IPQ Nurse Training

The Respiratory System and Arterial Blood Gas Analysis

Workplace competency record: respiratory assessment, oxygen therapy, ABG sampling and interpretation

Version 1.0, October 2026. Review due October 2027.

Complete this record alongside The Respiratory System and Arterial Blood Gas Analysis e-learning, during supervised practice in your own clinical area. It covers respiratory assessment, oxygen therapy, arterial blood gas sampling and interpretation of the result. It does not cover non-invasive ventilation, intubation, chest drain management, or arterial line insertion.

Step 1	Step 2	Step 3	Then
E-learning passed	**Supervised practice and assessment**	**Independent practice**	**Reassessment at your employer's interval**

How this course works

This course has no classroom session. Competence is built and assessed where you work, with a competent practitioner. Sign-off in section 9 is what authorises independent practice, within your employer's policy.

Before you begin section 3

Arterial blood gas sampling is a separate, invasive skill. Section 3 is completed only by practitioners whose employer has authorised them to take arterial samples. If you are not authorised to sample, leave section 3 blank and your assessor signs the record for sections 1, 2, 4 and 5 only. Interpreting a result is not the same as taking one.

Practitioner and assessment details

Name		**Job title and band**	
NMC PIN		**Ward or department**	
Organisation		**Named assessor**	
Date e-learning passed		**Authorised to take ABGs? (Y/N)**	

Before you start

Requirement	Date	Confirmed by
E-learning completed and final assessment passed at 16 of 20 or above (certificate seen)		
Local policies read: oxygen prescribing and administration, NEWS2 and escalation, arterial blood gas sampling, sepsis		
Escalation routes confirmed, including critical care outreach, NIV and the resuscitation team		

Requirement	Date	Confirmed by
Knows where the blood gas analyser is, who maintains it, and the local rule on sample transport time		
Understands that passing the e-learning does not authorise arterial sampling or any change to a prescription		

How this record is completed

Your assessor observes you in practice and marks each criterion on the scale below. Up to three observed occasions are recorded in columns 1, 2 and 3. Every criterion must reach level I before that section is signed off.

	Level	What it means
N	**Not yet demonstrated**	Step omitted, performed unsafely, or not explained when asked
P	**With prompting**	Performed correctly but needed a cue, a reminder or a question to prompt the next step
I	**Independently**	Performed correctly, in the right order, without prompting, and able to explain why

Safety-critical criteria

Criteria marked * are absolute. If one of these is not met, the occasion stops there, is recorded as N, and is repeated after further teaching. These are the steps where getting it wrong causes avoidable harm.

Section 1. Respiratory assessment

Observed on a patient who is breathless, or whose respiratory observations have changed.

Criterion	1	2	3	Date and assessor initials
1. Reviews the patient's history, diagnosis and current treatment before assessing, including any chronic lung disease and any previous need for ventilatory support				
2. Introduces themselves, confirms identity, explains the assessment and gains consent				
3. Counts the respiratory rate over a full 60 seconds, without the patient being aware they are being counted, and records the number rather than an estimate *				
4. Observes the work of breathing: accessory muscle use, position, ability to speak in full sentences, pursed-lip breathing, nasal flaring, intercostal or tracheal recession				
5. Observes symmetry and depth of chest movement and notes any abnormal pattern (Kussmaul, Cheyne–Stokes, agonal)				
6. Records SpO2 with a correctly positioned probe, checks the trace or signal quality, and states the limits of pulse oximetry (poor perfusion, movement, nail varnish, carbon monoxide, dark skin pigmentation, severe anaemia)				
7. States the oxygen the patient is receiving at the time the saturation is read, including device and flow rate or FiO2, and records it with the reading				
8. Completes a structured A to E assessment and identifies which findings belong to which part of it				
9. Auscultates or, where this is outside their role, escalates for auscultation; describes added sounds in plain terms (wheeze, crackles, reduced air entry, stridor)				
10. Calculates NEWS2 correctly, including choosing between Scale 1 and Scale 2, and does not omit the score because the patient "looks well" *				
11. Recognises and acts immediately on red flags: a respiratory rate of 25 or above or below 8, exhaustion, silent chest, new confusion, cyanosis, or a falling respiratory rate in a deteriorating patient *				
12. Documents the full set of respiratory observations, the NEWS2 score, the oxygen in use and the action taken, in the patient's record, contemporaneously				

Watch for this

A falling respiratory rate in a patient who was tachypnoeic is not improvement. It is one of the most commonly missed signs of exhaustion and impending arrest. The practitioner must say this unprompted.

