepts of withholding life sustaining treatment versus withdrawing life sustaining treatment.
 12. Describe the interrelationship of ethical obligation and moral behaviour.
 13. Describe the rights of the patient and family when being cared for by a paramedic.
 14. Describe the aspects of consent to treatment in the prehospital setting.
 15. Discuss the legal obligations and circumstances involved in an implied consent and informed consent as it applies to the role of the paramedic.
 16. Discuss the approaches and legal obligations the paramedic should use when there is a refusal to accept the interventions required for the patient's wellbeing.
 17. Describe the moral and ethical considerations which obligate the paramedic to act as a patient's advocate.
 18. Explain the concept of whistle blowing and the advantages and disadvantages associated with this action.
 19. Discuss the importance of self-reporting mistakes and near misses in the field of paramedicine.
 20. Discuss the impact of social media in the field of paramedicine including:
 - social media at the scene
 - personal use/misuse of social media
 - public perception of paramedics through social media

Medical-Legal Responsibilities

1. Discuss from the following legislations and standards, the legal duties and responsibilities which apply to the paramedic providing care in the prehospital setting:
 - *Ambulance Act and Regulation 257*
 - *Health Care Consent Act*
 - *Highway Traffic Act*
 - *Child and Family Services Act*
 - *Criminal Code of Canada*
 - *Mental Health Act*
 - *Coroner's Act*
 - *Regulated Health Professions' Act*
 - *Occupational Health & Safety Act*
 - *Personal Health Information Protection Act (PHIPA)*
 - *Canadian Charter of Rights and Freedoms*
 - *Bill 168*
 - Relevant paramedic practice documents / standards published by the Ministry of Health (e.g. BLS / ALS Patient Care Standards, Ontario Ambulance Documentation Standard etc.)
2. Identify the various types of consent and the situations in which they apply including:
 - implied consent
 - informed consent
 - children and consent
 - power of attorney for personal care (substitute decision maker)
 - incapable person without consent
 - capable person without consent
3. Discuss the methods to assess and interpret patient responses in order to determine patient capacity.
4. Discuss the conduct necessary to maintain patient confidentiality.
5. Define the following terms as they apply to PHIPA:
 - health care
 - health care practitioner
 - health information custodian
 - personal health information
 - identifying information

6. Discuss disclosure of personal health information as it relates to provide health care and as it relates for the purposes of legal proceedings under PHIPA.
7. Discuss the roles and responsibilities of the base hospital program and base hospital physician in the delivery of paramedic care.
8. Explain the concept of controlled medical acts and the reasons a paramedic must be certified to perform them.
9. Discuss the criteria for certification to perform the controlled acts defined in the MOH ALS Patient Care Standards and for maintaining that certification.
10. Identify the legal duties and constraints associated with the paramedic scope of practice.
11. Differentiate between the scope of practice of a PCP, ACP and CCP in Ontario.
12. State the reasons and associated outcomes for deactivation, decertification and/or provisional certification of controlled medical acts.
13. Differentiate the intent of tort and criminal law.
14. Differentiate between the tort laws governing assault, malpractice and negligence which pertain to the practice field of the paramedic.
15. Identify four elements of law which must be proven before a paramedic can be found guilty of negligence.
16. State those offences which constitute moral turpitude.
17. Differentiate the purpose and outcomes of a criminal court proceeding and those of a Coroner's inquest.
18. Discuss resources and methods of preparation when required to testify at an inquest or trial.
19. Identify those circumstances of death in which a coroner must be notified.
20. Describe the purpose of the *Canada Evidence Act* as it applies to providing testimony at a Coroner's inquest.
21. Identify the consequences of providing false or misleading statements as a witness.
22. Identify when opinion or hearsay evidence is admissible in the Canadian court system.

23. Explain the phrase “that which is reasonable” which is the underlying principle of Canadian law and describe the application of this principle to the practice of the paramedic.

Victims of Violence and/or Abuse

1. Identify the incidence of physical, emotional and sexual abuse for all age groups.
2. Identify the contributing factors towards abusive behaviour.
3. Identify those factors within the following, which are suggestive of abuse:
 - environment
 - incongruent incident history, assessment findings and behaviour of those involved
4. Identify the need for advocacy for care and protection of the abused.
5. Define assault and differentiate between the three levels of assault and the consequence of each if charged as guilty.
6. Discuss possible variations in the approach, assessment and management of a victim of sexual assault.
7. Describe and utilize therapeutic approaches towards those victims of violence and/or abuse.
8. Identify the legal obligations and ethical considerations related to caring for those victims of violence and/or abuse and the required reporting and documentation procedures.
9. Identify the precautions and demonstrate the ways and means to preserve evidence (materials) during the care of a victim of violence and/or abuse.

Patient Care Documentation

1. Describe and complete each element of the Ambulance Call Report (ACR), paper or electronic, according to the criteria required by the Ministry of Health, Emergency Health Regulatory and Accountability Branch as outlined in the Ambulance Call Report Completion Manual and the Ontario Ambulance Documentation Standards.
2. Clarify the reasons for selecting and recording the following on the ACR:
 - concise description of scene observations
 - statement of patient's chief complaint
 - synopsis of the incident history
 - summary of past medical history including allergies and medications
 - description of assessment findings
 - inclusion of pertinent negative assessment findings
 - treatment rendered prior to arrival (e.g. CPR)
 - implemented management and interventions
 - response to assessment processes and/or management interventions
 - changes in clinical status
 - fluid intake and output
 - aid to capacity
 - refusals of assessment/treatment and/or paramedic services
 - list of others assisting in care (including 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
3. State the rationale for utilizing medical terminology and accepted standardized abbreviations.
4. State the reason for the attending paramedic signing each treatment and/or intervention as well as the total report.
5. Summarize the responsibilities involved with the distribution of patient care documents.
6. Identify the minimum information to be included on the ACR for a non-patient carrying call.
7. Identify the minimum information to be included on the ACR for refusal of service calls.
8. Utilize designated codes when completing the ACR.

9. Describe the legal responsibilities and professional duties to protect and honour the confidentiality of patient documents.
10. Identify the legal consequences for a paramedic, should confidential obligations be ignored or mismanaged.
11. Summarize the professional responsibilities for accurate and complete documentation related to prehospital emergency care.
12. Summarize the reasons for documenting patient data in a way which is non-judgmental and objective.
13. Identify the circumstances and patient care situations which require documentation in an incident report.
14. Summarize the pertinent information which should be included in an incident report.
15. Differentiate between the information that should be documented in an incident report versus an ACR.
16. Identify the considerations that must be made should a paramedic chose to keep a personal notebook.
17. Discuss the legal constraints of providing patient and/or call details to the police for purposes of an investigation.
18. Discuss emerging trends in information technologies including:
 - remote access to patient records
 - telemedicine
 - recording and access to patch data
 - mobile and/or wearable biometric monitors

Transfer of Care Report

1. Demonstrate the ability to present to the receiving health care provider a succinct summarization of the most critical data concerning a patient's clinical status including:
 - patient identifiers (name, age, sex)
 - CTAS level
 - chief complaint
 - incident history
 - relevant past medical history, medications and allergies
 - pertinent assessment findings, including pertinent negative findings
 - working/field diagnosis
 - management and response to management
 - pertinent social factors related to non-support and/or self-care inability.

Patch to Base Hospital Physician

1. Identify the circumstances under which a patch to the base hospital physician may be required.
2. Identify the critical information to be reported including:
 - paramedic level of certification
 - report on patient's condition, situation or circumstance
 - reason for patch
3. Discuss the use of the acronym ISBAR (identification, situation, background, assessment, response to treatment) as it applies to a patch to the base hospital physician.
4. Identify the importance of confirming direction, authorization or orders given.
5. Describe the method of making contact with the base hospital physician via telephone or radio.

Radio Communication

1. Describe the radio procedures to be utilized in the prehospital environment including:
 - equipment usage
 - speech techniques
 - phonetic alphabet
 - 10 codes
 - standard words and phrases
2. Identify procedures to be utilized in circumstances involving danger or personal safety including:
 - 10-200
 - 10-2000
 - Emergency button
3. Identify the rationale for providing an en route report to the receiving facility.
4. Identify the critical information to be included in a radio report to the receiving hospital for CTAS 1 and CTAS 2 patients including:
 - unit ID
 - patient age, sex
 - CTAS level
 - chief complaint
 - pertinent history
 - pertinent assessment findings
 - pertinent management and response to management
 - abnormal vital signs
 - estimation of time of arrival

Lifting, Transferring and Positioning of the Patient

1. Describe strategies to develop and maintain physical strength and fitness.
2. Explain the concept of safe biomechanics.
3. Describe strategies to reduce the risk of injury to the paramedic.
4. Describe potential injuries common to the paramedic.
5. Describe situations where additional resources may be required to safely perform a lift or transfer of a patient.
6. Discuss and demonstrate the ability to 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 and proper ergonomics
 - 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, e.g. log roll, fore & aft, sheet pull, stand and pivot, stair chair, spinal board, adjustable break away stretcher, main and portable stretchers
7. Discuss and demonstrate the ability to assure patient safety by:
 - inspecting equipment to ensure proper functioning
 - 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.
 - positioning the stretcher at appropriate heights for various circumstances
8. Position the patient to:
 - protect and/or maintain the airway

- promote the efficiency of breathing
 - promote cerebral venous return in increased intracranial pressure
 - assure their comfort
 - protect an injured extremity
 - prevent vena caval hypotension in pregnant women
9. Discuss the rationale for the following suggested transport positions and circumstances when alternative positioning may be required:
- left lateral or recovery position for patients with decreased Level of Consciousness (LOC)
 - sitting or semi-sitting for patients with respiratory distress, fractured larynx, epistaxis or nausea
 - supine position for shock or hypotension
 - supine with head elevated 30 degrees for patients with possible increased Intracranial Pressure (ICP) (head injury, Cerebrovascular Accident (CVA))
 - supine on an extrication device for possible pelvic fracture
 - supine or semi-sitting on stretcher for possible spinal injury
 - left lateral recumbent for obstetrical patients
10. Discuss circumstances which would require the restraint of a patient and demonstrate the correct technique for patient restraint as per the BLS/ALS Patient Care Standards.

Driving Practices and Maneuvers

1. Describe the importance of maintaining an emergency vehicle in optimum operating condition.
2. Identify the components of a vehicle check to ensure safe operation for patient transportation.
3. Identify situations which would mandate the removal of the ambulance from service.
4. Identify legal obligations, constraints and precautions to be considered for the following:
 - safety belts – driver, passenger, patients
 - 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
 - staging/parking at scene
 - parking, standing, stopping
 - school bus stops, unloading
 - streetcar passing, unloading
 - access to airports
5. State and explain the factors which affect stopping distance and safe braking distance.
6. Explain brake fading and the reasons for its development.
7. Describe factors which affect road conditions for safe transport.
8. Describe the factors which affect safe negotiating of a curve.
9. Define hydroplaning and skidding and methods to mitigate these incidences.
10. Describe the corrective procedure to be utilized when rapid air loss from a tire occurs.
11. Describe the responsibilities of the paramedic in the event of an ambulance fire.

12. Describe the effective utilization of a fire extinguisher.
13. Describe the process to be followed if the ambulance is involved in a motor vehicle collision en route to a call or while transporting a patient.
14. Identify the situations when an accident report must be completed.
15. Identify the components to be considered and included in an accident report.
16. Explain and implement driving modifications that should be made during patient transport based on the patient's conditions.
17. Discuss the use of various mapping systems (e.g. Universal Transverse Mercator (UTM), electronic, paper) to locate a call location.

Multiple Casualty Incident

1. Identify the features of self and vehicle protection and safety which must be adhered to at any multiple casualty incident (MCI).
2. Identify the information which must be communicated to dispatch by the first paramedic crew on the scene of an MCI.
3. Identify the roles and responsibilities of each agency on the scene of an MCI.
4. Define triage as it applies to an MCI.
5. Summarize the individual and/or combined paramedic crew's responsibility in an MCI in relation to:
 - primary triage
 - secondary triage
 - incident command
 - communication coordination
 - medical coordination
 - transportation coordination
 - treatment/patient holding site coordination
6. Identify the priority assessments and the sequence for the sorting of multiple victims of an MCI.
7. Explain the triage criteria, tagging process and the types of injuries and/or illnesses constituting a/an:
 - immediate priority
 - secondary priority
 - delayed priority
 - Vital Signs Absent (VSA) or obviously deceased
8. Explain the reason for designating the following sites as part of the triage process in an MCI:
 - staging site
 - incident site
 - triage site
 - treatment site
9. Explain the precautions to be exercised with victims who are categorized as ambulatory (delayed priority).

10. Describe the rationale for providing advance information to treatment facilities in the area of an MCI.
11. Explain the need for determining the hospital and/or type of treatment facility which will be required for each type of victim/injury.
12. Identify different types of incident management systems (IMS).
13. Describe the principles of IMS.
14. Explain the various participant roles in an IMS.
15. Discuss the role of paramedic services in IMS.

Section 2 – Patient Care

2

Patient Assessment

Scene Survey

1. Identify and interpret the information provided by the Central Ambulance Communications Centre (CACC) at the initiation of a call including:
 - location
 - priority
 - ID/run number
 - patient information
 - pre-arrival information regarding scene safety
 - allied agencies responding
2. Identify the elements of a scene survey as they apply to a trauma and/or medical call including:
 - scene safety
 - mechanism of injury/nature of illness
 - number of patients
 - need for allied agencies
 - access/egress
3. Identify those situations where the paramedic would refrain from approaching the scene or would exit the scene due to safety concerns.
4. Identify the appropriate personal protective equipment (PPE) that may be required for various types of calls.
5. Assess a patient's febrile respiratory/enteric illness and recent travel status to determine the appropriate PPE required.
6. Identify situations which would require the notification of police to attend the scene.
7. Discuss the importance of preserving evidence at a crime scene and methods to accomplish this goal including:
 - access/egress
 - weapons
 - hangings
 - movement of objects
 - cutting or removing clothing
 - bagging linen/clothing
 - statements made by patient/bystanders
 - accurate note taking and documentation

8. Discuss the considerations related to MOI that would be used to determine the potential type and severity of patient injury in the trauma call.
9. Explain the potential injuries associated with the following motor vehicle collisions:
 - head-on collision
 - T-bone or side impact collision
 - rear impact collision
 - rollover collision
 - restraint device injuries
 - pedestrian struck incidents
 - ejection from a vehicle
10. Explain the potential injuries associated with the following mechanisms of injury:
 - falls
 - penetrating injuries
 - impaled objects
 - blast injuries
 - crush injuries
 - rapid deceleration injuries
 - assault injuries
11. Explain the roles of the various responders on the scene of a trauma and/or medical call.
12. Discuss the utilization of the BLS Patient Care Standards - Field Trauma Triage Standard for a trauma call.
13. Discuss criteria used for the request of an air ambulance as outlined in the Air Ambulance Utilization Standard as per the BLS Patient Care Standards.
14. Discuss the management of situations involving a deceased person as per the Deceased Person Standard in the BLS Patient Care Standards including situations of:
 - expected death
 - unexpected death
 - obviously dead
 - do not resuscitate (DNR) confirmation form
 - termination of resuscitation (TOR) order
15. Demonstrate the ability to:
 - 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
- assuming the role of patients' advocate
- directing other emergency service personnel
- directing by-standers/support person

Ensure environmental safety for patient care by:

- eliminating the threat of weapons
- removing obstacles
- requesting assistance from allied agencies
- removing the patient from hazards
- reducing noxious stimuli

Evaluate the environment for:

- mechanism of injury
- number of patients
- suggestive physical/social indicators

Primary Survey

1. Discuss the rationale for completing a primary survey as quickly as possible once patient contact has been initiated.
2. Differentiate the purpose, components and sequence of a primary survey.
3. Explain the rationale for an immediate carotid pulse check in the unconscious patient.
4. Explain the rationale for the inclusion of a rapid trauma survey immediately following the primary survey of a trauma patient.
5. Identify life-threatening problems that may be encountered during a primary survey and implement immediate corrective measures.
6. Based upon primary survey findings, demonstrate the ability to assign the appropriate arrive patient CTAS level to the patient.
7. Determine the need for cardiac monitoring based upon incident history and/or assessment findings.
8. Demonstrate the ability to:

Establish a baseline level of awareness:

- evaluate the patient response to verbal, tactile, or painful stimuli

Assess the airway:

- open and inspect the airway for patency and/or listen for the quality of air exchange and/or chest movement
- inspect the mouth for obstruction or potential obstructions

Assess the breathing:

- inspect and/or listen and/or feel for chest wall movement
- auscultate for air movement in apices and bases
- inspect for obvious manifestations of respiratory distress, cyanosis, tracheal deviation, subcutaneous emphysema, jugular vein distention (JVD)
- determine the need for prompt peripheral oxygen saturation (SpO₂) monitoring

Assess the cervical spine:

- palpate and/or inspect the posterior neck for deformity, pain and/or spasm
- question the mechanism of injury

Assess the circulatory status:

- palpate radial and/or carotid pulse
- visualize and hands-on inspection for gross bleeding
- determine the need for immediate defibrillation or cardiac monitoring

Assess for specific life threatening injuries by selectively palpating and inspecting the:

- head
- anterior and posterior chest
- abdomen
- pelvis
- femurs

Secondary Survey

1. State the purpose and components of a secondary survey for a trauma patient versus a medical patient.
2. Identify the abnormal assessment findings that correspond to the use of the mnemonic CLAP(S)(D) TIC(S)(D).

