

# Emergencies on the EDGE24

## Summary of the e-Learning Program

The e-learning is interactive and requires the clinician to consider a range of the clinical problems and scenarios and provide a response. At the end of each topic a summative quiz is used to evaluate learning and understanding of the topic material. There are 24 modules, each expected to take the medical practitioner 1.5 hours to complete with a total course time of 36 hours.

The course provides a broad introduction to core topics in emergency medicine including ECG and blood gas interpretation, chest pain, headache, abdominal pain, shortness of breath, agitation, first trimester bleeding, paediatric emergencies, trauma, pain management, eye and ENT emergencies.

## Learning Outcomes:

1. List the vital organ systems that should be first assessed in patients presenting with (potentially) life threatening illness
2. Identify the characteristic clinical markers associated with life threatening anaphylaxis
3. List the major life-threatening causes for acute chest pain
4. Describe a clinically based approach to evaluation of the ECG in the emergency patient
5. Describe the characteristics of the normal ST segment
6. Outline the priorities and interventions used for resuscitation in severe sepsis
7. Outline the role of investigations in the workup of the patient with acute headache
8. List the clinical features used to assess the degree of respiratory distress in a patient
9. Identify blood gas patterns for metabolic acidosis, metabolic alkalosis, respiratory acidosis and respiratory alkalosis
10. Identify the risk factors and examination findings indicating the potential for violence or self harm
11. Describe the immediate treatment priorities in the patient with acute poisoning
12. Describe the immediate treatment priorities in the patient with snake bite including the application of the pressure immobilisation bandage (PIB)
13. List Red Flags indicating a high risk for serious illness in the patient with abdominal pain
14. List the clinical findings indicating a high likelihood for ectopic pregnancy
15. Identify the steps in clinical assessment of the child presenting with acute illness
16. Recognise and correctly interpret clinical examination findings indicative of life threatening or acute developing respiratory distress in a child.
17. List the RED Flags in the history that indicate a high risk for progressive asthma
18. Describe the components of the Trauma Primary survey (ABCDE)
19. Identify the immediate priorities in the patient presenting with burn injury
20. Define what is meant medically by the term "pain"
21. Describe the principles of assessment and immediate management of the patient with suspected fracture to the upper limb
22. Describe the principles of assessment and immediate management of the patient with suspected fracture to the lower limb involving the femur or tibia.
23. List the important "Red flags" for the Eye indicating a high risk for serious eye disease
24. Describe the priorities in the initial assessment and haemodynamic stabilisation of the patient presenting with epistaxis

# Outline of the Program

## Module 1: Approach to the Seriously Ill Patient (90 minutes)

It is common to feel anxious when approaching a seriously ill patient. You may feel overwhelmed, wondering where to begin and how to approach the task. With so many different emergencies it would seem an impossible task to become competent in managing them all.

The good news is that the approach to the seriously ill patient always begins in the same place and follows the same basic structure, no matter what the emergency and no matter the age of the patient. This systematic approach to care of the critically ill enables you to identify immediate life threats and to initiate life saving intervention(s) without requiring a detailed knowledge of all possible emergency presentations. This approach to the seriously ill patient is termed the “Primary Survey” and is discussed in this first module of the EDGE24 course.

- Chapter Readings: Approach to the Critically Ill Patient
- Chapter Readings: Introduction to the Principles of Resuscitation
- Video eTutorial: Approach to the Seriously Ill Patient
- Interactive module: Clinical Casebook – Approach to the Seriously Ill Patient
- Graded Quiz- Critically Ill Patient

## Module 2: Acute Anaphylaxis (90 minutes)

Acute Anaphylaxis is a severe hypersensitivity reaction characterised by cardiovascular collapse and respiratory compromise. Symptoms develop rapidly often within several minutes, (but may develop within seconds to as long as an hour), after contact with the allergen. Management involves assessment of the patients airway, breathing and circulation and the immediate administration of Adrenaline. Additional therapies include nebulised Salbutamol, IV Fluids, IV Glucagon, Vasopressors and Steroids.