Section 2. Oxygen therapy and target saturations

Oxygen is a drug. Observed administering oxygen to a prescription, and adjusting it within that prescription.

Criterion	1	2	3	Date and assessor initials
1. Checks that oxygen is prescribed with a target saturation range, and does not start or change it outside that prescription except in an emergency, which is then escalated and documented *				
2. States the target range for most acutely ill adults (94 to 98%) and the range for patients at risk of hypercapnic respiratory failure (88 to 92%), and can say which applies to the patient in front of them and why				
3. Uses NEWS2 Scale 2 only for patients with a documented clinical indication and a prescribed 88 to 92% target, and uses Scale 1 for everyone else *				
4. Selects an appropriate delivery device for the flow required and states its approximate delivered oxygen range: nasal cannulae, simple face mask, non-rebreathe reservoir mask, and the fixed-performance Venturi devices				
5. Sets the flow rate correctly for a Venturi device, stating that the flow written on the barrel is the minimum, and does not use a Venturi at a lower flow than specified *				
6. Fully inflates the reservoir bag before applying a non-rebreathe mask and recognises that a flat reservoir bag means the flow is too low *				
7. Titrates oxygen down as the patient improves, and does not leave a patient on more oxygen than the prescription requires				
8. Recognises when a patient breaches the lower limit of their target range, increases oxygen within the prescription, reassesses, and escalates if the response is inadequate				
9. Recognises that in a patient at risk of hypercapnia, uncontrolled oxygen can cause a rising CO2 and worsening acidosis, and escalates for a blood gas rather than simply continuing to increase the flow *				
10. Checks humidification where it is indicated, and checks the patient's comfort, mask fit, pressure areas and mouth care				
11. Documents the device, flow rate or FiO2, the saturation achieved, the target range, and the time of every change				
12. Knows where emergency oxygen, Venturi valves and reservoir masks are kept in their own clinical area, and checks they are available and in date				

Target range	Who it applies to	NEWS2 scale and local note
94 to 98%	Most acutely ill adults	Scale 1
88 to 92%	Patients at risk of hypercapnic respiratory failure, where a target has been documented	Scale 2, and only with that documented indication
As prescribed	Critically ill patients during resuscitation: high-concentration oxygen first, titrated once stable	Scale 1 unless Scale 2 is documented

Local policy

Complete this table with your own organisation’s wording for who gets a Scale 2 target and who may authorise it. Where local policy differs from the ranges above, local policy applies and the difference should be recorded here before the record is used.

Section 3. Arterial blood gas sampling

Completed only by practitioners their employer has authorised to take arterial samples. Leave blank if you are not authorised.

If this does not apply to you

If this section is not applicable, write "not authorised to sample" across it and date it. Your assessor then signs the record for sections 1, 2, 4 and 5 only. Interpreting a blood gas does not require this section.

3a. Arterial puncture

Criterion	1	2	3	Date and assessor initials
1. Confirms there is a clinical indication for the sample and that the result will change management; does not take a gas as a routine observation *				
2. Checks for contraindications and cautions: anticoagulation or coagulopathy, local infection, arteriovenous fistula, previous surgery to the limb, planned use of the vessel				
3. Performs and documents an assessment of collateral circulation before radial puncture, in line with local policy, and does not proceed if it is inadequate *				
4. Explains the procedure honestly, including that it is more painful than venepuncture, and gains and records informed consent				
5. Offers local anaesthetic where local policy allows it, and does not dismiss the patient's pain				
6. Prepares the equipment: pre-heparinised blood gas syringe, appropriate needle, skin antisepsis, gauze, sharps bin, and checks the analyser is available and working				
7. Decontaminates hands, applies personal protective equipment, and prepares the skin and allows it to dry before puncture *				
8. Positions the limb correctly, palpates and identifies the artery, and punctures at the correct angle for the site				
9. Makes no more than the number of attempts permitted by local policy, and escalates rather than repeating indefinitely *				
10. Collects an adequate volume, expels air immediately, caps the syringe, and mixes the sample properly				
11. Applies firm pressure for the time local policy requires, and for longer if the patient is anticoagulated; checks the site before leaving the patient *				
12. Disposes of sharps at the point of use, in the correct container, and never re-sheathes				
13. Labels the sample at the bedside, records the FiO2 or oxygen device and flow, the temperature, and the time taken				
14. Gets the sample to the analyser within the time local policy allows, and knows what to do if that time cannot be met *				
15. Checks the site again for haematoma, pain, pallor or altered sensation, and knows the signs of arterial injury and who to escalate them to				