Inspect for:

- contusion/colour/cyanosis/contamination
- lacerations
- abrasion/asymmetrical motion/abdominal breathing(diaphragmatic)
- penetration/puncture(entrance/exit)/protruding object or organ
- swelling/sucking wound/splinting/subcutaneous emphysema
- distension/deformity/dried blood/diaphoresis

Palpate for:

- tenderness

- instability
 - crepitus
 - swelling, subcutaneous emphysema
 - deformity
3. Differentiate between a rapid trauma survey and a focused exam and when each would be employed.
 4. Explain the importance of removing any clothing or jewelry from an injury site.
 5. Discuss the importance of exposing as much of the body as is necessary to conduct a thorough examination while maintaining patient privacy.
 6. Provide the rationale for performing a selective secondary survey and demonstrate the ability to choose appropriate assessments given various patient situations/conditions.
 7. Demonstrate the ability to identify the topographical landmarks of and to inspect/palpate the following areas:

The head including the:

- cranium (bones, mastoid bruising)
- face (symmetry/drooping)
- ears (otorrhea, discharge)
- eyes (periorbital ecchymosis, ptosis, deviations, nystagmus)
- nose (bone, rhinorrhea, discharge)
- mouth (teeth, mucous membranes, blood/vomit, drooling)

The anterior neck including the:

- trachea
- jugular veins
- soft tissue

The spine including the:

- cervical vertebrae
- thoracic vertebrae
- lumbar vertebrae
- sacrum
- coccyx
- lateral spinal muscle groups

The thorax including the:

- clavicles
- scapulae
- sternum
- anterior ribs

- lateral ribs
- posterior ribs
- symmetrical movement of the chest wall
- shape of chest (barrel, funnel)

The abdomen including the:

- right upper quadrant
- left upper quadrant
- right lower quadrant
- left lower quadrant
- right posterior flank
- left posterior flank
- pulsating mass, distension, rigidity, discolouration, tenderness, guarding

The pelvis including the:

- anterior plane
- lateral plane
- posterior plane
- buttocks

The right and left arm including the:

- shoulder
- upper arm
- elbow
- lower arm
- wrist
- hand (edema)

The right and left leg including the:

- hip
- upper leg
- knee
- lower leg
- ankle
- foot (edema)

Select assessments of each arm and each leg to demonstrate:

- sensation (normal, numbness, tingling, paresthesia)
- circulation (pulse, capillary refill)
- mobility (plegia, paresis)
- strength and equality of strength

Locate and palpate the following extremity pulses:

- carotid
- brachial

- radial
- femoral
- popliteal
- dorsalis pedis
- posterior tibialis

History Taking

1. Gather pertinent information to clarify the patient's chief complaint.
2. Identify the questions you would ask pertaining to a chief complaint of pain. (e.g. OPQRST)
3. Identify the questions and/or method you would use to determine the possible causes of unconsciousness. (e.g. AEIOU TIPS)
4. Gather pertinent information to clarify the patient's incident history.
5. Gather pertinent information to clarify the patient's past medical history.
6. Gather pertinent information to identify allergies.
7. Gather pertinent information to identify prescribed, over the counter or homeopathic medications and compliance with their use.
8. Apply pharmacology concepts to interpret medical history and physiological and psychological outcomes associated with the patient's medication regime.
9. Discuss the importance of collecting and/or recording medications for transport with the patient.
10. Discuss the use of differential questioning to help determine a working diagnosis for the patient.

Vital Signs

1. Identify the frequency with which vital signs should be obtained as per the BLS/ALS Patient Care Standards.
2. Define pulse.
3. Identify normal pulse rate ranges for the adult, child, infant and newborn.
4. Describe pulse rate, pulse volume and pulse regularity as they relate to heart function.

5. List the locations where an arterial pulse may be felt.
6. Identify which pulse location is best used for the adult, child and infant in an emergency situation and explain the reasons.
7. Explain and utilize the technique for obtaining a peripheral pulse and an apical heart rate.
8. State the approximate systolic blood pressures that may be inferred by palpating peripheral pulses.
9. Identify normal and abnormal pulses in terms of rate, rhythm and volume for the adult, child, infant and newborn.
10. State possible causes for variation in pulse rate, rhythm and volume, interpret each and indicate the effect that each has on heart function and cardiac output.
11. Explain the reasons for the variety of changes that occur in pulse rate, rhythm and volume, in relation to compensatory, decompensatory or failing physiological responses of the heart.
12. Define the following, provide normal value ranges (where applicable) and demonstrate the assessment of:
 - blood pressure (BP)
 - BP by auscultation
 - BP by palpation
 - systolic pressure
 - diastolic pressure
 - pulse pressure
 - mean arterial pressure
 - venous pressure
 - hypertension
 - hypotension
 - pulse deficit
 - paradoxical pulse
 - apical heart rate
 - muffled heart sounds
 - tachycardia
 - bradycardia
13. Relate the physiological changes within the cardiac cycle to each phase of blood pressure measurement.
14. Describe and utilize the technique for blood pressure evaluation by palpation, auscultation and non-invasive BP monitoring (NIBP).

15. Explain the relationship between Korotkoff sounds and systolic and diastolic blood pressure.
16. Identify common sources of error when measuring blood pressure and state how each may be avoided.
17. List factors which affect blood pressure and explain the influence of each factor.
18. Interpret the relationship of the systolic and the diastolic pressure to cardiac output and peripheral resistance.
19. Identify the normal blood pressure ranges for the adult, child and infant.
20. Explain the reasons for changes in the systolic and diastolic pressures in relation to compensatory, decompensatory and failing physiological responses of the heart.
21. State the relationship between mean arterial pressure and perfusion.
22. Explain the causative factors relating to syncope and postural hypotension.
23. Identify normal respiratory rate ranges for the adult, child, infant and newborn.
24. Describe and demonstrate the assessment of the following as they relate to respiratory function:
 - respiratory rate
 - respiratory rhythm
 - respiratory volume
 - equality of air entry
 - respiratory sounds (normal, adventitious)
 - chest wall symmetry
 - use of accessory muscles
 - presence of retractions
 - nasal flaring, pursed lipped breathing
 - patient positioning (orthopnea, tripod, head bobbing)
25. Explain and utilize the technique for obtaining an accurate evaluation of the qualities of respiration listed above.
26. Describe the technique for assessing skin colour, temperature and moisture and the rationale for abnormalities of each.
27. Describe the technique for obtaining non-invasive temperature monitoring.
28. Explain the significance of changes in core temperature and their implications.

29. Explain the significance of changes in skin turgor including edema, pitted edema and tenting.
30. Explain the significance of the following skin colours and/or conditions:
 - flushed
 - rubor
 - ashen
 - jaundiced
 - cyanotic
 - pallor
 - central mottling
 - distal mottling
 - urticaria, erythema, pruritus
 - ulcerations/bed sores
31. Explain and demonstrate the assessment of a patient's level of awareness (LOA).
32. Explain and demonstrate the assessment of a patient's level of consciousness (LOC).
33. Differentiate between the use of the following stimuli used to elicit patient response:
 - verbal
 - loud verbal
 - tactile with loud verbal
 - pain
34. Identify the components of the Glasgow Coma Scale (GCS) and its application in determining neurological status.
35. State possible causes for variations in motor and sensory assessment findings.
36. Explain modifications used to assess the neurological status of special populations (pediatrics, mentally challenged, dementia).
37. Describe and demonstrate the assessment of pupil size, equality and reactivity.
38. Differentiate between normal and abnormal pupil responses.
39. State possible causes for variations in pupillary responses.
40. Describe the following terms as they apply to pupillary assessment:
 - pinpoint
 - fixed
 - dilated
 - brisk

- sluggish
41. Differentiate vital signs and assessment findings for each patient situation, which indicate compensation, decompensation and failure.
42. Demonstrate the ability to:

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
- turgor

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 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-elicite as required by using:

- verbal commands (stimuli)
- loud verbal commands (stimuli)
- tactile stimulus with loud verbal commands
- painful stimulus with loud verbal commands

Overall Assessment/Management

1. Demonstrate the ability to provide patient assessment and management in accordance with the BLS Patient Care Standards and ALS Patient Care Standards (Core and Auxiliary).
2. Rapidly assess and analyze patient responses to complex, undifferentiated and/or co-morbid health problems.
3. Demonstrate the ability to adapt care in dynamic, uncontrolled environments and complex situations.
4. 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
 - developmentally delayed
 - cognitively challenged
 - physically challenged
 - Gilles de la Tourette's Syndrome
 - hyperactivity with or without an attention deficit disorder (ADD / ADHD)

5. Demonstrate the integration of critical thinking and decision-making skills into patient assessment and management strategies.
6. Differentiate patient presentation across the lifespan and select and/or modify assessment techniques to accurately assess patients, including neonates, pediatric, obstetrical, adult and geriatric patients.
7. Interpret assessment findings through the use of diagnostic equipment including but not limited to pulse oximetry, non-invasive temperature monitoring, glucometric testing and end-tidal carbon dioxide monitoring.
8. Demonstrate the ability to anticipate and predict patient responses and adapt assessment techniques based on assessment findings.
9. Demonstrate the ability to interpret assessment findings towards a working diagnosis and implement the appropriate management strategies required.
10. Demonstrate the ability to adapt and/or prioritize preventive and therapeutic patient management strategies according to assessment findings, acuity, transport priority and destination options.
11. Provide and justify the rationale for the patient management strategies implemented.
12. Demonstrate the ability to evaluate the effectiveness of patient management strategies and prioritize, adapt and/or select new strategies based on reassessment findings.
13. Demonstrate the ability to recognize when patient care needs exceed the current scope of practice of the primary care paramedic or additional resources are required.
14. Differentiate between the CTAS levels and discuss the criteria for assigning a CTAS level to a patient based upon assessment findings.
15. Demonstrate the ability to assign the appropriate depart scene CTAS level to the patient.
16. Demonstrate the ability to recognize the need for initiating rapid transport as soon as possible during a patient call.
17. Demonstrate the ability to evaluate the timing of care and priority of transport considering the patient's condition, risk of deterioration and the proximity of definitive care.
18. Demonstrate the ability to determine the redirect, transfer or transport of the patient to the appropriate destinations in accordance with current regulatory framework and guidelines.

19. Demonstrate the ability to adapt transport priorities based on assessment/reassessment findings and on the evaluation of the effectiveness of patient management.

20. Discuss the choice of receiving facility destination as directed by:
 - dispatch
 - Field trauma triage guidelines
 - ST-Elevation Myocardial Infarction (STEMI) by-pass
 - Stroke by-pass

Airway, Suction, Ventilation and Oxygen Administration

Airway

1. Explain techniques utilized to assess airway patency.
2. Discuss conditions and/or situations that may compromise airway patency.
3. Describe and implement methods to maintain upper airway patency, including positioning.
4. Demonstrate the ability to manually position a patient's airway using:
 - head tilt – chin lift
 - jaw thrust
 - modified jaw thrust
5. Demonstrate the ability to manage a partial or total airway obstruction as per current Heart and Stroke Foundation of Canada Guidelines and BLS/ALS Patient Care Standards.
6. Describe and utilize a safe method for manual removal of a foreign body.
7. Summarize the indications and contraindications for the use of nasopharyngeal and oropharyngeal airway adjuncts.
8. Summarize the indications and contraindications for the use of various supraglottic airway adjuncts.
9. Demonstrate the method of measuring various airway adjuncts and the technique for the insertion of each.
10. Explain the methods to confirm placement of various airway adjuncts.
11. Demonstrate procedures to be performed when assisting an Advanced Care Paramedic in the advanced management of a patient's airway including:
 - cricoid pressure
 - BURP (backward, upward, right, pressure)
 - oral/nasal intubation
 - cricothyrotomy

Suction

1. Summarize the indications, complications and explain the rationale for oral, nasal, pharyngeal and tracheal bronchial suctioning of a patient.
2. Explain the advantages of placing the patient in a recovery position to promote drainage from the oral cavity.
3. Describe the various suction tips and catheters and the indications for the use of each.
4. Differentiate between the various suction devices including manual and mechanical suction units and demonstrate their use.
5. Describe the vacuum pressures, techniques and precautions when suctioning an adult, child and infant patient in the:
 - oral/pharyngeal cavity
 - nasal cavity
6. Explain the rationale for monitoring oxygen saturation when suctioning a patient.
7. Define:
 - stoma
 - laryngectomy
 - tracheostomy
8. Describe the method to be utilized when suctioning a patient with a tracheostomy/stoma.

Ventilation

1. State the oxygen concentration delivered to the patient with a bag valve mask with or without an oxygen source and/or reservoir bag.
2. State the advantages and disadvantages when ventilating a patient with a(n):
 - automatic transport ventilator
 - bag valve mask (BVM)
 - pocket mask
 - mouth to mouth technique
3. Identify factors which affect the ability to maintain a good seal with the ventilator face mask and demonstrate the technique for maintaining an air tight seal with the ventilator face mask.

4. State the appropriate rate and volume of positive pressure ventilation for an adult, child and infant.
5. Apply the concept of minute volume to providing assisted ventilations.
6. Evaluate the patient's oxygen and ventilation requirements and administer appropriate treatment utilizing SpO₂ and capnography as guides.
7. Modify ventilation techniques to maximize SpO₂ and End-Tidal Carbon Dioxide (ETCO₂) values.
8. Explain and demonstrate the technique used to ventilate a patient with and without various basic, intermediate and advanced airway adjuncts in place.
9. Identify patient conditions where alterations in rate and depth of ventilations may be required.
10. Describe the concept of lung compliance as it pertains to positive pressure ventilation.
11. Describe the causes of gastric insufflation during ventilation and the methods to prevent/correct this condition.
12. Explain the risks associated with gastric insufflation.
13. Describe the means of ventilating a patient with a stoma or tracheostomy.
14. Explain the following forms of ventilation:
 - Intermittent positive-pressure ventilation (IPPV)
 - Positive end-expiratory pressure (PEEP)
 - Bilevel positive airway pressure (BiPAP)
 - Continuous positive airway pressure (CPAP)
15. Describe and demonstrate the methods by which an ETCO₂ measurement is obtained and state the normal ETCO₂ range.
16. Explain the characteristics of an ETCO₂ waveform.
17. Identify situations that would warrant ETCO₂ monitoring.
18. Interpret potential reasons for and consequences of various ETCO₂ readings.

Oxygen

1. Explain the following laws as they apply to gases:
 - Boyle's Law
 - Charles Law
 - Dalton's Law
 - Henry's Law
2. Describe oxygen in terms of colour, odour, taste and combustion properties.
3. State the approximate percentage of concentration of the two main gases in the atmosphere.
4. State the litre capacity of D & M oxygen cylinders.
5. Describe the pin index safety system and state its purpose.
6. State the purpose and identify the regulation governing the hydrostatic testing of an oxygen cylinder.
7. State the precautions used when handling, transporting and storing oxygen cylinders.
8. Describe the purpose of a pressure regulator and the various types of flow meters.
9. Describe the precautions and procedure for changing an oxygen cylinder.
10. Calculate the length of time for maintaining oxygen administration at a given litre flow using the following formula:
$$\text{Duration of flow} = \frac{\text{P.S.I.} - 500 \times \text{factor}}{\text{L/min.}}$$
11. Identify the cylinder constant for a D and M sized oxygen cylinder.
12. State the purpose of administering humidified oxygen to patients and differentiate the situations requiring the administration of either humidified or non-humidified oxygen.
13. Define fraction of inspired oxygen (FiO₂) and identify the factors influencing FiO₂.
14. For each of the following devices, indicate the appropriate flow rate and expected FiO₂ being delivered:
 - partial non-rebreather mask
 - BVM with oxygen reservoir

- nasal cannula
 - simple face mask
 - pocket mask
 - automatic transport ventilator
15. Demonstrate the use of various oxygen delivery devices.
 16. State the effects that an increase or decrease in tidal volume will have on the FiO_2 with nasal cannula, simple face mask and partial non-rebreather mask.
 17. Identify the clinical indicators for the delivery of oxygen.
 18. Discuss the rationale for titrating oxygen delivery to maintain a SpO_2 no higher than approximately 96%.
 19. Explain the effects of hyperoxia and its physiological consequences.
 20. Identify the criteria used to evaluate the effectiveness of oxygen therapy.
 21. Explain instances when oxygen therapy may be considered toxic or detrimental to an individual.
 22. Discuss the modifications to oxygen delivery when managing a patient with Chronic Obstructive Pulmonary Disease (COPD).
 23. Explain the method by which a SpO_2 monitor measures oxygen saturation and demonstrate its use.
 24. Explain the characteristics of a SpO_2 waveform.
 25. Interpret potential reasons for and consequences of various pulse oximetry results.
 26. State the factors which contribute to a false pulse oximetry result.

Pharmacology

1. Outline the general stipulations of the Federal *Food and Drugs Act* as they pertain to medications.
2. Outline the Federal *Controlled Drugs and Substances Act* as it pertains to controlled and restricted drugs.
3. Define or explain the following:
 - pharmacology
 - pharmacokinetics
 - pharmacodynamics
 - adverse effects
 - indication
 - contraindication
4. Distinguish between the following drug nomenclatures:
 - chemical name
 - generic name
 - trade name
5. Explain the “rights” of drug administration.
6. Define the following terminology:
 - onset of action
 - duration of action
 - peak concentration
 - therapeutic dose/index
 - toxic dose
7. Explain the following abbreviations:
 - ac
 - od, bid, tid, qid
 - q2h
 - hs
 - pc
 - prn
8. Explain the factors which affect drug absorption.