- Chapter Readings: Acute Anaphylaxis
- Video eTutorial: Acute Anaphylaxis
- Video eTutorial: Using the Epipen in Acute Anaphylaxis
- Interactive module: Clinical Casebook – Acute Anaphylaxis
- Graded Quiz- Acute Anaphylaxis

## Module 3: Acute Chest Pain (90 minutes)

Chest pain, although a common presentation, remains one of the most difficult presentations to assess and treat because of the risk of missing life threatening disease. In this topic the approach to the patient with acute chest pain is discussed in detail with the aim of providing a clinical framework to assist the clinician with undertaking assessment and management of patients presenting with acute myocardial ischaemia.

- Chapter Readings: Acute Chest Pain – Clinical Assessment
- Video eTutorial: Acute Chest Pain
- Interactive module: Clinical Casebook – Acute Chest Pain
- Graded Quiz- Acute Chest Pain

#### **Module 4: Introduction to ECG Interpretation 1 (90 minutes)**

In this EDGE module we introduce a systematic approach to reading the ECG that will allow you to quickly "scan" an ECG to identify changes that provide a clue to serious underlying disease such as acute myocardial ischaemia, life threatening biochemical abnormalities and clinically significant arrhythmias.

We begin our clinical approach to ECG interpretation by focusing on arrhythmias. In the second topic we introduce a system for classifying the rhythm into one of four categories. This will enable you to significantly narrow down the diagnostic possibilities and aid in reaching a final diagnosis.

##### *Clinical Approach to ECG Interpretation*

- Video eTutorial: Approach to ECG Interpretation
- Interactive module: Clinical Casebook – Introduction to ECG Interpretation
- Graded Quiz – Introduction to ECG Interpretation

##### *Disorders of Rate and Rhythm*

- Video eTutorial: Approach to Cardiac Arrhythmias
- Interactive module: Clinical Casebook: A System for Rhythm Diagnosis
- Graded Quiz – Disorders of Rate and Rhythm

#### **Module 5: Introduction to ECG Interpretation 2 (90 minutes)**

The ECG plays a central role in the evaluation of the patient with acute chest pain. The ST/T wave component of the ECG waveform reflects repolarisation of the ventricle. Abnormalities of the ST segment commonly result from abnormal depolarisation of the ventricle and injury or inflammation of myocardial tissue due to myocardial ischaemia or acute pericarditis. In this module we focus on the patterns of ECG changes associated with myocardial ischaemia arguably one of the most interesting and challenging areas of ECG Interpretation!

- Video eTutorial: ECG in Myocardial Ischaemia
- Video eTutorial: ECG Myocardial Ischaemia
- Interactive module: Clinical Casebook: ECG in Myocardial Ischaemia
- Graded quiz – ECG in Myocardial Ischaemia

#### **Module 6: Recognition and Management of Sepsis (90 minutes)**

The possibility of Sepsis needs to be considered in every patient presenting with infection. A low threshold for considering sepsis is required to avoid delayed or missed diagnosis. This is particularly the case in the elderly or immunocompromised patient where presenting symptoms are often non-specific and may include confusion, lethargy, nausea, malaise, syncope and hypothermia. This module explores the presentation, diagnosis, complications and management of the patient with sepsis with an emphasis on early recognition the treatment.

- Chapter Readings: Sepsis – Recognition and Management
- Video eTutorial: Sepsis
- Interactive module: Clinical Casebook: Recognition and Management of Sepsis
- Graded Quiz – Recognition and Management of Sepsis

#### **Module 7: Acute Severe Headache (90 minutes)**

In this module we will consider the serious causes that need to be considered in acute headache and their distinctive clinical features. The "red flags" for serious disease are reviewed and provide important clues for identifying the patient at high risk for serious disease. The module concludes with a review of the evidence based pharmacological management of migraine and tension headache.