Criterion	1	2	3	Date and assessor initials
16. Documents the procedure, the number of attempts, the sample conditions, the result and the action taken				

3b. Sampling from an arterial line

Criterion	1	2	3	Date and assessor initials
1. Checks the line is patent, correctly zeroed and transducing an arterial waveform, and that the dressing and connections are intact				
2. Confirms the flush solution is 0.9% sodium chloride only, and that no glucose-containing or drug-containing fluid is attached to an arterial line *				
3. Decontaminates hands, applies personal protective equipment including eye protection, and decontaminates the sampling port and allows it to dry				
4. Withdraws and discards or reserves the correct dead-space volume according to local policy and the sampling system in use				
5. Takes the sample in the correct order, expels air, caps and mixes it				
6. Flushes the line correctly and confirms the waveform has returned before leaving the patient *				
7. Keeps the system closed where a closed sampling system is used, and does not introduce air into the line				
8. Never injects anything into an arterial line and can say why *				
9. Checks the limb distal to the line for perfusion, colour, warmth and sensation, and escalates any change immediately				
10. Documents the sample, the volume discarded, the result and the action taken				

Sample errors

Common errors that change the result, and which the practitioner must be able to name: air bubbles left in the syringe (falsely high PaO2, falsely low PaCO2), venous sampling (low PaO2 with a normal-looking saturation picture), delay before analysis (falling PaO2 and pH, rising PaCO2), too little blood in a heparinised syringe (dilution), and failure to record the FiO2, which makes the PaO2 uninterpretable.

Section 4. Interpreting the result and acting on it

Observed interpreting real results from the practitioner's own clinical area, using the six-step method.

Criterion	1	2	3	Date and assessor initials
1. States the oxygen the patient was receiving before interpreting the PaO2, and will not interpret a gas without it				
2. Step 1: assesses the patient, not only the numbers, and states what the clinical picture is				
3. Step 2: assesses oxygenation. Judges whether the PaO2 is adequate for the oxygen given, and recognises when it is not				
4. Step 3: assesses the pH and names the disturbance as acidosis, alkalosis or normal				
5. Step 4: assesses the respiratory component (PaCO2) and the metabolic component (HCO3 and base excess) and identifies which one matches the pH				
6. Step 5: assesses compensation and describes it correctly as uncompensated, partially compensated or fully compensated				
7. Step 6: states the likely cause in the context of this patient, and what needs to happen next				
8. Distinguishes Type 1 from Type 2 respiratory failure from the gas and states what each means for oxygen therapy and for escalation *				
9. Recognises acute respiratory acidosis with a rising PaCO2 and a falling pH as a medical emergency requiring immediate escalation, and does not wait for a repeat gas *				
10. Recognises a normal or rising PaCO2 in an acutely breathless asthmatic as a sign of exhaustion and escalates immediately				
11. Recognises a raised lactate and states what it may indicate and what it should prompt				
12. Recognises a mixed disorder, and does not force a result into a single category				
13. Correlates the result with SpO2 and recognises when the two do not agree, and what that might mean				
14. Repeats the gas when local policy or the clinical picture requires it, and compares results over time rather than reading one in isolation				
15. Knows the limits of their own role: interprets and escalates, and does not alter a prescription, start non-invasive ventilation, or withhold treatment on the basis of their own interpretation alone *				
16. Documents the result, the interpretation, who it was escalated to and what was decided				