9. Describe the following routes of administration and their respective times of onset of action.
 - oral
 - nasal
 - sublingual
 - buccal
 - rectal
 - transdermal
 - topical
 - vaginal
 - inhalation (metered dose inhaler, nebulizer)
 - intranasal
 - parenteral (IV, IM, SC, IO)
10. Explain drug distribution.
11. Define differential distribution as it applies to blood supply.
12. Briefly explain drug-protein binding in the circulatory system.
13. Explain the structure and functions of the blood brain barrier as they pertain to drug distribution.
14. Explain the structure and functions of the blood placental barrier as they pertain to drug distribution.
15. Explain the process of biotransformation and factors which may alter the process.
16. Differentiate between hepatic metabolism and hepatic first-pass effect.
17. Briefly explain the role of the hepatic microsomal enzyme metabolizing system.
18. Describe the routes through which drugs are excreted and factors which may alter the process.
19. Discuss the ways in which the following factors may modify drug effects and dosages:
 - age
 - body weight
 - gender
 - time of administration
 - route of administration
 - rate of metabolism and excretion
 - hepatic and/or renal failure

20. Briefly explain each of the following:
 - site of drug action
 - mechanism of drug action
 - drug-receptor interaction
 - drug-enzyme interaction
 - non-specific drug interactions

21. Define or describe the following characterizations of drug actions:
 - affinity
 - efficacy
 - agonist
 - antagonist
 - half life

22. Explain the following drug reactions and/or interactions:
 - synergism
 - potentiation
 - cumulative action
 - tolerance
 - tachyphylaxis
 - habituation

23. Explain the following undesired or adverse effects:
 - predictable (secondary)
 - hypersensitivity (allergic)
 - teratogenicity
 - mutagenicity
 - carcinogenicity
 - idiosyncrasy
 - drug dependency
 - drug addiction

24. For each medication identified in the PCP core medical directives and the PCP auxiliary medical directives identify and where applicable, provide the rationale for the:
 - indications
 - conditions
 - contraindications
 - routes of administration
 - dosages
 - clinical considerations
 - common side effects
 - onset of action
 - duration of action

- site of drug action
- mechanism of drug action

25. Given the following categories, identify commonly prescribed and/or field use medications for each and briefly describe their actions:

Medications affecting the central nervous system:

- opioid antagonists
- anticonvulsants
- antiparkinsonism agents
- anti-anxiety, anti-depressants
- neuroleptics
- non-narcotic analgesics
- opioid analgesics

Medications affecting the autonomic nervous system:

- adrenergic agonists
- adrenergic antagonists
- cholinergic agonists
- cholinergic antagonists
- antihistamines

Medications affecting the respiratory system:

- bronchodilators
- steroids

Medications affecting the cardiovascular system:

- antihypertensive agents
- cardiac glycosides
- diuretics
- antidysrhythmics (Class 1, 2, 3 and 4)
- antianginal agents

Medications affecting blood clotting mechanisms:

- anticoagulants
- thrombolytics
- platelet inhibitors

Medications affecting the gastrointestinal system:

- antiemetics

Medications affecting labour, delivery and postpartum hemorrhage:

- uterotonics
- tocolytics

Medications used to treat electrolyte and substrate imbalance:

- vitamin and electrolyte supplements
- antihypoglycemic agents
- insulin

Medications used to treat/prevent inflammatory responses and infection:

- corticosteroids
- Nonsteroidal anti-inflammatory drugs (NSAID)
- antibiotics
- immunizations

Medications used to treat poisoning and overdose:

- antidotes or neutralizing agents

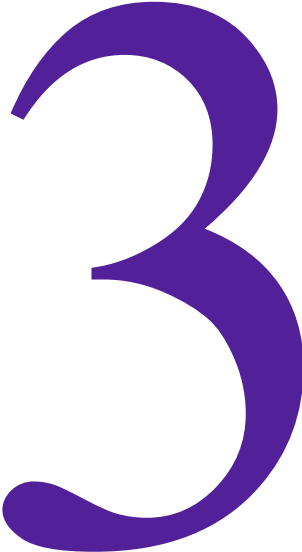
26. Describe the actions, use, contraindications and adverse effects for each of the medications administered by a PCP as per the ALS Patient Care Standards.
27. Briefly describe the action, use, contraindications and adverse effects for the following drug classifications:
- Angiotensin-converting enzyme (ACE) inhibitors
 - angiotensin receptor blockers
 - beta adrenergic blockers
 - calcium channel blockers
 - diuretics
 - nitrates
 - cardiac glycosides
 - antiplatelet agents
 - anticoagulants
 - thrombolytics
 - cholesterol lowering agents

Parenteral Therapy

1. Identify the risks to the paramedic associated with parenteral use and the procedures used to mitigate those risks.
2. Provide the rationale for the use of various sizes of syringe, gauge and needle length when performing an injection.
3. Describe and demonstrate the method used, the advantages and possible complications when administering medication via the subcutaneous route.
4. Describe and demonstrate the method used, the advantages and possible complications when administering medication via the intramuscular route.
5. Select the best locations for a venipuncture and intravenous (IV) infusion site and provide a rationale for each site.
6. List the reasons for which IV infusions are administered.
7. Identify the parts of an IV set.
8. Differentiate the indications and the number of drops/ml offered by a macrodrip versus a microdrip IV set.
9. Identify the purpose of a rate control delivery set.
10. Explain and demonstrate the preparation of IV equipment prior to IV initiation.
11. Identify and demonstrate the steps to be taken prior to, during and immediately following the insertion of an IV needle and catheter.
12. State and perform the calculations required to maintain the appropriate flow rate when a specific IV volume is ordered.
13. Set the drip rate required to maintain a “to keep vein open” (TKVO) infusion.
14. Identify factors which affect flow rate through a catheter and implement measures which should be taken to maintain the flow of the IV infusion.
15. Identify and assess for the manifestations of an interstitial IV and explain subsequent measures to be taken.

16. Identify the potential local, mechanical and systemic complications that may occur from IV therapy, their clinical presentations and prehospital management.
17. Describe and perform the responsibilities for maintaining asepsis while:
 - preparing the site for venipuncture
 - preparing or changing an IV bag
 - managing a dislodged or loosened IV tubing connection
18. Identify the information to be gathered before assuming responsibility for maintaining an IV infusion during a transfer.
19. Identify the commonly used solution for an IV infusion.
20. Distinguish between crystalloid and colloid IV fluids.
21. Differentiate between isotonic, hypotonic and hypertonic solutions.
22. Identify the indications for use of KCl, thiamine and multivitamins in IV solutions.
23. Identify the advantages of utilizing a heparin or saline lock for infusions.
24. Identify the types of infusions that patients may have infusing which do not require a medical escort to accompany the patient during an inter facility transfer.
25. Discuss the purpose and possible outcomes of fluid resuscitation in the pre-hospital setting.
26. Identify the indications and procedure for fluid bolus administration in the pre-hospital setting and possible complications.
27. Identify various types of central venous access devices (CVAD) and discuss their use in the out-patient setting.

Section 3 - Systems



Cardiovascular System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the heart:
 - pericardium, epicardium, myocardium, endocardium
 - right atrium, left atrium, right ventricle, left ventricle
 - interatrial septum, interventricular septum, atrial ventricular septum
 - tricuspid valve, mitral valve, aortic valve, pulmonary valve
 - inferior vena cava, superior vena cava, pulmonary veins, pulmonary arteries, aorta, coronary arteries
 - chordae tendonae, papillary muscle
 - apex and base
2. Trace the flow of blood from the vena cava to the aorta.
3. Identify the arterial and venous pressure changes which occur when blood flows from the left ventricle through the body and back to the left ventricle.
4. Describe the changes in blood flow that occur with each cardiac cycle.
5. Describe the function of the lymphatic system.
6. Describe the structure and function of arteries/arterioles, veins/venules and capillaries.
7. Locate the following major blood vessels:
 - aorta (ascending, arch, thoracic, abdominal)
 - mesenteric, renal arteries
 - iliac arteries (common, internal, external)
 - femoral artery/vein
 - popliteal, dorsalis pedis arteries
 - saphenous veins
 - brachiocephalic artery
 - subclavian, axillary, brachial, radial, ulnar artery/vein
 - metacarpal arteries/veins
 - vena cava (inferior, superior)
 - hepatic portal system
8. Identify the location point at which the coronary arteries branch off the aorta.

9. Identify the coronary artery branches and outline their distribution throughout the myocardium.
10. Identify the physiological factors which can increase/decrease coronary blood flow and therefore increase/decrease myocardial perfusion.
11. Describe the function of collateral arteries in the myocardium.
12. Explain the automaticity and rhythmicity properties of cardiac tissue.
13. Outline the components of the conduction system of the heart and identify the dominant pacemaker.
14. Outline the flow of impulses through the conduction system and explain the influence on each cardiac cycle.
15. Identify the intrinsic firing rates for the sinoatrial (SA) node, atrioventricular (AV) node and Purkinje system.
16. Identify the locations and functions of the internodal pathways.
17. 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.
18. Identify the sympathetic or parasympathetic nerves which innervate the SA node and AV node.
19. Explain the effects of the sympathetic and parasympathetic nervous system on heart rate, blood pressure, myocardial blood supply and vessel diameter.
20. Explain the term vagal dominance and the physiological outcome of vagal dominance of the heart and subsequently on the cardiac output.
21. Describe situations in which a patient may unintentionally stimulate a vagal response and the resulting consequences.
22. Describe the process of depolarization and repolarization of the myocardium.
23. Explain the role of various electrolytes during the phases of depolarization and repolarization of the myocardium.
24. Explain the significance of each waveform, complex and interval in an electrocardiogram (ECG) in relation to the electromechanical activities of the heart.

25. Explain the hemodynamic relationship to each configuration of the ECG.
26. 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.
27. Summarize the role of aortic and carotid baroreceptors (pressoreceptors) in influencing heart rate and blood pressure.
28. Summarize the effect of aortic and carotid chemoreceptors on blood pressure.
29. State the normal range of values for stroke volume.
30. Define cardiac output/minute in relation to stroke volume and heart rate.
31. Interpret the significance of a decreased or increased diastolic pressure on pulse rate, volume and cardiac output.
32. Interpret the significance of a decreased or increased systolic pressure on pulse rate, volume and cardiac output.
33. Define Starling's law and describe the effect of Starling's law of the heart on cardiac output.
34. Define ejection fraction in relation to cardiac output.
35. Describe the relation of cardiac contractility on cardiac output and the ejection fraction.
36. Describe the factors which influence venous return and its effect on cardiac output, cardiac perfusion and peripheral perfusion.
37. Describe the factors which influence stroke volume, heart rate and myocardial perfusion with a compensating and decompensating heart.
38. Identify the consequences of a decreased atrial kick on cardiac output.
39. Identify the consequences of a reduced clearing of blood volume in the right or left ventricle.
40. Describe the effect of a varied peripheral resistance on cardiac output, heart rate and the contractile force of the ventricle.
41. Define preload and afterload pressures and identify factors which influence each.

42. Explain the effect of increased preload and/or afterload on the workload and oxygen consumption of the myocardium.
43. Identify the source of epinephrine production.
44. Identify the stimuli which promote the release of epinephrine into the blood.
45. Describe the effect of epinephrine on blood vessels, blood pressure, heart rate and cardiac output.
46. Describe the effect of physiological (intrinsic) norepinephrine and dopamine on blood vessel diameter.
47. Identify the sources for the production of renin, angiotensin I and II and aldosterone.
48. State the factors which control renin production and release.
49. Explain the sequences of hormonal influences which occur in response to renin secretion.
50. Explain the outcomes of renin, angiotensin I and II and aldosterone on blood pressure and blood volume.
51. State the functions of the blood and identify the blood reservoirs in the body and their storage capacity.
52. State the locations of erythrocyte (RBC) production in the adult and child.
53. State the influence erythropoietin has on RBCs.
54. Identify the reasons erythropoietin is produced and secreted.
55. State the blood volume of an average adult, child and infant.
56. State the functions of and explain the clinical significance of altered values for:
 - plasma
 - erythrocytes (RBC)
 - leukocytes
 - lymphocytes
 - thrombocytes (platelets)
 - plasma proteins - albumin, fibrinogen, prothrombin, globulins

57. Define hematocrit and identify the influence of a loss in blood volume on the hematocrit value.
58. State the normal hemoglobin value for the adult male and describe the role of hemoglobin, iron and the RBC in maintaining oxygen transport to body cells.
59. Describe the required substances and the physiology events in the clotting process.
60. State the role of the liver in maintaining the clotting mechanism.
61. Describe the factors which influence the amount of bleeding in damaged tissues and organs.
62. Describe the reasons(s) little or no bleeding may temporarily occur with an amputation of an extremity.
63. State the four blood types and identify the universal donor and the universal recipient.
64. Describe the reason(s) for bleeding tendencies occurring in major pathologies, such as hemophilia, advanced leukemia and liver failure.

Pathophysiology of the Cardiovascular System

1. Define arteriosclerosis, identify its incidence and list the predisposing risk factors which contribute to its development.
2. Explain the developmental process and the potential pathophysiological consequences of arteriosclerosis.
3. Identify the possible diseases or disorders associated with the presence of arteriosclerosis.
4. Define coronary artery disease (CAD) and acute coronary syndrome (ACS).
5. State the most common causes and/or contributing factors to the development of hypertension (HTN) and hypertensive crisis.
6. Describe the pathophysiological processes, possible consequences and clinical manifestations for hypertension and hypertensive crisis.
7. Explain the pathophysiological consequences and rationale for hypertension causing:
 - an increased oxygen demand by the myocardium
 - a decreased oxygen supply to the myocardium
 - hypertrophy of the left ventricle

8. Explain the pathophysiological consequences of acute and chronic hypertension on kidney function.
9. State the most common causes and/or contributing factors to the development of angina.
10. Describe the pathophysiological processes, possible consequences and clinical manifestations of angina.
11. Describe the dynamics of development and consequences of myocardial ischemia in terms of imbalances in oxygen supply and oxygen demand.
12. Differentiate between stable, unstable and Prinzmetal's angina in terms of pathology and clinical manifestations.
13. State the most common causes and/or contributing factors to the development of an acute myocardial infarction (MI).
14. Describe the pathophysiological processes, possible consequences and clinical manifestations of a myocardial infarction.
15. Identify the zones of myocardial tissue associated with a myocardial infarction.
16. List the terms used to identify an MI by location and differentiate each one based upon the chamber affected and the coronary artery branch diseased.
17. Define collateral circulation and state its purpose during infarct and post infarct stages.
18. Summarize the major complications and their associated pathophysiology which frequently occur following a major myocardial infarction.
19. Explain the development of cardiogenic shock in association with an MI.
20. State the most common causes and/or contributing factors to the development of left sided heart failure (LSHF) and right sided heart failure (RSHF).
21. Describe the pathophysiological processes, possible consequences and clinical manifestations for LSHF and RSHF.
22. Explain the development of paroxysmal nocturnal dyspnea (PND) as it relates to LSHF.
23. Explain how LSHF and RSHF lead to the development of congestive heart failure (CHF).

24. Differentiate between the development of acute cardiogenic pulmonary edema versus chronic CHF.
25. Discuss the rationale for the implantation of a left ventricular assist device (LVAD) and differentiate between continuous flow and valvular flow devices.
26. List several reasons for cardiac arrest.
27. Differentiate between a hypoxic arrest and a sudden cardiac arrest.
28. Identify the types and common sites for arterial aneurysms.
29. State the most common causes and/or contributing factors to the development of aortic aneurysms.
30. Describe the pathophysiological processes, possible consequences and clinical manifestations of aortic aneurysms in the various locations.
31. Identify the rationale for modifications in the abdominal assessment for a patient with a suspected abdominal aortic aneurysm.
32. Describe the pathophysiological processes, possible consequences and clinical manifestations of a dissecting aorta in the various locations.
33. Given the following disorders:
 - endocarditis, myocarditis, pericarditis
 - peripheral vascular disease (peripheral atherosclerosis disease, varicose veins, phlebitis, thrombo phlebitis)
 - cardiac myopathies
 - valvular disorders
 - deep vein thrombosis
 - ventricular rupture
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.

ECG Assessment

1. Differentiate between an electrode and a lead.
2. Identify the bipolar leads and their limb placement.
3. Identify the unipolar augmentation leads.
4. Discuss augmentation as it applies to ECG interpretation.
5. Explain Einthoven's law.
6. Discuss the morphology of an impulse travelling to and away from a positive electrode.
7. Discuss the hexiaxial diagram of leads as it applies to direction of current flow.
8. Explain the delineations of ECG paper.
9. Discuss and demonstrate the method for obtaining a 3 or 4-lead ECG.
10. Identify patient conditions for which cardiac monitoring is recommended.
11. Discuss common causes for inaccurate ECG recordings.
12. Identify artifact and its effects on an ECG.
13. Discuss methods used to reduce the occurrence of artifact on an ECG.
14. Discuss the steps used to interpret an ECG.
15. Identify the pathophysiological reasons for the development of cardiac dysrhythmias e.g. ectopic foci, atrial stretch, hypoxia of the conduction system, etc.
16. Given the following cardiac rhythms/dysrhythmias:

Sinus rhythms:

- normal sinus rhythm
- sinus bradycardia
- sinus tachycardia
- sinus dysrhythmia
- sinus pause
- sinus arrest

Atrial dysrhythmias:

- premature atrial complex (PAC)
- atrial flutter
- atrial fibrillation
- wandering atrial pacemaker
- paroxysmal atrial tachycardia (PAT)
- supraventricular tachycardia (SVT), (PSVT)
- Wolff-Parkinson-White syndrome

Junctional dysrhythmias:

- junctional rhythm
- premature junctional complex (PJC)
- accelerated junctional
- junctional tachycardia

Blocks:

- first degree heart block
- second degree heart block, Mobitz I and II
- third degree heart block
- bundle branch blocks, (left and right)

Ventricular dysrhythmias:

- premature ventricular complex (PVC)
- ventricular bigeminy/trigeminy
- ventricular tachycardia
- ventricular fibrillation
- idioventricular, accelerated idioventricular rhythms

Other rhythms:

- agonal rhythm
- asystole
- paced rhythm (atrial, ventricular, AV sequential)

- a) Interpret each on an ECG.
- b) Differentiate the clinical manifestations and provide the rationale for their occurrence.
- c) Describe the consequences including; myocardial workload; oxygen demand of the myocardium; oxygen supply to the myocardium; cardiac output; systemic perfusion; thrombi development; and potential for life threat for each.