- Chapter Readings: Acute Headache – Clinical Assessment
- Video eTutorial: Assessment and Management of Acute Headache
- Interactive module: Clinical Casebook – Acute Headache
- Graded Quiz- Acute Headache

## Module 8: Acute Pulmonary Oedema (90 minutes)

Respiratory distress is a common presenting symptom in emergency patients. Respiratory distress may range from a mild decrease in exercise tolerance to a feeling of increased respiratory effort at rest to severe respiratory distress associated with life threatening hypoxia and altered conscious state.

Although there are a wide variety of recognised causes for respiratory distress, in practice a small number of diseases account for the majority of emergency presentations. Many are strongly associated with age narrowing the differential diagnosis. The common causes for acute respiratory distress include Upper airway obstruction, Infection, Obstructive airway disease, Acute Pulmonary oedema, Pulmonary embolism, Pneumothorax, and Trauma.

- Chapter Readings: Acute Pulmonary Oedema
- Video eTutorial: Acute Pulmonary Oedema
- Interactive module: Clinical Case book – Acute Respiratory Distress and CPAP
- Graded Quiz- Acute Respiratory Distress and CPAP

## Module 9: Introduction to Blood Gas Interpretation (90 minutes)

**Section 1: Blood Gases: Normal Values and Patterns:** In this first topic we look at the blood gas variables that are most useful for determining acid base disorders in clinical practice and consider the differences in the normal values between the arterial and venous specimens. There four clinical patterns that may be seen in acid base disorders and these are explained in the video and form the basis for the concepts discussed in the videos that follow.

- Video eTutorial: Blood Gases (1) Basic Principles
- Quiz – Blood Gases (1)

**Section 2: Acid Base Patterns on the Blood Gas:** In this topic we roll our sleeves up and get into blood gases for real. In the video we explore the four principle acid base disorders:

1. *Metabolic Acidosis*
2. *Metabolic Alkalosis*
3. *Respiratory Acidosis*
4. *Respiratory Alkalosis*

For each of these acid base abnormalities we look for a pattern on the blood gas that will allow us to readily identify them. For this discussion we focus on three parameters; the pH, the Bicarbonate ( $\text{HCO}_3$ ) and the Partial pressure of Carbon dioxide ( $\text{pCO}_2$ ) and begin to develop our approach to examining blood gases that will form the basis of discussions in later videos.

- Video eTutorial: Blood Gases Patterns
- Quiz – Blood Gases (2)

**Section 3: Compensation in Acid Base Disorders:** In this video we begin exploring a topic that is at the core of many of concepts we will be discussing in later videos - the topic of Physiologic Compensation. The body has built in mechanisms that enable it to reduce the impact of disturbances to the acid base balance in the body. Primarily operating through the lungs and kidneys these mechanisms allow the body to maintain and restore acid base homeostasis in the setting of acid load (acidosis) or acid deficiency (alkalosis).

- Video eTutorial: Blood Gases Compensation
- Quiz – Blood Gases (3)

**Section 4: Application to Clinical Practice:** Now we are able to recognise single base disorders it is time to see how they may useful in clinical practice and assist us with diagnosis. In this topic we consider the four principal acid base disorders and identify common causes for each of these acid base disturbances.

- Video eTutorial: Blood Gases Application to Clinical Care
- Quiz – Blood Gases (4)

### **Module 10: Management of Severe Agitation (90 minutes)**

In the patient presenting with disturbed behaviour, disordered thinking or suspected acute mental illness the initial task is to stabilise the patient with the aim of minimising the risk of harm (to the patient and to others), identify and treat life threatening (medical) disease and reduce patient suffering and anxiety.

The management of the agitated or violent patient embraces psychological, physical and pharmacological approaches. Psychological methods focus on controlling the environment through the establishment of communication and trust. Physical measures involve a show of force and physical restraint whilst pharmacological methods use strong sedatives to control behaviour. In the following module we explore a clinical case of a patient with severe agitation and risk for violence.

