

# Cyanosis and hypoxia

(March 2023)

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## Rationale

Cyanosis is the bluish discolouration of the tissues that results from increased concentration of reduced hemoglobin. Hypoxia is defined as insufficient levels of oxygen in tissues to maintain cell function. These findings could indicate a serious underlying condition and may require urgent management.

## Causal Conditions

(list not exhaustive)

- Central cyanosis or hypoxemia
  - a. High alveolar-arterial (A-a) gradient
    - Shunting, intrapulmonary (e.g., acute respiratory distress syndrome)
    - Ventilation perfusion mismatch (e.g., cystic fibrosis, pulmonary embolus)
    - Diffusion impairment (e.g., restrictive lung disease)
  - b. Normal A-a gradient
    - Hypoventilation (e.g., opioid overdose)
    - High altitude
- Peripheral (e.g., low cardiac output, cold exposure)

## Key Objectives

Given a patient with cyanosis, the candidate will diagnose the cause, severity, and complications, and will initiate an appropriate management plan. Particular attention should be paid to determining if hypoxemia or hypoxia is present.

## Enabling Objectives

Given a patient with cyanosis, the candidate will

- list and interpret critical clinical findings, including those derived from an appropriate history and physical examination to distinguish central from peripheral cyanosis and to determine possible causes, severity, and complications;
- list and interpret critical investigations (e.g., calculation of A-a gradient); and
- construct an effective initial management plan, including
  - a. initiating resuscitation if the patient is critically ill;
  - b. initiating treatment of the underlying cause;
  - c. referring the patient to specialized care if indicated; and
  - d. counselling and educating the patient about preventive measures, if applicable.