- d) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.
 - e) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.
17. Explain the role of cardioversion in the management of specific dysrhythmias.
 18. Identify and explain pulseless electrical activity (PEA).
 19. Identify circumstances when a 3 or 4-lead ECG versus a 12-lead ECG should be acquired and the diagnostic value of each.
 20. Discuss and demonstrate the method for obtaining a 12-lead ECG and a 15-lead ECG.
 21. Discuss the importance of limb and precordial lead placement in the acquisition of the 12-lead and 15-lead ECG.
 22. Describe the normal QRS complex deflections in each of the 12 leads on an ECG.
 23. Discuss 12-lead ECG findings that would warrant a modified 12-lead (right-sided) or 15-lead ECG.
 24. Discuss the concept of contiguous leads in identifying areas of damage within the myocardium.
 25. Given a 12-lead ECG, identify the following features:
 - P, Q, R, S, T waves
 - J-point
 - S-T segment
 - T-P segment
 - S-T depression
 - S-T elevation
 - T wave inversion
 - pathological Q waves
 26. Interpret the changes on a 12-lead ECG that may reflect evidence of:
 - myocardial ischemia
 - myocardial injury
 - myocardial infarct (STEMI)
 - electrolyte imbalances
 - pericarditis

27. Analyze the following on a 12-lead or modified 12-lead (right-sided) and/or 15-lead ECG:
- anterior myocardial infarction (MI)
 - septal MI
 - inferior MI
 - lateral MI
 - posterior MI
 - right ventricular MI

Assessment and Management for patients with Cardiovascular System disorders

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. Prioritize and perform patient assessments and interpret the assessment findings for a patient with cardiac pain/distress and explain the rationale for each.
4. Differentiate the questions to be asked and gather the information concerning the patient's chest pain to clarify the origin and determine severity.
5. Identify the questions to be asked and assessments to be performed when chest pain or distress is not present, yet cardiac dysfunction is suspected.
6. Identify typical differences in the descriptions of chest pain experienced by the cardiac patients of different age and gender.
7. Explain the importance of chest auscultation for the patient with chest pain or a known cardiac disorder.
8. Interpret the assessment findings of auscultation in relation to cardiac/respiratory function.
9. Explain the reasons for crackles and/or wheezes in a patient with a cardiac disorder.
10. Interpret those assessment findings which indicate cardiac compromise of a life-threatening nature.
11. Interpret significant data from the patient's medical history which suggest the presence of coronary artery disease.

12. Discuss single versus dual chamber pacemakers.
13. Discuss demand versus fixed rate pacemaker.
14. Discuss electrical and mechanical capture as they apply to a pacemaker.
15. Identify captured and non-captured pacemaker spikes on an ECG.
16. Identify the reasons for pacemaker failure.
17. Describe the assessment findings indicative of pacemaker failure.
18. Identify the purpose of an automatic implantable cardioverter/defibrillator (AICD).
19. Identify the precautions to be taken when caring for a patient with an AICD.
20. Identify the adjustment of electrode placement to be made when external defibrillation is required by a patient with a pacemaker or an AICD.
21. Discuss the prehospital and hospital management of acute coronary syndrome (ACS).
22. Discuss the modified treatment approach to ischemic chest pain in the setting of right ventricular infarction.
23. Discuss the possible differences in the management and transport of a cardiac patient with a STEMI positive ECG versus a non-STEMI ECG.
24. Identify the indications and contraindications for by passing a local hospital and transporting to a hospital with a 24/7 catheterization lab.
25. Define reperfusion therapy, fibrinolysis, percutaneous coronary intervention (PCI) and coronary artery by-pass graft (CABG).
26. Describe the pre-hospital role in reperfusion therapy.
27. Differentiate between rescue PCI and primary PCI.
28. Define continuous positive airway pressure (CPAP).
29. Explain the rationale for CPAP application in the field.
30. Describe the physiological advantages of CPAP application to a patient with pulmonary edema.

31. Explain the rationale for the use of pulse oximetry in conjunction with CPAP application.
32. Identify the various complications that can arise from CPAP application.
33. Discuss the current Heart and Stroke Foundation of Canada Guidelines in the management of cardiac patient.
34. Explain the electrical, circulatory and metabolic phases of a sudden cardiac arrest.
35. Identify the evidence-based interventions for each of the three phases of sudden cardiac arrest.
36. State the mortality rate for acute myocardial infarction.
37. Explain the importance of effective cardiopulmonary resuscitation (CPR) in cardiac arrest management and demonstrate CPR for the adult, child and infant.
38. Discuss methods to measure CPR effectiveness (compressions and ventilations).
39. Identify the role of end-tidal carbon dioxide monitoring (capnography) in evaluating CPR.
40. Discuss the development and prevention of 'compressor fatigue'.
41. Identify the two rhythms that are treated with defibrillation.
42. Explain the goal of defibrillation during cardiac arrest.
43. Demonstrate the integration of CPR and defibrillation in patient care in both the S-AED and manual modes.
44. Explain the relationship between the peri-shock pause and successful defibrillation.
45. Discuss the concept of myocardial stunning and the importance of CPR post defibrillation.
46. Differentiate between monophasic and biphasic defibrillation.
47. Explain the concept of transthoracic impedance as it relates to defibrillation.
48. Identify methods to minimize transthoracic impedance during defibrillation.
49. Demonstrate proper defibrillation pad selection and placement for various age groups.
50. Discuss paediatric defibrillation and weight based energy selection.

51. Explain the rationale and procedure for oxygen titration in the management of a post-arrest/return of spontaneous circulation (ROSC) patient.
52. Discuss the role of therapeutic hypothermia in the management of a post-arrest/ROSC patient in the pre-hospital and hospital environment.
53. List the criteria for the application of a Do Not Resuscitate order (DNR) in the pre-hospital setting.
54. List the criteria for the application of a Termination of Resuscitation (TOR) in the pre-hospital setting.
55. Given the cardiovascular system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Respiratory System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the respiratory system:
 - nose (nares, nasal bone/cartilage, cavities, septum, turbinates, conchae)
 - mouth (cribriform plate, palate, tongue, uvula, tonsils, pharynx)
 - larynx (cricoid, thyroid, epiglottic cartilage, vocal cords, glottis)
 - trachea, esophagus, cilia
 - bronchi (right and left mainstem), bronchioles, terminal bronchioles
 - hilum, apex and base of lung, diaphragm
 - pleura, pleural space
 - alveoli (type I cells, parenchyma-type II cells), alveolar ducts
2. Differentiate the structures of the upper airway from the lower airway.
3. Describe or define the following:
 - respiration (internal, external)
 - volumes (tidal, minute, inspiratory reserve, expiratory reserve, dead space, residual)
 - I:E ratio
 - intrapleural pressure
 - lung compliance
 - chest wall compliance
 - diffusion
 - capillary-perfusion membrane
 - hypoxia, anoxia
 - hypercapnia/hypercarbia
4. Explain the reason oxygen is required for the metabolism within each body cell.
5. Explain the way in which carbon dioxide is produced in each body cell and how it is removed from the body.
6. Identify the primary and accessory muscles involved in respiration and their innervations.
7. Explain the inspiratory and expiratory phases of the respiratory cycle including muscle involvement and intrapulmonic changes.
8. Identify the anatomical part of the brain which controls involuntary and voluntary respiration.

9. Describe the way in which the brain stem regulates respiration rate, volume and rhythmicity.
10. Describe the influence of the autonomic nervous system on respirations.
11. State the function of Herring-Breuer Reflex (stretch receptors).
12. List the external factors which may cause the respiratory pattern to vary in the individual.
13. Describe the relationship between oxygen levels, carbon dioxide/pH and chemo-receptors in controlling the rate and depth of respiration.
14. Summarize the location of the brain and circulatory chemoreceptors, which control rate and depth of respiration.
15. Outline the changes in pressure gradients and transport mechanisms for oxygen and carbon dioxide at the alveolar-capillary level and the cellular level.
16. State the normal values for PaO₂ and PaCO₂ for an adult.
17. Describe factors which lead to the development of hypercapnia/hypercarbia and its effects on respiration and blood pH.
18. Define hypocarbia and describe the factors which lead to the development of this state and its effects on respiration and blood pH.
19. Explain the four types of hypoxia.
20. Define hypoxemia and explain its effect on respirations.
21. State the influence of pH and temperature on oxyhemoglobin dissociation.
22. Explain the functions, locations and importance of the mast cells and goblet cells within the respiratory tract.
23. Describe the production and function of surfactant in relation to alveolar surface tension and the mechanics of ventilation.

Pathophysiology of the Respiratory System

1. Differentiate between respiratory distress, respiratory insufficiency, respiratory failure and hypoventilation including differing manifestations and their rationale.

2. Describe the influence of chest pain on the breathing pattern.
3. State the initial and prolonged effects of hypoventilation on arterial pH, pO₂ and pCO₂.
4. Describe the influence of anxiety on acute respiratory distress.
5. Given the following disorders:
 - acute respiratory failure
 - acute (adult) respiratory distress syndrome (ARDS)
 - aspiration (pneumonitis)
 - upper airway obstruction
 - chronic bronchitis
 - chronic emphysema
 - asthma / reactive airway disease
 - pleurisy
 - pleural effusion
 - pneumonia (viral, bacterial)
 - acute bronchitis
 - croup (also see pediatrics)
 - epiglottitis (also see pediatrics)
 - pulmonary edema (cardiogenic, non-cardiogenic)
 - pulmonary hypertension
 - pulmonary embolism
 - pulmonary fibrosis
 - cystic fibrosis
 - severe acute respiratory syndrome (SARS)
 - febrile respiratory illness (FRI)
 - hyperventilation syndrome
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
6. 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.

7. Describe the breakdown of the alveolar ducts and alveolocapillary units and the consequences to the lungs and subsequent perfusion as COPD progresses in its development.
8. Describe the reason for and consequences of acute and/or chronic air trapping in the air passages as COPD progresses in its development.
9. Describe the development and consequences of cor pulmonale.
10. Describe the role of leukotrienes, prostaglandins, histamine and other mediators in the progression of an asthma exacerbation.
11. Describe the concept of air trapping and the potential development of a pneumothorax in the asthma patient.
12. Describe status asthmaticus and discuss the life threat associated with it.
13. Describe the pathophysiological hemodynamic consequences of an acute pulmonary embolus based on size and location or of multiple disseminated emboli.
14. Explain the reasons for a ventilatory-perfusion deficit when primary or multiple emboli occur within the lungs.

Assessment and Management for patients with Respiratory System disorders

1. Describe the following respiratory assessments and abnormalities which may be associated with each:
 - inspection
 - palpation
 - auscultation
 - percussion
2. Describe the following normal breath sounds:
 - tracheal
 - bronchovesicular
 - vesicular
3. Demonstrate and explain the technique for auscultating chest sounds.

4. Locate the upper and lower anatomical borders of the lungs in an inflated state (full excursion).
5. Explain the reason for using the posterior chest as well as the anterior chest wall during auscultation.
6. Gather the pertinent incident and past medical history to be asked of a patient in respiratory distress.
7. Describe the following breathing patterns and explain their physiological consequences:
 - eupnea, apnea, bradypnea, tachypnea
 - hyperventilation, hypoventilation
 - dyspnea, orthopnea
 - Cheyne Stoke's respiration
 - Biot's rhythm
 - Kussmaul's respiration
 - agonal, ataxic, apneustic respirations
8. Explain the pathophysiological rationale for each of the following:
 - adventitious sounds (stridor, stertorous, wheezing, fine/coarse crackles, friction rub)
 - air entry (absent, diminished)
 - expiratory grunt
 - I:E ratio variations
 - hyporesonance, hyperresonance
 - variations in cough and sputum (production, colour)
 - accessory muscle use
 - indrawing/retractions (supraclavicular, sternal, intercostal)
 - nasal flaring
 - pursed lip breathing
 - tripod position
 - subcutaneous emphysema
 - jugular vein distension
 - tracheal deviation
 - hemoptysis
 - inspiratory pain
 - chest wall symmetry
 - paradoxical chest wall movement
9. Explain the specific assessment findings of the chest wall structures, movement and other abnormalities that relate to respiratory distress.
10. Explain the clinical significance of word dyspnea.

11. Identify the clinical indicators of chronic hypoxia.
12. Given the respiratory system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Thoracic Injuries

1. Given the following thoracic trauma:
 - penetrating injuries
 - hemothorax
 - open pneumothorax
 - spontaneous pneumothorax
 - tension pneumothorax
 - flail chest
 - rib fracture
 - cardiac tamponade
 - traumatic asphyxia
 - pulmonary contusion
 - myocardial contusion
 - great vessel rupture
 - ruptured diaphragm/diaphragmatic tears
 - tracheobronchial disruption
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
2. Describe paradoxical chest wall movement and air pendelluft as they relate to a flail chest.

Assessment and management for patients with Thoracic Injuries

1. Identify the rationale for the use of a 3-sided occlusive dressing or commercially available chest seal with one-way valve when treating an open chest wound.
2. Discuss the concerns and modifications to assisting the ventilations of a patient with a traumatic chest injury.
3. Given the thoracic injuries listed in this unit and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Nervous System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the nervous system:

The Brain

- brain stem (medulla oblongata, pons, midbrain, reticular activating system (RAS))
- cerebellum
- diencephalon (thalamus, hypothalamus)
- cerebrum (cortex, hemispheres, lobes, corpus callosum, gray matter, white matter, basal ganglia, limbic system)
- meninges (membrane, spaces, dural folds)
- ventricles
- cranial nerves

The Spinal Cord

- spinal canal
- spinal tracts (afferent, efferent, decussation)
- spinal nerves
- spinal reflexes

Nerves

- neuron (axon, dendrite, myelin sheath, neurolemma, synapse)
- nerve fibres (efferent, afferent, ascending, descending, reflex arcs)

Cerebral Blood Supply

- circle of Willis
- middle meningeal artery
- vertebral and carotid arteries
- venous return/sinuses

2. Describe the formation, constituents, circulation and location of cerebrospinal fluid (CSF).
3. Describe the divisions of the nervous system including:
 - central nervous system
 - peripheral nervous system
 - somatic nervous system
 - autonomic nervous system

- sympathetic nervous system
 - parasympathetic nervous system
4. Explain the following: depolarization, repolarization, absolute and relative refractory periods, resting membrane potential, action potential and transmission of the impulse across the synapse.
 5. Explain the role of the $\text{Na}^+ - \text{K}^+$ pump in nerve impulse transmission.
 6. Describe the transmission of a neural impulse across the neuromuscular junction.
 7. Discuss the function of the following neurotransmitters:
 - acetylcholine
 - norepinephrine
 - epinephrine
 - serotonin
 - dopamine
 - endorphins
 - enkephalins
 8. Describe the function and distribution of adrenergic (alpha and beta) and cholinergic (muscarinic and nicotinic) receptor sites.
 9. Contrast the effects of innervation by the sympathetic and parasympathetic nervous systems on major organs and structures in the body.
 10. Describe the structure, location and functions of the following components of the eye:
 - sclera, conjunctiva, cornea
 - lens, ciliary body, ciliary muscles, iris, pupil
 - anterior chamber, posterior chamber
 - aqueous humor, vitreous humor
 - retina, rods, cones, fovea centralis, optic chiasm, optic nerve, choroid layer
 - canal of Schlemm
 - lacrimal apparatus
 11. Describe the way in which the optic nerve and oculomotor nerve influences vision, eye function and pupillary response.
 12. Describe the structure, location and functions of the following components of the ear:
 - outer ear (auditory canal, tympanic membrane)
 - middle ear (malleus, incus, stapes)

- inner ear (cochlea, vestibule, semicircular canals, organ of Corti, otoliths, maculae, crista ampullaris)
 - eustachian tubes
13. Describe the pathway of auditory stimuli to the interpretive areas of the cerebral cortex.
 14. Identify the cranial nerves which control hearing.
 15. Describe the location, structures and function of the following components of the nose:
 - turbinates (nasal conchae)
 - nasal cartilage
 - cilia
 - nasal bones
 - septal cartilage
 - cribriform plate
 16. Identify the cranial nerve which controls the sense of smell.

Pathophysiology of the Nervous System

1. Define traumatic brain injury (TBI).
2. Differentiate between primary and secondary brain injury.
3. Differentiate the causes, distinguishing features and manifestations of various skull fractures (linear, depressed, open, basilar).
4. Given the following injuries/disorders:
 - cerebral concussion
 - diffuse axonal injury
 - cerebral contusion
 - epidural hematoma
 - subdural hematoma (acute, subacute, chronic)
 - intracerebral hemorrhage
 - subarachnoid hemorrhage (including cerebral aneurysms)
 - brainstem infarcts and/or hemorrhage
 - CVA (hemorrhagic and occlusive)
 - transient ischemic attack (TIA)
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.

