

## 1

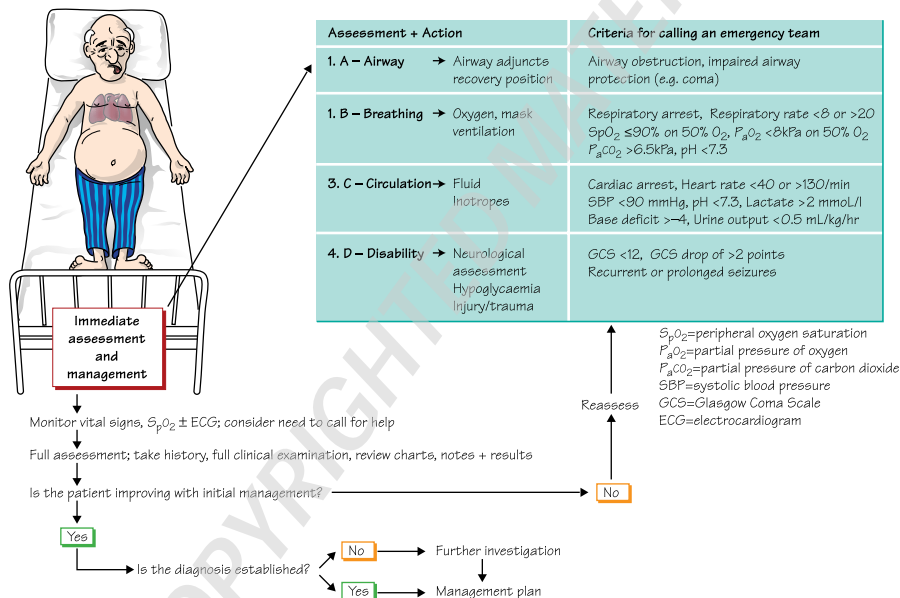
# Recognising the unwell patient

**Figure 1a Early Warning Score:** an aggregate score  $\geq 5$  is the key trigger threshold for urgent clinical review. For example a 'Medical Emergency Team' (MET) composed of doctors/senior nurses familiar with acutely unwell patient management, should be summoned. If the score is  $\geq 7$  the response team must include staff with critical care skills (e.g. airway management).

Parameter / Score	3	2	1	0	1	2	3	Notes on chart
Breath rate/min	$\leq 8$		9–11	12–20		21–24	$\geq 25$	A dedicated SpO <sub>2</sub> scale (SpO <sub>2</sub> scale 2) is included for use in patients with hypercapnic respiratory failure (usually due to COPD) in whom an SpO <sub>2</sub> of 88–92% is recommended.
SpO <sub>2</sub> Scale 1	$\leq 91$	92–93	94–95	$\geq 96$				
SpO <sub>2</sub> Scale 2	$\leq 83$	84–85	86–87	88–92	93–94 on oxygen	95–96 on oxygen	$\geq 97$ on oxygen	'New confusion' (i.e. disorientation, delirium or new alterations to mentation) is added to the previous AVPU score, which becomes ACVPU (where C represents confusion)
Air or Oxygen?		Oxygen		Air				
Systolic BP (mmHg)	$\leq 90$	91–100	101–110	110–219			$\geq 220$	Urine output is not included in the early warning score as it is not always available but monitoring is essential in some patients
Heart rate (beats/min)	$\leq 40$		41–50	51–90	91–110	111–130	$\geq 131$	
Level of consciousness				Alert			C, V, P or U	
Temperature	$\leq 35.0$		35.1–36.0	36.1–38.0	38.1–39.0	$\geq 39.0$		

BP = blood pressure, A = alert, C = confused, V = response to voice, F = response to pain, U = unresponsive to voice or pain (or unconscious)

**Figure 1b Assessing the acutely ill patient.**



**Figure 1c Clinical features of underlying lung disease.**

Disorder	Chest wall movement	Percussion note	Breath sounds	Added sounds
Consolidation	↓ on affected side	↓ Dull	Bronchial	Coarse crackles
Collapse	↓↓ on affected side	↓ Dull	Absent or bronchial	None
Pleural effusion	↓ on affected side	↓↓ Stony dull	Diminished	None (trub)
Pneumothorax	↓↓ on affected side	Normal or hyperresonant	Absent or diminished	None
Asthma/COPD	↓ on both sides Hyperinflation Accessory muscles	Normal or hyperresonant	Vesicular with prolonged expiration	Expiratory wheeze

## Wise owl reading

Resuscitation Council UK Guidelines. 2015. The ABCDE approach. [www.resus.org.uk/library/2015-resuscitation-guidelines/abcde-approach](http://www.resus.org.uk/library/2015-resuscitation-guidelines/abcde-approach)  
 2021 Resuscitation Guidelines. 2021. <https://www.resus.org.uk/library/2021-resuscitation-guidelines>  
 Royal College of Physicians. National Early Warning Score (NEWS) 2. 2017. [www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2](http://www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2)



In the acutely unwell patient, assessment of deranged physiology and immediate resuscitation precedes diagnostic considerations because incomplete history, cursory examination and limited investigation often preclude classification by primary organ dysfunction. It is this initial diagnostic uncertainty and the need for immediate physiological support that defines critical care medicine.

## Recognising the acutely unwell patient

Early recognition that a patient's condition is deteriorating is essential and should initiate immediate action to correct abnormal physiology and prevent vital organ damage (e.g. brain). Clinical severity may be obvious: as in sudden, catastrophic events (e.g. pulmonary embolism) or presentation with established severe illness (e.g. emergency room). In these cases, organ damage may have already occurred but immediate action prevents further injury. It is the failure to recognise progressive deterioration (e.g. worsening physiological variables), and to initiate timely preventative action, that is a common, and unacceptable, cause of harm, which must be avoided.