- Chapter Readings: Acute Headache – Management of Severe Agitation
- Video eTutorial: Agitated Patient
- Interactive module: Clinical Casebook – Management of the Severely Agitated Patient
- Graded Quiz- Management of Severely Agitated Patient

### **Module 11: Emergency Management of Acute Poisoning (90 minutes)**

Poisoning accounts for between 2% - 5% of Emergency Department presentations. The poisoned patient is a medical emergency requiring rapid assessment and stabilisation. Immediate life-threatening complications of poisoning include coma, confusion, seizures, respiratory depression, hypotension and arrhythmias. Critical skills in the management of the poisoned patient include "Resuscitation", "Risk Assessment" and a working knowledge of the emergency interventions used to reduce the risk / treat severe toxicity including decontamination, enhanced elimination and use of antidotes. In most cases once the initial resuscitation and risk assessment is completed there is time to consult "Poisons Information" to determine further management.

- Chapter Readings: Acute Poisoning
- Video eTutorial: Acute Poisoning
- Interactive module: Clinical Casebook – Acute Poisoning
- Graded Quiz- Acute Poisoning

### **Module 12: Envenomation: Snake and Red Back Spider Bite (90 minutes)**

Australia has some of the deadliest snakes in the world including the brown, tiger, mulga, copperhead, inland taipan, red bellied black and the death adder. In Australia there are about 3000 bites per year and between 1 and 4 deaths per annum. At most risk for snakebite are children, farmers, and reptile handlers. Young adult males affected by alcohol present a major risk as they often attempt to catch or kill the snake provoking further bites. Despite the large number of bites envenomation is fortunately quite rare with only about 5% of snake bite victims requiring antivenom. Most deaths occur from brown snake envenomation resulting in early collapse and cardiac arrest.

Red Back Spider bite is the most common cause of significant envenomation presenting to emergency care. The Red Back spider is found Australia-wide and is aggressive. The venom can be slow acting and causes the release of neurotransmitters. Although it is now recognised that Red Back spider bite does not cause life threatening envenomation it may however cause significant pain requiring in some cases parenteral analgesia.

- Chapter Readings: Snake Bite
- Chapter Readings: Spider Bite
- Video eTutorial: Red Back Spider Bite
- Interactive module: Clinical Casebook – Snake Bite
- Graded Quiz- Snake Bite

### **Module 13: Acute Abdominal Pain in the Elderly (90 minutes)**

Acute abdominal pain is a common cause of serious illness. It is vital to have a sound approach to the assessment, investigation and management of patients presenting with abdominal pain as presentations with serious pathology can be subtle and easily missed. This is particularly true in specific populations such the elderly.

Compared to younger patients, acute abdominal pain in the elderly is associated with a high rate of misdiagnosis. Important considerations when in assessing the elderly patient with abdominal pain include the high incidence of serious disease in this population and an appreciation that “atypical” presentations for serious and life-threatening conditions are “typical” in this patient group.

- Chapter Readings: Acute Abdominal Pain
- Chapter Readings: Abdominal Pain in the Elderly
- Video eTutorial: Acute Abdominal Pain
- Interactive module: Clinical Casebook – Acute Abdominal Pain
- Graded Quiz- Acute Abdominal Pain

### **Module 14: First Trimester Bleeding (90 minutes)**

Bleeding and / or pelvic pain in the first trimester is a common acute presentation in the pregnant patient. In most patients the symptom will be the result of a threatened or complete miscarriage. A cautious approach however should be routinely applied to the assessment of patients with first trimester bleeding aiming first to rule out the major life threats including ectopic pregnancy, septic abortion and incomplete miscarriage.

- Chapter Readings: PV Bleeding in Early Pregnancy
- Video eTutorial: First Trimester Bleeding
- Interactive module: Clinical Case book – PV Bleeding in Early Pregnancy
- Graded Quiz (1)- PV Bleeding in Early Pregnancy

### **Module 15: Approach to the Sick Child (90 minutes)**

The young child with acute illness presents major challenges to the clinician due to incomplete history (eg the infant who is unable to report symptoms), difficulties with examination (eg the crying or uncooperative child) and the subtle features of serious disease that may be easily overlooked or missed.