- c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
5. Explain the coup-contrecoup brain injury.
 6. Identify the various causes of increasing intracranial pressure, including arterial and venous bleeding, edema formation, tumor development and shunt blockages.
 7. Describe the effect of histamine release with respect to formation of cerebral edema and subsequent increases in ICP.
 8. Discuss the progression of increasing ICP including neuronal compression, brain stem torsion and compression, tentorial and uncal herniations and coning.
 9. Describe the consequences of weakened arterial walls at points of bifurcation.
 10. Explain the influence of oxygen and carbon dioxide levels on the development of increasing intracranial pressure and neuronal function.
 11. Describe the pathophysiological basis for the following manifestations of traumatic and non-traumatic head/brain injuries:
 - altered levels of awareness/consciousness
 - altered neuro muscular responses
 - vasomotor instability responses
 - respiratory depression/irregularities
 - dysphasia
 - dysphagia
 - decerebrate, decorticate or other abnormal posturing
 - seizure activity
 - projectile vomiting
 - abnormal pupillary assessments (unilateral pupil dilation, fixed pupils, deviation of eyes)
 - Cushing's triad
 12. Given the following disorders:
 - meningitis (bacterial, viral)
 - meningococemia
 - encephalitis
 - a) Identify the most common causes, modes of transmission and/or contributing factors to the development of each.

- b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
13. Explain the etiology, precipitating factors/triggers and manifestations for the various types of headaches (including; tension, migraine, cluster, sinus headaches).
14. Explain the development and manifestations for each of the following:
- Parkinson's disease
 - multiple sclerosis (MS)
 - amyotrophic lateral sclerosis (ALS)
 - myasthenia gravis
 - Huntington's chorea
 - muscular dystrophy
 - Alzheimer's
 - cerebral palsy
 - Bell's palsy
 - Guillain-Barre syndrome
 - hydrocephalus
 - spina bifida
15. Differentiate between the following types of seizures in terms of origin, onset, location, progression and characteristics:
- grand mal (tonic/clonic)
 - petit mal (absence)
 - simple partial (Jacksonian, focal)
 - complex partial (psychomotor)
16. Describe the following as they apply to seizure activity:
- prodromal
 - aura
 - tonic
 - hypertonic
 - clonic/myoclonic
 - post ictal
 - automatism
17. Describe the pathophysiological basis for seizures developing from the following:
- space occupying lesions (tumors)

- scar tissue
 - metabolic disorders (hypoglycemia, acidosis, electrolyte imbalance)
 - drug/alcohol overdose/withdrawal
 - toxins
 - pyrexia
 - congenital
 - idiopathic
18. Define:
- epilepsy
 - status epilepticus
19. State the pathophysiological basis and/or cause(s) of status epilepticus and its potential consequences.
20. Define the following terms and describe the conditions in which they would be observed:
- disconjugate gaze
 - strabismus
 - nystagmus
 - ptosis
 - diplopia
 - photophobia
 - reduced peripheral field
 - glaucoma/acute glaucoma
 - cataract
21. Describe the causes, manifestations and consequences for each of the following injuries to the eye:
- flash/chemical burns
 - hyphema
 - scleral hemorrhage
 - retinal occlusion/detachment
 - corneal injuries
 - blowout fractures
 - enucleation
 - impaled/imbedded material
 - avulsion
 - globe or scleral rupture
 - conjunctivitis
22. Describe the causes, manifestations and the consequences for each of the following:
- otitis media/externa
 - otorrhea

- tinnitus
 - gross bleeding from the ear
 - vertigo
23. Describe the causes, manifestations and the consequences for each of the following:
- rhinorrhea
 - epistaxis (anterior, posterior)
 - sinusitis
 - traumatic injury

Assessment and Management for patients with Nervous System disorders

1. Collect and interpret information concerning the incident and patient history to determine the potential for head injury.
2. Identify manifestations which indicate the type and severity of damage created by head injury.
3. Identify assessment findings that would indicate injury (caused by irritation, compression, hypoxia, acidosis) to the following cranial nerves:
 - olfactory (I)
 - optic (II)
 - oculomotor (III)
 - facial (V)
 - abducens (VI)
 - vagus (X)
 - spinal accessory (XI)
4. Describe, differentiate and interpret the assessment findings which determine the type and degree of severity of head trauma or central nervous system (CNS) pathologies in relation to the following:
 - behavioural changes/agitation/cognitive dysfunction
 - changing pulse pressures
 - BP and pulse changes
 - eye deviations
 - photophobia/visual impairment
 - respiratory changes and patterns
 - otorrhea
 - rhinorrhea
 - periorbital ecchymosis
 - mastoid bruising
 - vomiting/projectile in nature

- abnormal posturing: decorticate/decerebrate/opisthotonus/trismus
 - nuchal rigidity
 - incontinence
5. Describe and implement specific assessments used to determine the possibility of a CVA.
 6. Determine those situations in which providing assisted ventilations and/or hyperventilation are advisable in the patient with increasing ICP.
 7. Identify the indications and contraindications for by passing a local hospital and transporting to a designated stroke centre.
 8. Identify the purpose of a computerized tomography (CT) scan or magnetic resonance imaging (MRI) in a patient with brain trauma and/or brain pathology.
 9. Explain the indications and contraindications for the use of thrombolytic agents in patients presenting with a CVA.
 10. State the risks associated with the insertion of a nasopharyngeal airway into a patient with a basilar skull fracture.
 11. State the reason for using a nasopharyngeal airway in managing a status epilepticus patient.
 12. Identify those assessment findings which may differentiate between bacterial and viral meningitis.
 13. Describe and implement measures and precautions for self-protection (PPE) during care and transport of a patient with meningitis.
 14. Identify the rationale for informing hospital personnel of suspicion of the patient having meningitis.
 15. Identify the questions to be asked to assist in differentiating the origin/type of headache experienced by the patient.
 16. Identify the situations and state the rationale and implement bandaging the uninjured eye when injury has occurred to the opposite eye.
 17. Describe the rationale for asking the patient to remove contact lenses when treating eye injuries.
 18. Given the nervous system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:

- a) Prioritize and perform patient assessments and explain their rationale.
- b) Formulate and implement priority managements and explain their rationale.

Spinal Injuries

1. Differentiate between torsion, burst, wedge and compression fractures of vertebrae and describe the type of cord damage which may result in each.
2. Identify the type of damage which occurs with each of hyperflexion, hyperextension, vertical compression, rotational and distraction force injuries to the spine.
3. Differentiate between a stable and an unstable spinal fracture.
4. Describe the importance of considering all unconscious or head injury patients as having potential for spinal cord injury.
5. Define and differentiate between spinal shock and neurogenic shock.
6. Explain the pathophysiological basis for the development of spinal shock and its potential consequences.
7. Explain the pathophysiological basis for the development of neurogenic shock and its potential consequences.
8. Identify and describe the rationale for the general manifestations of spinal cord injuries.
9. Identify and describe the rationale for the specific manifestations of lumbar, thoracic and cervical spinal cord injuries.
10. Differentiate between degenerative and traumatic type injuries of the spine.
11. Differentiate the manifestations, the consequences and pathophysiological basis for a:
 - cord concussion
 - cord contusion
 - cord compression
 - partial transection of the cord
 - complete transection of the spinal cord
 - central cord syndrome
 - Brown-Séquard syndrome

12. State the reasons for early or late onset and/or early or latent resolution of a patient's manifestations from a spinal cord injury.
13. Identify the approximate level of spinal cord injury, given the findings of a patient's neurological examination.
14. Differentiate between hemiplegia, paraplegia and quadriplegia.
15. Describe the pathophysiological basis for impaired diaphragm, bowel and bladder functions in a patient with spinal cord injury.
16. Describe the dynamics and consequences of a whiplash injury.
17. Describe the etiology, development, manifestations and consequences for each of the following:
 - ruptured intervertebral disc
 - herniated intervertebral disc
 - degenerative disc disease

Assessment and Management for patients with Spinal Injuries

1. Interpret information concerning the incident and patient history to determine the potential for spinal injury.
2. Differentiate between a rapid trauma survey and a focused exam and when each would be employed.
3. Explain and demonstrate the modifications to be made when conducting a primary survey of a potential spinal cord injured patient.
4. Explain and demonstrate the modifications to be made when conducting a secondary survey of a potential spinal cord injured patient.
5. Identify the technique to be used to minimize head and neck movement when removing a helmet from a patient suspected of spinal injury.
6. Demonstrate the proper technique for manually stabilizing and positioning the cervical spine during spinal motion restriction (SMR).
7. Demonstrate the proper sizing and application of a C-collar and discuss the importance of applying the C-collar prior to moving the patient whenever possible.

8. Describe and implement the measures to ensure spinal motion restriction during extrication using the spinal board, adjustable break away stretcher or spinal immobilization extrication device.
9. Discuss special considerations in spinal motion restriction during extrication as they apply to the following circumstances:
 - water emergencies
 - pediatric patient
 - elderly patient
 - bariatric patient
10. Demonstrate the following techniques for moving a patient with a suspected spinal injury, while maintaining spinal motion restriction:
 - log roll onto spinal board
 - from ground to stretcher via adjustable break away stretcher or spinal board
 - from vehicle to stretcher via self-extrication with stand/turn/pivot
 - from vehicle to stretcher via spinal board or spinal immobilization extrication device.
 - from bed to bed via slider board, slider sheet or sheet pull
 - removal of patient from spinal board or adjustable break away stretcher
11. Given the spinal injuries listed in this unit and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Endocrine System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the endocrine system:
 - pineal gland
 - pituitary gland
 - thyroid gland
 - parathyroid gland
 - pancreas
 - adrenal glands
 - ovaries
 - testes
2. Explain the role of the various hormones secreted by these endocrine glands.

Pathophysiology of the Endocrine System

1. Explain the functions of insulin in the body.
2. Identify the body's fuel sources for metabolic functions, in order of priority.
3. Relate the function of the pancreas to insulin and glucagon production and cellular metabolism.
4. Explain the role of the liver in maintaining blood glucose levels.
5. State the normal blood glucose level in mmol/L.
6. Identify the specific cells of the pancreas which produce insulin and glucagon.
7. Define:
 - glycolysis
 - glycogenolysis
 - gluconeogenesis
8. 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

9. Identify those body cells which must have glucose actively transported across their cell membrane walls versus those which can utilize free glucose without an active transmitter substance.
10. Define the following terms:
 - juvenile diabetes
 - gestational diabetes
 - late onset diabetes
 - type 1 diabetes
 - type 2 diabetes
11. Differentiate between insulin dependent diabetes mellitus (IDDM) and non-insulin dependent diabetes mellitus (NIDDM) given the following headings:
 - predisposing factors
 - intrinsic production of insulin and/or glucagon
 - pathophysiological processes
 - microvascular and macrovascular changes
 - consequences
 - early versus late manifestations
12. Given the following disorders:
 - hypoglycemia (insulin shock)
 - hyperglycemia (diabetic coma, diabetic ketoacidosis)
 - hyperosmolar hyperglycemic non-ketotic acidosis (HHNK)
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
13. Discuss issues relating to the uncontrolled (brittle) diabetic.
14. Given the following disorders:
 - Addison's disease
 - Cushing's disease
 - pheochromocytoma
 - adrenal crisis

- diabetes insipidus
 - hyperthyroidism (thyroid storm)
 - hypothyroidism
 - hyperaldosteronism
- a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.

Assessment and Management for patients with Endocrine System disorders

1. Briefly describe the following clinical tests:
 - glucose tolerance test
 - urine dextrose stick
2. Explain the procedure for the use of a glucometer in measuring a patient's blood glucose level.
3. State blood glucose levels for acute hyperglycemia and acute hypoglycemia.
4. Given the following diabetic control methods, explain how each is used:
 - diet and exercise
 - oral antidiabetic agents
 - continuous subcutaneous insulin infusion pump
 - insulin injections
 - self-glucose monitoring
5. Discuss the differences in the actions of oral antidiabetic medications in classes such as biguanide drugs and sulfonylureas.
6. Given a list of insulin types, identify:
 - peak time
 - duration time

7. Given the endocrine system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Musculoskeletal System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the musculoskeletal system:
 - skull bones (sutures, fontanelles), facial bones
 - cervical, thoracic, lumbar, sacral, coccygeal spine
 - vertebral body, processes, spinal canal
 - sternum, ribs
 - clavicle, scapula, humerus, radius, ulna, carpals, metacarpals, phalanges
 - pelvis (ilium, ischium, pubis), femur, tibia, fibula, patella, tarsals, metatarsals, phalanges
 - major muscles of the face, neck, shoulder, arm, chest, abdomen, pelvis, leg
2. Explain the significance, function and differences in structure and/or distribution in the child versus adult of the following components of a bone:
 - periosteum, endosteum, articular surface
 - diaphysis, epiphysis, epiphyseal plate
 - compact bone, spongy bone
 - red bone marrow, yellow bone marrow, medullary cavity
3. Describe the process of bone growth, remodeling and repair.
4. Identify the age at which the fontanelles close and sutures ossify.
5. Describe the structure and function of the following as they apply to joints:
 - capsule, synovial membrane, synovial fluid
 - cartilage, ligaments, tendon, bursae
 - muscle origin, muscle insertion
 - ball and socket, hinge, gliding, limited motion (slightly moveable), fused (immoveable)
6. Describe the following as they relate to muscle function:
 - physiological dynamics of a muscle contraction and relaxation
 - chemical mediators/neurotransmitters which are liberated at the motor end plate
 - role of Ca^{++} ions and the Na^{+} and K^{+} pumps in the transmission of a nerve impulse and contraction and relaxation of a muscle
 - physiological mechanism of a muscle spasm and associated pain
 - relationship of oxygen debt to the development of muscle pain

Pathophysiology of the Musculoskeletal System

1. Given the following musculoskeletal conditions:
 - strain, sprain
 - dislocation, subluxation
 - fracture (greenstick, transverse, spiral, oblique, impacted, comminuted, simple, compound, angulated)
 - skull fracture (linear, depressed, basilar)
 - facial fracture (zygoma, orbit, nasal, maxilla, mandible, LeFort)
 - avulsed tooth
 - vertebrae fracture/displacement (atlas, axis, cervical, thoracic, lumbar, sacral, coccygeal)
 - shoulder girdle (fracture, dislocation)
 - upper extremity fractures
 - rib/sternum (fracture, separation, flail)
 - pelvic fracture, hip fracture
 - lower extremity fractures
 - compartmental syndrome
 - intervertebral disc (herniation, protrusion, degenerative disease)
 - scoliosis, kyphosis, lordosis
 - arthritis (osteoarthritis, rheumatoid), bursitis
 - gout
 - osteoporosis
 - osteomyelitis, osteomalacia, rickets
 - muscular dystrophy

- a) Identify the most common causes and/or contributing factors to the development of each.

- b) Describe the pathophysiological processes of each.

- c) Analyze the possible consequences for each.

- d) Differentiate the clinical manifestations of each.

Assessment and Management for patients with Musculoskeletal System disorders

1. Describe the mechanisms of injury which may lead to the above injuries.

2. Identify and perform circulatory and neurovascular assessments pre-and post-immobilization and identify the assessment findings indicative of circulatory and/or neurovascular compromise in relation to an extremity fracture.
3. Given a list of common splints, classify them as rigid, semi-rigid (flexible), soft or traction splints.
4. Identify the principles of immobilization and splinting of a fracture(s).
5. Describe and implement the most effective immobilization method for each type of fracture listed.
6. Explain the reasons for realigning an angulated fracture.
7. Describe and implement the appropriate method of realigning an angulated fracture(s) prior to immobilization.
8. Explain the reasons for utilizing traction prior to immobilization and the rationale for using traction devices.
9. Identify the factors and implement the guidelines governing the amount of traction to be utilized when utilizing a traction device.
10. Describe and implement measures to stabilize a possible fractured pelvis including the use of a circumferential sheet wrap or commercial device in conjunction with a spinal board or adjustable break away stretcher.
11. Describe and implement measures to reduce swelling and pain.
12. State the common post-fracture complications which may develop.
13. Discuss the rationale for the following order of splinting priorities:
 - spine (neck, thoraco-lumbar, head)
 - pelvis
 - femurs
 - lower legs
 - upper limbs
14. Given the musculoskeletal system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.

- b) Formulate and implement priority managements and explain their rationale.

Skin and Soft Tissue

Anatomy and Physiology

1. State the major functions of the skin.
2. Identify the location and explain the function of the following components of the skin:
 - epidermis, dermis, subcutaneous layers
 - stratum germinativum
 - sweat gland, sebaceous gland, hair follicle
 - nerve endings, blood supply

Pathophysiology of Skin and Soft tissue injury

1. Describe the process of the inflammation and its rationale in relation to open and closed soft tissue injuries.
2. Given the following soft tissue injuries:
 - blunt injury
 - penetrating injury
 - abrasion
 - laceration, incision
 - contusion, ecchymosis, hematoma
 - petechia
 - avulsion
 - amputation
 - puncture, impalement
 - arterial bleed, venous bleed
 - crush injury/syndrome
 - necrotizing fasciitis
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.

3. Describe the pathophysiology of a crush injury as it relates to the following:
 - electrolyte balance
 - blood pressure
 - fluid volume
 - myoglobin
 - rhabdomyolysis

Assessment and Management for patients with Skin and Soft tissue injury

1. Explain the reason for recovery and transport of an amputated body part and avulsed tissue to the emergency department.
2. Describe and implement the prescribed method to preserve the integrity of amputated or avulsed body parts during transport.
3. Explain the principles to be followed when bandaging an extremity.
4. Identify and perform circulatory and neurovascular assessments pre-and post bandaging and identify the assessment findings indicative of circulatory and/or neurovascular compromise.
5. Describe and implement the techniques for controlling bleeding.
6. Determine the indications for the application of the following and demonstrate their use:
 - pressure dressing
 - occlusive dressing
 - pressure points
 - tourniquet
 - hemostatic agent
7. Describe the possible adverse effects on the soft tissue distal to a tourniquet.
8. State precautions to be considered when applying direct pressure to vessels in the neck.
9. Identify situations when irrigation of soft tissue injuries is recommended and provide the rationale for irrigation.
10. Describe and implement measures to reduce the risk of wound infection.
11. Explain the concept of utilizing aseptic technique when dressing a wound.