**Identification of 'at-risk' patients** (e.g. post-operative) allows complications to be anticipated and prevented. 'At-risk' patients must be monitored, deterioration recognised and appropriate action initiated. Simple physiological parameters including temperature, blood pressure (BP), heart rate, respiratory rate, urine output and conscious level correlate with mortality. One, two or three abnormalities correlate with 30-day mortalities of 4.4, 9.2 and 21.3%, respectively. Early warning systems based on these parameters (Figure 1a) promote early detection and trigger interventions aimed at preventing deterioration, critical care admissions and cardiac arrests.

## Assessment of the acutely ill patient

A normal response to the question 'Are you alright?' indicates that a patient's airway is patent and that they are breathing, conscious and orientated. No response (e.g. coma) or difficulty responding (e.g. breathlessness) suggests serious illness. Immediate assessment and management of these acutely ill patients are summarised in Figure 1b. They aim to ensure patient safety and survival rather than to establish a diagnosis. Assessment starts with detection and simultaneous treatment of life-threatening emergencies. It uses the **ABC system**: **A** – Airway, **B** – Breathing, **C** – Circulation, in this order, because airway obstruction causes death faster than disordered breathing, which in turn causes death faster than circulatory collapse. Appropriate life-saving procedures or investigations are performed (e.g. airway clearance, pneumothorax decompression) during examination (i.e. before the next step). Simple monitors (e.g. saturation, BP) are used to assist assessment when safely possible.

**Airway obstruction** (Chapters 5, 11) is a medical emergency and unless rapidly corrected leads to hypoxia, coma and death within minutes. Causes include aspiration (e.g. food, teeth, vomit), laryngeal oedema (e.g. allergy, burns), bronchospasm and pharyngeal obstruction by the tongue when reduced tone causes it to fall backwards in obtunded patients.

- **Complete obstruction** is characterised by absent airflow (feel over the patient's mouth), accessory muscle use, intercostal recession on inspiration, paradoxical abdominal movement and absent breath sounds on chest auscultation.
- **Partial obstruction** reduces airflow despite increased respiratory effort. Breathing is often noisy, with 'stridor' suggesting laryngeal and 'snoring' nasopharyngeal obstruction.

Simple measures correct most airway obstruction. Suction removes blood, vomit and foreign bodies. Obstruction by the tongue (i.e. during coma) can usually be prevented by chin lift manoeuvres or insertion of an oropharyngeal (Guedel) airway. Occasionally endotracheal intubation or, rarely, emergency cricothyroidectomy are required.

**Breathing** (Chapters 5, 11) The most useful early sign that breathing is compromised is a respiratory rate  $\leq 8$  or  $\geq 20$ /minute. Central cyanosis is usually a late sign. Examine depth and pattern of breathing, accessory muscle use, abdominal breathing and chest wall expansion. Abnormal expansion, altered percussion note (e.g. hyperresonance), airway noise (e.g. stridor) and breath sounds may determine the cause of underlying lung disease (Figure 1c). Saturation ( $S_pO_2$ ), measured by pulse oximetry, and inspired oxygen concentration ( $F_iO_2$ ) should be recorded. Arterial blood gases (ABGs) provide information about ventilation as well as oxygenation (i.e. a high  $P_aCO_2$  indicates poor ventilation). The  $S_pO_2$  should be  $>90\%$  in all critically ill patients. Respiratory acidosis ( $pH < 7.3$ ,  $P_aCO_2 > 6.7$  kPa) or hypoxaemia despite high-flow oxygen therapy ( $S_pO_2 < 90\%$ ,  $P_aO_2 < 8$  kPa) requires urgent intervention. Treatment depends on cause (e.g. chronic obstructive pulmonary disease [COPD]) and is discussed in later chapters.

**Circulation** (Chapters 5, 8) Assessment includes central and peripheral pulses (i.e. rate, rhythm, equality), BP peripheral perfusion (e.g. limb temperature), urine output and conscious level. Initially BP is maintained by compensatory mechanisms (e.g. increased peripheral resistance). Cardiac output (CO) has to fall by  $>20\%$  (i.e. equivalent to 1 L of rapid blood loss) before BP falls. Thready, fast pulses indicate poor CO, whereas bounding pulses suggest sepsis. Capillary refill time is usually  $<2$  seconds and prolongation suggests poor tissue perfusion. Metabolic acidosis (base excess  $> -4$ ) and raised lactate ( $>2$  mmol/L) on ABG may be due to tissue hypoxia. Hypovolaemia should be considered the primary cause of shock, unless there is obvious heart failure (i.e. resuscitate with intravenous fluids [Chapters 9, 11]).

**Disability** Neurological status is rapidly determined by pupil examination and assessment of conscious level using simple systems (Figure 1a) or the Glasgow Coma Scale (Chapters 3, 72). Exclude hypoglycaemia, ischemia and injury (e.g. hip fracture) in every patient.

**Full patient assessment** When stability has been restored and assistance summoned, a thorough history and examination is required. Review the patient's notes, treatment, investigations and charts. If a diagnosis has not been established, arrange further investigations as appropriate. Document and communicate a clear management plan.

Management of the acutely unwell patient often involves several teams (e.g. medicine, surgery, critical care) but should be a 'seamless' process in which cooperation, communication and patient interests are foremost. Treatment should occur in clinical areas where staffing and technical support are matched to patient needs.

### Pearl of wisdom

Monitoring of simple physiological parameters reliably identifies early clinical deterioration. Trends in these parameters are often more useful than isolated values