In this topic we consider the clinical features and red flags that suggest serious illness in a young child. We explore this topic in detail by examining the presentation, clinical assessment and management of a child presenting with fever.

- Chapter Readings: Approach to the Seriously Ill Child
- Video eTutorial: Paediatric Assessment
- Video eTutorial: Clinical Features for Serious Illness in a Child
- Interactive module: Clinical Case book – The Seriously Ill Child
- Graded Quiz – Seriously Ill Child

### **Module 16: Severe Respiratory Distress in the Young Child (90 minutes)**

The young child with severe respiratory distress is arguably one of the most frightening experiences to manage as a clinician. The child is visibly struggling to breath and this is exacerbated by the fear of the child and parental anxiety. The interactive clinical case explores the recognition and assessment of respiratory distress in the child and considers the differential diagnosis and some of the common conditions that may cause respiratory distress in the young child.

- Chapter Readings: Upper Airway Emergencies in the Young Child
- Chapter Readings: Acute Bronchiolitis
- Video eTutorial: Paediatric Respiratory Distress
- Interactive module: Clinical Case book – Paediatric Respiratory Distress
- Graded Quiz- Paediatric Respiratory Distress

### **Module 17: Severe Asthma in a Child (90 minutes)**

In this topic we explore the assessment, red flags and management of the young child with severe or life-threatening asthma. Early recognition and institution of bronchodilator therapy in appropriate doses is critical to preventing further deterioration of the child and is discussed through the use of Case Simulation.

- Chapter Readings: Paediatric Acute Asthma
- Video eTutorial: Acute Severe Asthma
- Interactive module: Clinical Case book – Paediatric Asthma
- Graded Quiz- Paediatric Asthma

### **Module 18: Emergency Management of Major Trauma (90 minutes)**

The patient presenting following major trauma is one of the great challenges in emergency medicine. Instead of one primary diagnosis (involving one organ system) as in medical presentations there are often multiple diagnoses (significant injuries) involving multiple regions or organs that need to be identified. To make things even more challenging patients with major trauma may appear initially to be stable only to suddenly deteriorate due to unrecognised bleeding, chest trauma or intracerebral injury. In the severely injured patient it is often necessary to commence management of the patient before we have a good understanding of the extent of a patient's injuries or the opportunity to complete a thorough clinical assessment.

Once immediate resuscitation has been commenced the next step is to undertake a thorough assessment of the patient to identify the extent of the patient's injuries. This is termed the Secondary Survey and follows the routine structure to patient assessment of history, examination, (targeted) investigations and institution of symptomatic and specific treatment.

- Chapter Readings: Resuscitation of the Trauma Patient
- Chapter Readings: Structured Approach to the Trauma Patient
- Video eTutorial: Major Trauma
- Interactive module: Clinical Case book – Major Trauma
- Graded Quiz- Emergency Management of Major Trauma

### **Module 19: Assessment and Emergency Management of Burns (90 minutes)**

In this topic we examine the immediate priorities in the patient presenting with major burns and consider not only the immediate life threats such as airway obstruction but highlight the importance of fluid resuscitation, prevention of hypothermia and search for other injuries that contribute morbidity and delayed mortality as a consequence of burn injury.

- Chapter Readings: Management of Burns
- Video eTutorial: Burn Injury
- Interactive module: Clinical Case book – Management of Burn Injury
- Graded Quiz- Burn Injury

### **Module 20: Approach to Managing Acute Pain (90 minutes)**

Although the relief of acute pain is the most common reason that patients seek emergency care research studies have documented that acute pain is frequently poorly managed in the ED setting. There is often a complete failure to provide any form of analgesia in a timely manner and even when analgesia is provided it is often ineffective due to either poor drug selection, inappropriate route of administration or inadequate dosing. This phenomenon is so significant that it has been given its own name – “Oligoanalgesia”. In the following modules we explore the principles for assessing and treating acute pain and will find that in most cases it does not require a significant amount of our time but only a thoughtful and informed approach to providing pain relief.