12. Describe and implement the precautions to be considered when a patient's clothing is adhered to a wound.
13. Describe and implement methods for securing an impaled object and dressing the associated wound.
14. Identify the specific situation(s) in which an impaled object should be removed.
15. Given the soft tissue injuries listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Gastrointestinal System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the gastrointestinal (GI) system:
 - layers of GI tract wall (muscle, submucosa, mucosa, villi)
 - esophagus
 - stomach (cardiac orifice/sphincter, fundus, body, pyloric sphincter)
 - small intestine (duodenum, jejunum, ileum)
 - mesentery (mesenteric arteries/veins)
 - large intestine (ascending, transverse, descending, cecum, vermiform appendix, sigmoid, rectum)
 - anal canal (internal/external sphincters)
 - liver (hepatocytes, Kupffer cells, hepatic duct)
 - gall bladder (cystic duct, common bile duct, ampulla of Vater)
 - pancreas (pancreatic duct, alpha cells, beta cells, Islets of Langerhans, pancreatic juice, endocrine function, exocrine function)
 - spleen
 - peritoneum (parietal, visceral layers)
2. Differentiate between the mechanical and chemical breakdown of food through the GI tract.
3. Identify and explain the function of the substances/enzymes which contribute to the chemical breakdown of food thereby facilitating their absorption in the:
 - mouth
 - stomach
 - small intestine

Pathophysiology of the Gastrointestinal System

1. Differentiate between the following processes as they relate to abdominal disorders:
 - inflammation
 - obstruction
 - perforation
 - hemorrhage
 - ischemia
 - ulceration
2. Define and/or explain the significance of:

- hematemesis
 - hematochezia
 - melena
 - dysphagia
 - endoscopy
 - laparoscopy
 - laparotomy
 - ascites
3. Describe the following and explain their clinical significance:
- Rovsing's sign
 - Kehr's sign
 - McBurney's point
 - tilt test
 - referred pain
 - rebound tenderness
 - involuntary guarding
 - point tenderness
4. Given the following disorders:
- esophageal varices
 - esophagitis
 - Mallory-Weiss syndrome
 - hiatus hernia
 - esophageal reflux, gastroesophageal reflux disease (GERD)
 - abdominal, inguinal hernia
 - ulcers (gastric/duodenal)
 - bowel obstruction/perforation
 - appendicitis
 - cholelithiasis, cholecystitis (calculi, biliary colic)
 - hepatitis, cirrhosis and associated portal-hepatic hypertension
 - pancreatitis
 - splenic rupture
 - gastritis, enteritis
 - viral gastroenteritis (rotavirus, adenovirus, norovirus)
 - bacterial gastroenteritis (clostridium difficile, E. coli)
 - peritonitis
 - inflammatory bowel disease (ulcerative colitis, colitis ileitis, Crohn's disease)
 - diverticulitis
 - hemorrhoids
 - upper GI bleed

- lower GI bleed
 - anal fissure
 - prolapsed rectum
- a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
5. Explain the types of obstructions, their consequences and clinical manifestations which may occur within the:
 - throat
 - esophagus
 - stomach
 - small intestine
 - large intestine
 - biliary duct
 - pancreatic duct
 - ampulla of Vater site
 6. List the most common bacteria and parasites which affect the GI system and identify their clinical manifestations.
 7. State the most common causes and complications of:
 - constipation
 - diarrhea
 - vomiting
 8. Describe the need for and the consequences of surgical removal of a portion of the stomach, duodenum, ileum, jejunum and/or colon.
 9. Explain the following conditions and identify any implications regarding patient management:
 - end to end anastomosis
 - ileostomy
 - jejunostomy
 - colostomy

Assessment and Management for patients with Gastrointestinal System disorders

1. Describe the types of abdominal pain, the reason for each and the way each may be described by the patient.
2. Formulate and utilize a repertoire of focused questions to be used for a patient whose chief complaint is acute abdominal pain.
3. Explain the significance of each of the following findings that may be observed during visualization of the abdomen:
 - pulsating mass
 - distension
 - ascites
 - discolouration
 - surgical scars
4. Explain the significance of each of the following findings that may be encountered during palpation of the abdomen:
 - rigidity
 - guarding
 - tenderness
 - rebound tenderness
 - masses
5. Explain the significance of each of the following findings that may be heard during auscultation of the abdomen:
 - normal bowel sounds
 - hypoactivity
 - hyperactivity
6. Explain the reasons for avoiding abdominal palpation upon finding a pulsating abdominal mass.
7. Describe the most effective method to use when palpating the abdomen and testing for rebound tenderness.
8. Briefly explain the following diagnostic procedures:
 - paracentesis
 - peritoneal lavage
 - gastric lavage
 - laparoscopy

- endoscopy
 - gastroscopy
 - colonoscopy
9. Given the GI system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
- a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Abdominal Injuries

1. Differentiate between the damage caused by penetrating injury versus blunt injury to abdominal organs.
2. Identify the abdominal and pelvic organs/structures which are most prone to rupture versus tears/lacerations and the possible consequences for each.
3. Identify and locate the major organs which may be a source of acute abdominal hemorrhage.
4. Identify and locate the major organs which may be a source of a retroperitoneal bleed.
5. Discuss the possible consequences of abdominal evisceration.
6. Provide the rationale for the application of a moist sterile dressing covered by an occlusive dressing when managing an abdominal evisceration.

Assessment and Management for patients with Abdominal Injuries

1. Given the abdominal injuries described in this unit and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Renal System

Anatomy and Physiology

1. Identify the location and explain the function of the following components of the renal system:
 - kidney (renal capsule, cortex, medulla, hilum, nephron, Bowman's capsule, glomerulus, renal tubules, afferent and efferent arterioles, peritubular capillaries)
 - ureters
 - bladder (trigone, detrusor muscle)
 - urethra (internal and external sphincters, meatus)
2. Explain the way glomerular filtration is affected by and/or influences the following:
 - blood volume (hypo/hypervolemia)
 - urine production
 - blood pressure
 - erythropoiesis and red blood cell maturation
 - regulatory hormones (antidiuretic hormone (ADH), aldosterone, angiotensin/renin)
 - blood osmolality
3. Explain the processes by which urine is produced.
4. Identify the normal constituents and pH of urine.
5. Identify the normal urinary output/hour, per day for the adult, child and infant.
6. Explain the role of pressure receptors, the autonomic nervous system and the spinal cord reflex in emptying the bladder.
7. 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.
8. Describe the way in which the kidney controls fluid and acid/base balance.
9. Identify the means by which glucose is reabsorbed and/or excreted in the kidney tubules.

Pathophysiology of the Renal System

1. Given the following disorders:
 - anuria

- dysuria
 - hematuria
 - oliguria
 - glomerulonephritis
 - nephrosis
 - tubular necrosis
 - acute and chronic renal failure
 - uremia
 - urinary tract infection (UTI)
 - neurogenic bladder
 - renal colic
 - obstruction (kidney, ureter, bladder, urethra)
 - tumor (kidney, bladder, urinary tract)
- a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
2. Identify the function of dialysis for the patient with kidney failure.
 3. Differentiate between the mechanisms of hemodialysis and peritoneal dialysis.
 4. Explain the ways in which access to the patient's blood is achieved for both types of dialysis.
 5. Identify the manifestations and reason for the following occurring as post dialysis complications during transport to or from hospital to home:
 - hypotension
 - hyperkalemia
 - fistula/graft or shunt hemorrhage
 - chest pain
 - hypertension
 - acute cardiogenic pulmonary edema
 - dysrhythmias
 6. Describe the pathophysiological processes, possible consequences and clinical manifestations of blunt or penetrating trauma to the kidney area or pelvic region.

Assessment and Management for patients with Renal System disorders

1. Identify reasons and/or purposes of suprapubic and indwelling urinary urethral catheters.
2. Identify the discomforts that may be expressed by patients with an indwelling urinary catheter and identify the associated reasons for such discomfort.
3. Describe and implement the techniques to maintain urinary flow in the direction of the drainage system and prevent the tension/trauma to the indwelling site.
4. Explain the potential for the development of infection of a patient with an indwelling catheter.
5. Identify the importance of recording and reporting the urinary output.
6. Identify situations and/or conditions for which an emergency disconnect from home dialysis may be required.
7. Explain the process of performing a home dialysis emergency disconnect.
8. Given the renal system disorders listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Reproductive Systems

Male Anatomy and Physiology

1. Identify the location and explain the function of the following male reproductive structures:
 - urethra
 - prostate gland
 - external meatus
 - scrotum
 - testes
 - penis
 - vas deferens
 - epididymis
 - seminiferous tubules
2. Identify and explain the function of the hormones which regulate the functions of the male reproductive system.

Pathophysiology of the Male Reproductive System

1. Identify the types of soft tissue injuries and the manifestations that may occur to the external/internal male genitalia.
2. Given the following disorders:
 - priapism
 - testicular torsion
 - urethritis
 - syphilis
 - genital herpes
 - prostatitis
 - prostatic hypertrophy (hyperplasia) – benign
 - prostate cancer
 - testicular cancer
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.

- c) Analyze the possible consequences for each.
- d) Differentiate the clinical manifestations of each.

Female Anatomy and Physiology

1. Identify the location and explain the function of the following female reproductive structures:
 - urethra, urinary meatus
 - ovaries
 - fallopian tubes
 - vagina, vaginal orifice
 - uterus, endometrium, myometrium
 - cervix
 - perineum
 - labia majora, minora
2. Identify and explain the function of the hormones which regulate the functions of the female reproductive system.

Pathophysiology of the Female Reproductive System

1. Given the following disorders:
 - perineal trauma
 - menstrual disorders
 - vaginal bleeding
 - ectopic pregnancy
 - uterine prolapse
 - pelvic inflammation disease (PID)
 - vaginitis
 - ovarian cyst
 - endometriosis
 - cervix cancer
 - ovarian cancer
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.

d) Differentiate the clinical manifestations of each.

Assessment and Management for patients with Reproductive System disorders

1. Given the reproductive system disorders (male and female) listed under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Section 4 - Disorders

4

Behavioural Disorders

1. Differentiate the behavioural patterns of neuroses and psychoses.
2. Given the following disorders and/or patterns of behaviour:
 - withdrawal
 - depression
 - anxiety
 - agitation/hyperactivity
 - hostility/violence
 - delirium
 - excited delirium
 - delusion
 - paranoia
 - phobia
 - conversion hysteria
 - obsession
 - hallucination
 - schizophrenia
 - manic depression
 - bipolar disorder
 - chronic alcohol abuse
 - substance abuse
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the patient assessment findings and behaviours which may be demonstrated in each.
 - c) Describe the therapeutic approaches for each and provide the rationale for each approach.
3. Relate suicide and suicide attempts to age, sex, situational crisis and developmental crisis.
4. Describe typical behaviour patterns of an acutely depressed individual prior to a suicide attempt.
5. Describe and utilize therapeutic approaches and select management strategies when caring for a suicidal patient.

6. Discuss the importance of direct questioning of the suicidal patient regarding suicide ideation and the existence of a plan.
7. Describe the following strategies which can be utilized to assist the out of control or the potentially violent individual:
 - safety of self
 - de-escalating the situation
 - providing an exit
 - reducing stimuli/separate antagonists
 - means of allowing a cooling down
 - avoiding the use of force and/or restraint
 - restraining self from retaliating
 - setting positive expectation/setting limits
 - acknowledgement/encouragement in expressing feelings
 - statements of reality/consequence
8. Identify the reasons and situations in which a patient may need to be restrained.
9. Describe the methods of restraining a patient and the precautions to be taken while the patient is restrained.
10. Describe the way in which the paramedic's disposition may positively or negatively influence the mentally disturbed patient.
11. Identify and incorporate those legal implications which need to be considered when transferring or transporting a patient according to the Mental Health Act.

Stress and Pain

Stress

1. Define or explain:
 - stress
 - anxiety
 - stressor
 - life stress factors
 - coping mechanisms
 - support systems
2. Differentiate between initial versus prolonged stress response in terms of:
 - pathophysiology of response
 - physical and psychological manifestations
 - effect on existing illness or injury
3. Differentiate between the behavioral manifestations of a normal, exaggerated or panic level of stress/anxiety.
4. List and explain several factors which influence adaptability to stress.
5. Identify common stress related disorders and briefly explain their development.

Pain

1. Differentiate between the following types of pain:
 - localized
 - referred
 - radiating
 - intractable
 - phantom
 - somatic
 - visceral
 - acute
 - chronic
2. State the physiological and protective function of pain.
3. Identify the effect of peripheral sensory input on pain perception and the role of nociceptors.

4. Explain the physiological, somatic and psychological response to pain.
5. State and explain the factors which vary one's reaction to pain.
6. Describe the influence of anxiety on the degree of pain experienced.
7. Interpret the manifestations and assessment findings, which indicate the patient's degree of pain.
8. Discuss the barriers to effective pain management.
9. Discuss pain assessment strategies in the pediatric, adult and geriatric populations.
10. Discuss non-pharmacological pain control interventions.
11. Discuss pharmacological pain control interventions.
12. Formulate and implement priority managements for pain control (as per BLS/ALS Patient Care Standards) and provide their rationale.

Fluids and Electrolytes

1. Define and apply a percentage of total body weight and/or total fluid volume to:
 - total body water
 - intracellular fluid
 - extracellular fluid
 - interstitial fluid
 - intravascular fluid
2. Define:
 - electrolyte
 - ion, cation, anion
 - colloid, crystalloid
 - mEq/L
 - isotonic solution
 - hypertonic solution
 - hypotonic solution
 - pH
 - buffer
 - acidosis
 - alkalosis
3. Identify the main location (intracellular/extracellular) and function of the following:
 - potassium
 - calcium
 - sodium
 - chloride
4. Explain the process of osmosis, simple and facilitated diffusion and active transport.
5. Explain the way in which colloids and/or crystalloids influence fluid balance in the body's fluid compartments.
6. State the normal pH of the blood.
7. Describe the role of the buffer, respiratory and renal systems in maintaining acid base balance.
8. Explain the relationship between potassium and hydrogen ions in acid/base balance.
9. Explain Starling's law of capillary forces in terms of fluid movement.

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

11. Explain the process of edema formation as it relates to:
 - colloid osmotic pressure
 - capillary hydrostatic pressure
 - capillary permeability
 - lymphatic blockage
 - a state of profound acidosis

12. Given the following disorders:
 - hypokalemia
 - hyperkalemia
 - hyponatremia
 - hypernatremia
 - hypocalcemia
 - hypercalcemia
 - respiratory acidosis
 - respiratory alkalosis
 - metabolic acidosis
 - metabolic alkalosis
 - dehydration
 - overhydration
 - edema
 - a) Identify the most common causes and/or contributing factors to the development of each.

 - b) Describe the pathophysiological processes of each.

 - c) Analyze the possible consequences for each.

 - d) Differentiate the clinical manifestations of each.

 - e) Prioritize and perform patient assessments and explain their rationale.

 - f) Formulate and implement priority managements and explain their rationale.

Shock

1. Define shock.
2. Explain the causes for the development of each of the following types of shock:
 - cardiogenic
 - hypovolemic (hemorrhagic, non-hemorrhagic)
 - distributive (vasogenic, septic, anaphylactic, neurogenic, psychogenic)
 - obstructive
3. Explain the pathophysiology, consequences and complications, including multi-system failure for each of the following stages of shock:
 - compensatory
 - decompensatory (progressive)
 - failure/irreversible
4. Explain the variations in the body's ability to compensate given the different types of shock.
5. Identify the manifestations and their supporting rationale for each of the stages of shock including changes in:
 - blood pressure (systolic, diastolic, pulse pressure)
 - pulse (rate, rhythm, volume)
 - respiratory pattern (rate, rhythm, volume, abnormal patterns)
 - skin (colour, temperature, condition)
 - LOA/LOC
 - Neurological exam (protective reflexes, pupils, behavioural pattern, posturing)
 - GI/GU functioning
6. Identify sources from which gross bleeding (traumatic and/or non-traumatic) most frequently occur in the following areas:
 - neck
 - thorax
 - abdominal cavity
 - pelvic/retroperitoneal regions
 - extremities
7. Identify the potential blood volume loss with a hemorrhage occurring from sources listed above.
8. Relate the volume of blood loss to the development of changes in vital signs.

9. Identify mechanisms of injury which may lead to exsanguination and which vessels are most likely involved.
10. Define:
 - antigen
 - allergen
 - antibody
11. Identify the types and specific allergens which typically cause anaphylactic reactions.
12. Explain the allergen/antibody hypersensitivity responses and associated pathophysiological consequences in an anaphylactic reaction/shock.
13. Differentiate between local, systemic and anaphylactic allergic reactions and identify the manifestations and describe the pathophysiological reason for each.
14. Identify the most common causes of sepsis and discuss situations which would indicate the likelihood of potential sepsis in a patient.
15. Explain the development of sepsis and the progression to septic shock.
16. Identify the clinical manifestations of sepsis.
17. Given the following conditions:
 - cardiogenic shock
 - hemorrhagic shock
 - anaphylactic shock
 - septic shock
 - neurogenic shock
 - vasogenic shock
 - obstructive shock
 - a) Describe the clinical manifestations and provide the rationale for their occurrence.
 - b) Prioritize and perform patient assessments and explain their rationale.
 - c) Formulate and implement priority managements and explain their rationale.

Toxicology

1. Define:
 - poison
 - drug abuse
 - physical dependence
 - psychological dependence
 - tolerance
 - addiction
2. Identify four methods through which poisons can enter the body.
3. List common situations which may lead to accidental poisoning by ingestion.
4. Identify the questions to be asked of a patient who has ingested a poison.
5. Define withdrawal and list several associated manifestations.
6. Explain the purpose of toxidromes in understanding toxicological poisonings.
7. Given the following toxidromes:
 - opioid/narcotic
 - cholinergic /anti-cholinesterase
 - anticholinergic
 - adrenergic/sympathomimetic
 - sedative-hypnotic
 - a) Identify the possible product names, common names and sources.
 - b) Explain the pathophysiological reaction to these agents in the body.
 - c) Identify the amount of agent required to produce mild to severe responses.
 - d) Identify the manifestations and short term and long term toxic effects.
8. Describe the specific environmental concerns present with agents responsible for the cholinergic toxidrome.
9. Given a list of designer drugs, discuss the corresponding toxidrome(s) and management in the event of an overdose.

10. Discuss the etiology, progression and management of excited delirium.
11. Identify the safety concerns that a paramedic must consider when responding to a call involving a clandestine drug lab.
12. Given the following list of poisoning agents:

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, Clostridium botulinum)

Inhalants

- hydrocarbons – carbon tetrachloride, methylene chloride
- soluble gases – ammonia, chlorine, polyvinyl chloride
- low solubility/insoluble chemically produced gases – Nitrogen dioxide (silo gas)
- hydrogen sulfides
- metal fumes – Arsine (arsenic)
- carbon monoxide

Surface Absorbed

- organophosphates and carbamates

Injectants

- venom of reptiles/snakes
- ticks and spiders as vectors or those insects secreting venom or toxins

- a) Identify the possible product names, common names and sources.
 - b) Explain the pathophysiological reaction to these agents in the body.
 - c) Identify the amount of agent required to produce mild to severe responses.
 - d) Identify the manifestations and short term and long term toxic effects.
13. 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.

14. Provide the rationale for collecting a sample of the overdose substance, emesis, medication or chemical containers and drug paraphernalia evident at the scene.
15. Describe the function of:
 - activated charcoal
 - gastric lavage
 - dialysis
16. With regards to bites, discuss the following:
 - safety considerations of self/partner and patient
 - disease transmission
 - anaphylaxis, hypovolemic shock, CNS toxicity
 - animal behaviour
 - irrigation of site
 - positioning of bite area below heart level
17. Describe the properties of ethyl alcohol and its metabolism in the body.
18. Describe the process of methanol metabolism and the pathophysiologic effects of metabolites on the body.
19. List several manifestations of an alcohol emergency.
20. Describe the progression of liver failure in chronic alcoholism.
21. Describe the following chronic effects of alcohol abuse:
 - clotting disorders
 - esophageal varices
 - Wernicke's syndrome
 - Korsakoff's psychosis
 - Fetal Alcohol Syndrome (FAS)
22. Describe the effects of acute alcohol withdrawal including delirium tremens and its associated management.
23. Describe the metabolism of ASA within the body.
24. Differentiate between NSAIDs (ibuprofen), salicylates (ASA) and acetaminophen (Tylenol) in terms of:
 - actions and uses
 - patient risk of overdose
 - pathophysiology of overdose
 - manifestations of overdose
 - treatment

25. Given any overdose or poisoning situation and as per the BLS/ALS Patient Care Standards:
- a) Describe the clinical manifestations and provide the rationale for their occurrence.
 - b) Prioritize and perform patient assessments and explain their rationale.
 - c) Formulate and implement priority managements and explain their rationale.

Oncology

Pathophysiology of Cancer

1. Define the following:
 - oncology
 - neoplasm
 - malignant
 - benign
 - primary tumour
 - secondary tumour
 - precursory lesions
 - metastasis
 - hyperplasia
 - metaplasia
 - dysplasia
 - carcinoma
 - sarcoma
 - carcinogen
 - cachexia
2. Identify examples of benign tumours.
3. Explain the following procedures:
 - needle biopsy
 - surgical biopsy
 - histological analysis
4. State the known common causes of cancer.
5. Explain the process of carcinogenesis.
6. Compare and contrast the distinction between a carcinoma and a sarcoma.
7. Describe the development of malignant tumours and their growth and spread to secondary locations.
8. Describe the obstructive and parasitic consequences of tumour growth in the:
 - lungs
 - brain
 - breasts

- throat
 - abdomen
 - prostate
 - spine
 - bone
9. Define and briefly describe:
 - Hodgkin's lymphoma
 - Non-Hodgkin's lymphoma
 - leukaemia
 - multiple myeloma
 10. Describe the appearance of Kaposi's sarcoma and its association with AIDS.
 11. Identify possible acute oncological emergencies which may occur as a direct or indirect result of cancer or its treatment.

Assessment and Management for patients with Cancer

1. Identify traditional and non-traditional methods utilized in the treatment of cancer.
2. Identify the most common side effects experienced by a patient receiving chemotherapy, radiation therapy or other therapies.
3. Utilize and describe comfort measures and therapeutic communication approaches which may assist the patient depending on their type and stage of cancer.
4. Identify the means of reverse isolation and protective measures that must be employed to protect the cancer patient during transport.
5. Define palliative care.
6. Describe the role of palliative care units, hospices and/or home care in the care of the patient with cancer.
7. Describe the means by which pain control is administered for terminal stages of cancer.
8. Relate the stages of grieving to the reactions of the patient with cancer.
9. Describe the role of the paramedic in providing support to the patient and family of a terminally ill patient in the home.

10. Given the types of cancer listed in this unit and as per the BLS/ALS Patient Care Standards:
- a) Describe the clinical manifestations and provide the rationale for their occurrence.
 - b) Prioritize and perform patient assessments and explain their rationale.
 - c) Formulate and implement priority managements and explain their rationale.

Communicable Disease

1. Distinguish between the major categories of microorganisms including:
 - bacteria
 - viruses
 - protozoa
 - fungi
 - rickettsia
2. Distinguish between:
 - pathogen
 - non-pathogen
 - infection
 - infestation
 - infectious disease
 - communicable disease
3. Given the conditions found in the human body, discuss the factors which favour the growth of pathogens.
4. Define virulence and state the factors that determine the extent of an organism's virulence.
5. Identify the portals of entry and exit for pathogens into and out of the body.
6. Describe the different modes of disease transmission.
7. Explain the general defense mechanisms employed by the body to protect against pathogens.
8. Describe the role of the various types of T cells and B cells in the immune response.
9. Describe the normal course of an infection under the following headings:
 - incubation period
 - prodromal period
 - full illness period
 - convalescent period
10. Explain the various types of immunity including:
 - naturally acquired active immunity
 - naturally acquired passive immunity
 - artificially acquired active immunity
 - artificially acquired passive immunity

11. Explain the various types of vaccines.
12. Given the following conditions:
 - hepatitis A, B, C
 - HIV/AIDS
 - Tuberculosis (TB), multi-drug resistant TB (MDR-TB)
 - febrile respiratory illness (FRI) (SARS)
 - influenza virus
 - west nile virus
 - gastroenteritis (bacterial, viral)
 - ebola
 - meningitis (bacterial, viral)
 - mononucleosis
 - strep throat
 - whooping cough
 - German measles
 - chicken pox
 - shingles
 - mumps
 - diphtheria
 - polio
 - malaria
 - gonorrhea
 - syphilis
 - herpes
 - chlamydia
 - scabies
 - lice
 - a) Discuss the:
 - etiology
 - mode of transmission
 - portal of entry and exit
 - pathogenesis including incubation and communicable periods
 - precautionary measures
 - b) Describe the clinical manifestations and provide the rationale for their occurrence.
 - c) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.

- d) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.
13. Explain the influence of age, degree of wellness, virulence and chemotherapy on the occurrence of systematic infections caused by staphylococci, streptococci, pseudomonas, E. Coli, C. difficile, hemolytic streptococci and prominent bacterial organisms resistant to conventional antibiotics, e.g.: vancomycin-resistant enterococci (VRE), Methicillin-resistant Staphylococcus aureus (MRSA).
 14. Discuss the procedures to be followed when treating and/or transporting a patient with an infectious agent.
 15. Explain the following terms as they apply to the decontamination of equipment, surfaces and linens:
 - sterilization
 - disinfection
 - clean
 - disposable
 - non-disposable
 16. Differentiate between isolation and reverse isolation and describe precautions for transporting a patient with reverse isolation procedures.
 17. Identify the measures to be utilized prior to transfer of a patient with a known communicable or infectious disease.
 18. Identify the various pieces of personal protective equipment (PPE) and what each protects against.
 19. Explain the proper procedure for donning and doffing PPE.
 20. Explain the way in which universal precautions should be applied during each patient care situation.
 21. Explain the procedure to be followed regarding patient equipment and the ambulance, when a patient with a communicable disease has been transported in the ambulance.
 22. State the reasons for informing hospital personnel when transporting a patient with virulent infectious or communicable disease to the receiving facility.
 23. Describe the reasons for hand washing before and after each patient contact.
 24. Describe and implement the acceptable method of hand washing before and after each patient contact and compare that to the use of hand sanitizer.

25. Discuss the specifications and use of the N95 respirator.
26. Describe the effects of tetanus and state the rationale for receiving a tetanus inoculation after acquiring an open tissue injury.
27. Discuss the paramedic's responsibilities as they apply to the Ambulance Service Communicable Disease Standards.
28. Explain the paramedic's responsibilities when they have reasonable cause to believe that they have been exposed to a communicable disease.
29. Explain the paramedic's responsibilities when they have been referred to a consulting physician following a communicable disease exposure.
30. Discuss the role of the paramedic and the designated officer in terms of reporting an exposure to a communicable disease.

Environmental Disorders

Temperature Related Disorders

1. Define:
 - convection
 - conduction
 - radiation
 - evaporation
2. State the normal core temperature.
3. Explain the concept of body adaptation and the process of temperature regulation in the human body.
4. List the factors which may contribute to the development of hypothermia.
5. Identify the core temperature for:
 - mild hypothermia
 - moderate hypothermia
 - severe hypothermia
6. Explain the phenomena of paradoxical cooling and after drop.
7. Explain the mammalian diving reflex as it applies to cold water immersion.
8. Explain the reason for implementing passive re-warming versus active re-warming in the prehospital field setting.
9. Identify the precautions to be taken to prevent systemic complications in the management of the hypothermic patient.
10. Explain the precautions taken when instituting CPR and defibrillation of the unresponsive hypothermic patient.
11. Describe the characteristics of the different degrees of frostbite and the most common sites affected.
12. Identify the rationale for separating each digit prior to bandaging of frostbitten hands or feet.

13. Identify the most susceptible populations affected by heat related emergencies.
14. Define the term heat syncope.
15. Given the following disorders:
 - hypothermia (mild, moderate, severe)
 - immersion hypothermia
 - frostbite (superficial, deep)
 - heat cramps
 - heat exhaustion
 - heat stroke
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
 - e) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.
 - f) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.

Water Related Disorders

1. Differentiate between the terms drowning and near drowning.
2. List common situations which may lead to drowning.
3. Describe the drowning process.
4. Describe the difference between wet versus dry drowning.
5. Given the following conditions:
 - drowning (fresh water, salt water)
 - decompression sickness
 - nitrogen narcosis
 - air embolism

- barotrauma
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
 - e) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.
 - f) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.
6. Explain the rationale for the accessing a hyperbaric chamber for certain diving conditions.

Altitude Related Disorders

1. Given the following conditions:
- acute mountain sickness
 - high altitude pulmonary edema (HAPE)
 - high altitude cerebral edema (HACE)
- a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
 - e) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.
 - f) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.

Burns

Pathophysiology of Burns

1. Identify the common causes of burns.
2. Distinguish between the different types of burns including:
 - thermal
 - scald
 - friction
 - chemical
 - electrical
3. Explain the following burn depths:
 - first degree
 - second degree
 - third degree
 - fourth degree
 - partial thickness
 - full thickness
4. Define:
 - Curling's ulcer
 - keloid scarring
 - granulation tissue
 - eschar
5. Discuss the three distinct zones of a thermal injury.
6. For each burn depth, explain the pathophysiological responses and consequences in the development of:
 - pain versus 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
 - blister and/or eschar formation
7. Explain the development of cardiac and respiratory depression in the post-burn patient.

8. Define:
 - joule
 - amperage
 - voltage
 - ohm
9. Describe the effects of the following on the body:
 - AC versus DC current
 - low voltage versus high voltage electrocution
 - arc injuries
 - flash electrical burns
10. List factors which will affect the severity of an electrical burn.
11. Describe the pathway of current through the body and the resultant pathophysiological consequences and tissue damage associated with an electrical burn.
12. Explain the causes for respiratory arrest in the electrocution patient.
13. Describe how you would protect yourself and your patient from electrical hazards.
14. Differentiate the potential depth and severity of a burn caused by:
 - dry caustic chemicals
 - wet caustic chemicals
 - alkali
 - acids
 - ammonia
 - phenol
15. Identify potential sources of the above chemicals.

Assessment and Management of the Burn patient

1. Differentiate the criteria of critical, moderate and minor burns according to the surface areas involved, depth, age and medical condition of the patient.
2. Describe and utilize the assessment criteria to determine burn depth.
3. State and apply the Rule of Nines as it applies to the adult, child and infant.
4. Identify the specific history information that should be obtained from a burn patient.

5. State the rationale for fluid replacement in critically burned patient.
6. State the specific precautions to be taken and the rationale for using cool normal saline dressings on burns.
7. Describe the method of applying wet or dry dressing for bandages to a burned area or extremity.
8. Identify the rationale for separating each digit prior to bandaging of hands or feet that have burns.
9. Describe and implement the precautions to be considered when a patient's clothing is adhered to a burn.
10. State the rationale for avoiding applications of petroleum base ointments on a severe burn.
11. Describe the following in-hospital management of full-thickness burn patients:
 - debridement
 - escharotomy
 - skin graft
12. Identify the chemical burns which should be flushed with water as a priority treatment.
13. Identify those chemical burns for which water flushing is contraindicated.
14. With respect to chemical burns, explain the rationale for the following:
 - manual brushing off or removal of solid or powdered particles
 - having patient remove contact lenses
 - removing as much clothing, shoes, socks, jewelry as possible from affected area
 - use of large volumes of water when indicated
 - irrigation times of 20 minutes' minimum for alkali burns and 10-minute minimum for acid burns
 - technique for irrigation of eyes
15. Demonstrate the assessment for the following in a patient with significant electrical injury:
 - cardiac arrest, dysrhythmias
 - cold, mottled, pulseless extremities
 - shallow, irregular breathing
 - neurological impairment (confusion, disorientation, convulsions, sensory loss)
 - burns, entry/exit wounds
 - muscle spasm, tetany
 - smoldering clothes, shoes

16. 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).
17. Describe the manifestations of smoke inhalation.
18. Describe the specific manifestations for the burn patient with a suspected compromised upper or lower airway and the reasons for each.
19. State the specific information that must be obtained from the medical history and the surrounding environment for a patient who had inhaled toxic gases.
20. Explain the rationale for the use of a hyperbaric chamber in the treatment of CO poisoning.
21. Given the following:
 - partial thickness burn
 - full thickness burn
 - chemical burn
 - electrical burn
 - smoke/toxic gas inhalation
 - a) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.
 - b) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.

Ballistics

1. Describe the difference between a shotgun, rifle and handgun as they relate to the nature of the wound they inflict.
2. Describe the following:
 - round nose bullet
 - hollow point bullet
 - jacketed bullet
 - caliber
 - gauge
 - cartridge
3. Explain the concept of tumbling and yaw as it applies to potential tissue damage.
4. Explain the following as they relate to tissue damage:
 - entry wound
 - cavitation
 - exit wound
5. Explain the effects of an electronic control device on the body.

Assessment and Management for patients with Ballistic injuries

1. Given a ballistic injury:
 - a) Describe the clinical manifestations and provide the rationale for their occurrence.
 - b) Prioritize and perform patient assessments as per the BLS/ALS Patient Care Standards and explain their rationale.
 - c) Formulate and implement priority managements as per the BLS/ALS Patient Care Standards and explain their rationale.
2. Describe the method used to remove an electronic control device probe and circumstances when such removal is contraindicated.

Hazardous Materials and CBRNE

Hazardous Materials

1. Discuss procedures and operations consistent with Workplace Hazardous Materials Information System (WHMIS).
2. Discuss the appropriate disposal of body fluids, waste and equipment including sharps in compliance with current legislation, regulations and standards.
3. Identify the safety procedures that must be employed when dispatched to a scene involving a hazardous material.
4. Explain the rationale for attempting to park upwind or upstream (e.g. run-off) from a hazardous material situation.
5. Discuss the use of the following resources when attempting to determine the type and concentration of the hazardous material:
 - CANUTEC (Emergency Line, Emergency Response Guidebook)
 - dangerous goods placard or product code number
 - Material Safety Data Sheet
 - Poison Control Centre
 - bystanders/employees
 - allied emergency services
6. Describe the process of decontamination including:
 - removal of contaminated clothing and/or jewelry
 - irrigation of eyes
 - irrigation with large quantities of water
 - manually brushing off contaminant which is powdered or solid
 - circumstances when water irrigation would be contraindicated
7. Describe the process of decontamination of the vehicle following exposure to a hazardous material.
8. Perform assessments and management of the exposed patient as per the BLS/ALS Patient Care Standards.