- Chapter Readings: Acute Pain – Core Principles in Management
- Chapter Readings: Pharmacology of Analgesic Agents
- Interactive module: Clinical Case book – Controlling Severe Acute Pain
- Interactive module: Clinical Case book – Maintaining Pain Relief – Planning Discharge
- Graded Quiz- Introduction to Pain Management

### **Module 21: Upper Limb Orthopaedic Trauma (90 minutes)**

Acute Orthopaedic injury is a common emergency presentation and occurs across all age groups with injuries ranging from minor through to limb or even life threatening. In this module, we explore the clinical and radiological assessment of the patient with orthopaedic injury and review the presentation, diagnosis and treatment of a selection of upper limb fractures and dislocations.

- Video eTutorial: Clinical Assessment of Orthopaedic Injury
- Video eTutorial: Xray Interpretation in Orthopaedic Injury
- Interactive module: Clinical Case book – Introduction to Upper Limb Injuries
- Graded Quiz- Introduction to Upper Limb Orthopaedic Injuries

### **Module 22: Lower Limb Injuries (90 minutes)**

In this topic we focus on injuries to the lower limb and examine a number of significant orthopaedic injuries including such as fractured neck of femur and fractured femoral shaft and limb threatening injuries such as fractured tibia and fibula with the significant risk of compartment syndrome.

- Chapter Readings: Ankle and Foot Orthopaedic Injuries
- Video eTutorial: Introduction to Lower Limb Injuries
- Interactive module: Clinical Case book – Lower Limb Injuries
- Graded Quiz- Introduction to Lower Limb Orthopaedic Injuries

### **Module 23: Introduction to Eye Emergencies (90 minutes)**

Assessment of the patient presenting with an acute eye begins by establishing a history of the problem and associated eye symptoms. Assessment focuses initially on looking for "Red Flags in the Eye" ; these are clinical features in the presenting history and examination that indicate an increased risk for serious disease. In the following module we outline the procedure for examining the eye, the red flags that signify a high risk for eye threatening disease and explore the approach to patient presenting with an acute red eye. Causes for "red eye" vary widely from benign conditions, such as viral conjunctivitis, through to conditions that may, unless diagnosed and treated early, threaten sight in one or both eyes. It is not uncommon for serious disease to be missed in patients, so a careful history and examination is essential.

- Chapter Readings: Acute Red Eye
- Interactive module: Clinical Case book – Eye examination and Red flags
- Video eTutorial: Eye Emergencies
- Graded Quiz- Introduction to Eye Emergencies

### **Module 24: ENT Emergencies (90 minutes)**

There are a wide range of ENT emergencies and in this module we explore three of the most difficult ENT emergencies; epistaxis, severe tonsillitis / peritonsillar abscess (quinsy) and bells palsy. Severe tonsillitis is a common presentation and after ensuring there is no threat to the airway may be effectively managed medically in most cases with significant relief of the patient's symptoms. In the patient with bells palsy the focus is often excluding other causes for facial palsy, prevention of eye injury and considering the role of pharmacological management.

Epistaxis can range from the trivial self-limited nose bleed to bleeding that results in life-threatening airway obstruction and circulatory shock. The patient presenting with epistaxis requires careful assessment and the potential for it to seriously compromise haemodynamic function should never be underestimated, especially in the elderly and patients on antiplatelet agents or anticoagulants. This case simulation explores the aetiology, assessment, investigation and management of epistaxis.

- Chapter Readings: Tonsillitis/Peritonsillar abscess, Epistaxis
- Video eTutorial: ENT Emergencies
- Interactive module: Clinical Case book – Epistaxis
- Graded Quiz- Epistaxis