CBRNE

1. Define the term CBRNE and describe potential sites for accidental incidents.
2. Define the term CBRNE terrorist incident and describe the likely targets for such an incident.
3. Define the term dissemination device and describe the various types of such devices.
4. Identify the categories of chemical agents.
5. Describe the routes of exposure for chemical agents.
6. Discuss the clinical manifestations and treatment of a patient exposed to chemical agents.
7. Identify the types of biological agents and how they differ from their natural state.
8. Describe the routes of exposure for biological agents.
9. Discuss the clinical manifestations and treatment of a patient exposed to biological agents.
10. Differentiate the following radiation particles in terms of energy and penetrating power:
 - alpha
 - beta
 - gamma
 - x-rays
11. Identify the potential sources for each type of radioactive materials, residues, wastes and/or leaks.
12. Identify the shielding required for each type of ionizing radiation.
13. Describe the precautions to be taken to avoid exposure to radiation.
14. Identify the factors which will reduce and/or protect the individual from the effects of radiation.
15. Describe the immediate and delayed responses as well as the local and systemic responses of accidental radiation.
16. 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 contaminants
17. Describe and implement the features of decontamination procedures which apply to the obligations of the paramedic.
 18. Identify the other emergency and/or disaster personnel who would likely participate in an accidental radiation situation.
 19. Identify the specific reasons for notifying hospital emergency staff concerning the arrival of a potential radiation victim.
 20. Define the term dirty bomb.
 21. Discuss the clinical manifestations and treatment of patient exposed to radiological/nuclear material.
 22. Explain the following concepts as they apply to an explosion and the common types of injuries associated with each:
 - primary blast injuries
 - secondary blast injuries
 - tertiary blast injuries
 23. Discuss the following as they apply to paramedic safety at the scene of a CBRNE event:
 - establishing scene safety
 - approaching the scene
 - protective measures
 - establishing a safety zone
 - ongoing re-evaluation of scene safety
 - awareness of secondary devices
 24. Discuss the following critical action of the paramedic at a CBRNE event:
 - notification
 - establishing command
 - patient triage
 - patient management
 - decontamination procedures
 - patient transport
 25. Discuss the psychological impact of a CBRNE event.

Section 5 – Special Populations

5

Obstetrics

Obstetrics - Normal

1. Explain the physiological process of ovulation, fertilization and implantation and the corresponding hormonal changes.
2. Identify the normal gestational period of pregnancy.
3. Discuss the normal physiologic maternal changes in pregnancy.
4. Identify the structure and function of the placenta, cord, amniotic sac and fluid.
5. Define the following terms:
 - antepartum
 - intrapartum/labour
 - postpartum
 - spontaneous abortion
 - induced (therapeutic) abortion
6. Describe the three stages of labor and identify the events which occur during each stage.
7. Differentiate between Braxton Hicks contractions, false labour and true labour.
8. Describe the method used to time contractions.
9. Identify and gather the pertinent information which should be obtained from a pregnant woman.
10. Explain the significance of performing the following when assessing a woman in labour:
 - height of the uterus
 - 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

11. Identify and implement measures to protect the privacy of the pregnant woman during assessment/labour and delivery.
12. Identify the factors used to determine whether childbirth is imminent.
13. Identify the steps involved in preparing a patient for a normal delivery.
14. Explain the procedure for the normal delivery of a neonate.
15. 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
 - patency of newborn's airway
 - neonate to the breast
16. Describe the management for each of the following, immediately after delivery:
 - the mother
 - the neonate
 - the placenta/cord
17. Identify when the cord should be clamped and cut and describe the method for doing so.
18. Identify the transport position for all near term mothers.
19. Identify those situations in which the midwife at a home delivery may request the assistance of the paramedic team.
20. Describe the role and the delineation of responsibilities of the midwife and paramedic within the parameters of a home birth, transit and hospital admission as per the BLS standards.
21. Describe and demonstrate ways to effectively collaborate with a midwife to meet the needs of the mother and/or neonate.

Obstetrical Complications

1. Given the following conditions:
 - threatened abortion
 - spontaneous abortion
 - ectopic pregnancy

- antepartum vaginal bleeding
 - placenta previa
 - abruption placenta
 - ruptured uterus
 - uterine inversion
 - venal caval hypotension
 - pregnancy-induced hypertension (PID)
 - HELLP syndrome
 - pre-eclampsia, eclampsia
 - prolapsed umbilical cord
 - breech birth
 - umbilical cord around neck
 - limb presentation
 - shoulder dystocia
 - frank breech
 - footling breech
 - post-partum hemorrhage
 - still birth
 - spontaneous aborted pregnancy
- a) Identify the most common causes and/or contributing factors to the development of each.
- b) Describe the pathophysiological processes of each.
- c) Analyze the possible consequences for each.
- d) Differentiate the clinical manifestations of each.
2. Define meconium, indicate the causes of meconium expulsion and state the complication associated with meconium passage during delivery.
3. Describe the potential maternal/fetal consequences which may result from:
- blunt/penetrating abdominal trauma
 - head injury with increasing intracranial pressure
 - trauma-induced hypoxia/hemorrhage
 - maternal cardiac arrest
 - maternal alcohol/drug abuse
 - gestational diabetes

Assessment and Management for Obstetrical patients

1. Given the obstetrical situations listed in this unit and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Neonates

1. Discuss fetal development and fetal circulation.
2. Explain the pressure changes and shunting that occur during the transitional phase from fetus to neonate.
3. Discuss the causes and manifestations of cardiovascular insufficiency and/or respiratory insufficiency in the neonate.
4. For the premature neonate, identify:
 - reasons for prematurity
 - general appearance
 - potential complications
5. Describe the pathophysiological consequences of cold stress on all neonates.
6. Describe and implement measures to prevent the effects of cold stress.
7. Explain the relationship between hyperbilirubinemia, kernicterus and jaundice in the neonate.
8. Explain the pathology and pathophysiology of the following congenital abnormalities:
 - patent foramen ovale
 - patent ductus arteriosus
 - tetralogy of Fallot
 - coarctation of the aorta
 - pyloric stenosis
 - esophageal atresia
 - esophageal atresia with a tracheal fistula

Assessment and Management for Neonates

1. Discuss when suctioning is indicated for the neonate and explain the possible consequences of meconium aspiration.
2. Identify the elements of APGAR scoring for a newborn and the times at which an APGAR score should be recorded.
3. Identify the APGAR scores which indicate a neonate is in mild, moderate or severe distress.

4. Explain the term acrocyanosis and when it is a normal finding in a neonate.
5. State the normal ranges of respirations and heart rate in the neonate.
6. Explain the procedure for performing neonatal resuscitation according to the ALS Patient Care Standards.
7. Demonstrate the correct procedure for performing CPR on a neonate as per the Heart and Stroke Foundation of Canada Guidelines.
8. Given the neonatal situations listed in this unit and as per the BLS/ALS Patient Care Standards:
 - a) Describe the clinical manifestations and provide the rationale for their occurrence.
 - b) Prioritize and perform patient assessments and explain their rationale.
 - c) Formulate and implement priority managements and explain their rationale.

Pediatrics

Pathophysiology of Pediatric Disorders

1. Given the following disorders:
 - asthma
 - hyper-reactive airway
 - bronchiolitis
 - acute epiglottitis
 - acute laryngotracheobronchitis (viral croup) (LTB)
 - acute tracheitis
 - pneumonia – viral/bacterial
 - Acute Newborn Respiratory Distress Syndrome (IRDS or HMD)
 - cystic fibrosis
 - febrile seizures
 - seizures
 - dehydration
 - meningitis (viral and bacterial)
 - Reye’s Syndrome
 - sudden infant death syndrome (SIDs)
 - pediatric cancers
 - a) Identify the most common causes and/or contributing factors to the development of each.
 - b) Describe the pathophysiological processes of each.
 - c) Analyze the possible consequences for each.
 - d) Differentiate the clinical manifestations of each.
2. Discuss the relationship between respiratory depression/arrest and bradycardia and/or cardiac arrest in the pediatric patient.
3. Explain the reasons for children being accident-prone and the most common types of fractures according to their developmental age.
4. Differentiate the assessment findings for a fracture, strain or sprain in a child compared to an adult.
5. Describe the complications which may occur as a result of a fracture or sprain in a child.

6. Describe the assessment findings and complications associated with fractures near the epiphyseal plate.
7. Compare and contrast the pediatric and adult airway and discuss the implications related to the potential for obstruction.
8. Describe the anatomical and physiological reasons for the vulnerability of pediatric patients to the following types of trauma-related injuries:
 - airway obstruction
 - head injuries
 - spinal injuries
 - cardiac and lung contusion
 - splenic, liver and mesenteric ruptures/tears
9. Explain the reasons for the vulnerability of the pediatric patient to blood loss according to age group.
10. Explain the pathophysiological reasons for the differences in the progression and assessment findings of compensatory, decompensatory and failing stages of shock in the child compared to the adult.
11. Identify the common causes and types of burns found in pediatric patients.
12. Explain the reasons for the vulnerability of young children to the development of hypothermia and heat related emergencies.
13. Identify the causes, manifestations and the pathophysiological consequences of hypothermia and heat-related emergencies in the pediatric patient.
14. Explain the rationale for maintaining prolonged resuscitation efforts for a pediatric patient who is a victim of cold water drowning.
15. Describe the pathophysiological consequences and manifestations for the pediatric patient from intentional or accidental inhalation, ingestion, injection or absorption from each of the following categories of substances:
 - over the counter medications
 - prescription medications
 - elicit/recreational drugs
 - alcohol
 - household chemicals (cleaning agents, insecticides, paints, solvents, etc.)
 - poisonous plants

16. Identify the explicit on scene information that should be gathered and provided to a poison control center and identify the type of prehospital treatments a poison control centre will recommend.
17. Describe the types of indicators which may trigger a suspicion of possible child neglect and/or abuse.
18. Describe the type of physical and behavioural assessment findings for each age group which are suggestive of:
 - physical abuse
 - emotional abuse
 - sexual abuse
 - neglect
19. Outline the legal obligations in reporting suspected child abuse and the details to be documented.

Assessment and Management of the Pediatric patient

1. Identify growth and developmental characteristics which need to be considered to individualize care for each of the following age groups:
 - neonate
 - infant (1-12 months)
 - toddler (1-3 years)
 - young child (4-8 years)
 - child (9-12 years)
 - adolescent (13-18 years)
2. Recognize the need for equipment appropriate to the patient's size.
3. Discuss modifications to the primary survey including assessment for:
 - appearance (sick, lethargic, irritable, screaming, crying, pale, listless)
 - breathing (should be quiet and inaudible)
 - upper respiratory distress (grunting, snoring, stridor, barking cough, drooling)
 - general respiratory distress (indrawing, nasal flaring, wheezing, head bobbing)
 - pulse rate (tachycardia, bradycardia)
 - dehydration (hot and dry skin, sunken eyes, dry mouth/lips/tongue, no tears with crying)
4. Describe the modifications to history taking and physical examination of the pediatric patient including:
 - allowing small child to sit on parent's lap
 - use of play techniques for small children (demonstrate on doll, parent first)

- let child or parent touch and handle equipment before exam when safe to do so
 - do not lie about painful procedures; explain how you will help make them feel better
 - perform secondary survey in a toe to head sequence when possible
 - examine obviously painful areas last when possible
 - ask parents if child's responses are normal or abnormal
 - determine if there have been changes in appetite, usual interest in toys, presence of inconsolable crying, decrease number in wet diapers
5. Discuss the following considerations when performing a secondary survey on the pediatric patient:
- anterior fontanelle – open until 9-18 months (depressed, bulging)
 - meningismus (sign of meningeal irritation)
 - groin/scrotum – masses or swelling – hernias common in infant boys
 - presence of fever – look for rapid/laboured breathing; excessive drooling; change in behaviour; lethargy; fretfulness
6. 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
7. Identify the modifications to be made when utilizing the Glasgow Coma Scale specific to the various pediatric age groups.
8. State and evaluate the normal values for the vital signs of the various pediatric age groups.
9. Explain the rationale for the use of the brachial artery for pulse checks in infants.
10. Describe pediatric assessment considerations for the following:
- skin
 - mental status
 - respiratory
 - circulatory
 - abdominal
 - extremities

- neurological
11. Describe the considerations to be made when assessing the following:
 - head trauma
 - chest injuries
 - abdominal injuries
 - burns
 - foreign bodies
 12. Discuss the methods and provide the rationale for including the mother/father or significant care provider, during the assessment, management and transport of the pediatric patient.
 13. Identify 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.
 14. Utilize effective therapeutic strategies to provide realistic support and reduce the fear and anxiety of the mother, father or significant care provider.
 15. Describe the pediatric assessment triangle.
 16. Explain the rationale for ensuring that the neck of an infant or small child is not hyperextended during airway positioning.
 17. Identify modifications to the assessment (Modified Rule of Nines) and management of a pediatric burn patient.
 18. Identify methods of administering oxygen to the pediatric patient that will help reduce anxiety and improve cooperation.
 19. Demonstrate the correct procedure for performing CPR on a pediatric patient as per the Heart and Stroke Foundation of Canada Guidelines.
 20. Given the pediatric disorders included under pathophysiology and as per the BLS/ALS Patient Care Standards:
 - a) Describe the clinical manifestations and provide the rationale for their occurrence.
 - b) Prioritize and perform patient assessments and explain their rationale.
 - c) Formulate and implement priority managements and explain their rationale.

Gerontology

1. Define geriatrics.
2. Identify the major physical and physiological degenerative changes which occur as the elderly person advances in age, in relation to the following systems:
 - respiratory
 - cardiovascular
 - renal
 - nervous
 - musculoskeletal
 - immune
 - skin and sensation
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 versus a refined chief complaint
 - defenses against infection
 - mobility and stability of bone and muscle structures
4. 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 judgment
 - 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
5. 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

6. Discuss the challenges in determining a field diagnosis for an elderly patient given the incidence of:
 - multiple disease processes in varying stages of development
 - multiple prescription drugs
 - multiple complications/adverse effects
 - multiple problems which may contribute to patient's medical problems (social, economic, mental health, nutritional, environmental)
7. Explain the reasons for a lack of definitiveness of some elderly patient's explanation of their chief complaint or current problem.
8. List several special considerations to be taken during a physical assessment of an elderly patient.
9. Identify ways and implement measures the paramedic can use to respect the privacy and dignity of the elderly patient during their care.
10. Identify unique comfort needs of the elderly which should be implemented during assessment, management and transport.
11. Discuss possible complications when attempting to communicate with an elderly patient.
12. 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) including:
 - being respectful (use of Mr., Mrs., Ms. and last name unless they indicate otherwise)
 - being calm, reassuring
 - speak facing them – if trouble seeing, find out if they have glasses and locate
 - question in quiet environment free of noise or other distractions when possible
 - if hearing impaired, speak slowly and with slightly raised voice, locate hearing device if applicable
 - utilize family resources to help when required
13. Identify reasons that elderly persons may be non-compliant in correctly taking their prescribed medication, supplements or over-the-counter medication.
14. 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.
15. Identify the reasons an elderly person may delay seeking medical assistance or seeking help.

16. Identify the reasons an elderly person may frequently avoid or over-use the paramedic services.
17. Identify factors which should prompt a paramedic to report about the elderly patient's home environment which could assist in discharge planning.
18. Identify factors from the elderly patient's home situation, which should prompt reporting a need for assistance from community resources.
 - bathing/hygiene
 - dressing
 - transferring – ability to stand/sit/walk
 - toileting
 - eating
19. Briefly describe how the following problems may manifest differently in the elderly patient:
 - MI
 - CHF
 - pneumonia
 - pulmonary embolism
 - cancer
 - acute abdominal pain
 - infection
20. Discuss the following causes of confusion in the elderly patient:
 - cardio/cerebrovascular disease
 - infection
 - malnutrition/dehydration
 - polypharmacy
 - dementia
 - depression
 - sudden change in environment (hospitalization, institutionalization)
21. Describe the pathophysiological development and corresponding manifestations associated with the stages of Alzheimer's disease.
22. List the medications which may be prescribed as memory enhancers in the early stages of Alzheimer's disease.
23. Identify other degenerative causes for a decline in function in the elderly person's cognition, memory and physical ability.

24. List the types of elder abuse.
25. Describe the observations which should prompt a paramedic to be suspicious of distress and/or abuse of an elderly patient.
26. Identify the incidence of suicide in the elderly, compared to other age groups.
27. Describe the behavioural manifestations of suicidal gestures and for self-neglect.
28. Describe the possible reasons for an elderly person to consider suicide as a plausible life-ending solution.
29. Identify the major considerations when assessing an elderly patient given the following types of trauma:
 - vehicular trauma
 - falls
 - head trauma
 - chest injuries
 - abdominal injuries
 - musculoskeletal injuries
30. Identify the priority management considerations for the above trauma situations.
31. Given the sick or injured geriatric patient and as per the BLS/ALS Patient Care Standards:
 - a) Prioritize and perform patient assessments and explain their rationale.
 - b) Formulate and implement priority managements and explain their rationale.

Bariatrics

1. Discuss the physiological changes associated with obesity.
2. Identify the pathologies that the obese patient is at a greater risk of developing.
3. Discuss modifications which may be made to the assessment of a bariatric patient.
4. Discuss modifications which may be made to the management of a bariatric patient.
5. Discuss specific equipment and equipment modifications available for the bariatric patient.