Section 5. Escalation, communication and documentation

Criterion	1	2	3	Date and assessor initials
1. Escalates according to the NEWS2 score and local escalation policy, within the timeframe that policy sets, and does not delay to gather more information *				
2. Hands over using SBAR, including the respiratory rate, the saturation, the oxygen in use, the NEWS2 score, the trend and the blood gas result if there is one				
3. States clearly what they are asking for, and what they are worried about				
4. Escalates again if the response is inadequate or does not come, and knows the route for doing so, including going above the first responder *				
5. Knows when to call the resuscitation team rather than continue escalating				
6. Knows the local route to critical care outreach and to non-invasive ventilation, and what information those teams will ask for				
7. Involves the patient and, where appropriate, those close to them, and checks for any advance decision, ReSPECT form or treatment escalation plan before escalating				
8. Recognises when a patient is approaching the end of life and that breathlessness then needs a different response, and escalates for a palliative review rather than escalating treatment				
9. Documents the escalation, the time, who responded, what was decided and the plan for review				
10. Reports an incident where one has occurred, including a failed sample, a delayed escalation, or oxygen given outside a prescription				

Assessor note

Escalating is a clinical skill in its own right, and so is escalating a second time. A practitioner who recognised deterioration, handed it over, and then accepted an inadequate response has not completed the task. Assessors should test this directly.

Section 6. Underpinning knowledge

Asked verbally by the assessor. Record the substance of the answer, not a tick.

Question	Response noted by assessor
1. Where does gas exchange happen, and what has to be true of the alveolus and the capillary for it to work?	
2. What is V/Q mismatch, and why does a shunt respond poorly to oxygen while a dead-space problem responds better?	
3. Why does a diffusion problem affect oxygen before it affects carbon dioxide?	
4. What drives breathing in a healthy person, and what changes in someone with chronically raised CO2?	
5. What is the difference between Type 1 and Type 2 respiratory failure, in numbers and in what it means for the patient?	
6. Why can uncontrolled oxygen harm a patient at risk of hypercapnic respiratory failure? Give more than one mechanism.	
7. Which patients should have a target saturation of 88 to 92%, and who decides that?	
8. What are the limits of pulse oximetry? Name at least four situations where the reading cannot be trusted.	
9. Walk me through the six-step method for reading a blood gas.	
10. What are the three rules of compensation, and how do you tell partial from full compensation?	
11. What does a raised lactate tell you, and what does it not tell you?	
12. Name four things that can make a blood gas result wrong before it reaches the analyser.	
13. What is the difference between a respiratory acidosis that is acute and one that is chronic, and how would you tell from the gas?	
14. A patient's respiratory rate has fallen from 32 to 14 and they look calmer. What are the two possible explanations and how do you decide which it is?	

Section 7. Scenarios

Talked through with your assessor. Record what the practitioner says they would do, and in what order.

Question	Response noted by assessor
1. A 68-year-old with known COPD is admitted breathless. SpO2 is 86% on air, respiratory rate 28. There is no oxygen prescription yet. What do you do, in what order, and what do you aim for?	
2. The same patient is now on 6 litres via a simple face mask with a saturation of 97%, and is drowsy. What are you thinking, and what do you do first?	
3. A 24-year-old with acute asthma cannot speak in full sentences. Their blood gas shows a PaCO2 of 5.4 kPa, which the registrar calls "normal". What is your response?	
4. A post-operative patient has a respiratory rate of 9, pinpoint pupils and a NEWS2 of 6. What do you do?	
5. You take an arterial sample and the result shows a PaO2 of 7.1 kPa on 15 litres of oxygen, but the patient is talking comfortably and the SpO2 reads 96%. What do you suspect, and what do you do?	
6. A patient with pneumonia has a pH of 7.29, PaCO2 of 3.4 kPa, HCO3- of 12 mmol/L and a lactate of 4.8. What is the disturbance, what is the likely cause, and who do you call?	
7. You escalate a NEWS2 of 7 with a respiratory rate of 30. Forty minutes later nobody has attended and the patient is worse. What do you do?	
8. You are asked to take an arterial blood gas on a patient whose anticoagulation was given an hour ago, and you have not been authorised to sample. What do you do?	

Section 8. Supervised practice log

Record every supervised episode, including those that did not go to plan. Your employer sets the number required.

Date	What you did (assessment, oxygen titration, sampling, interpretation, escalation…)	What you would do differently	Level (N/P/I)	Supervisor initials

Blood gases interpreted

Record the results you interpreted with your assessor. Three correctly interpreted gases from your own clinical area, including at least one abnormal respiratory and one abnormal metabolic result, is a reasonable minimum.

Date	pH / PaCO2 / PaO2	HCO3 / BE / lactate / FiO2	Interpretation and action	Assessor initials

Section 9. Reflection and action plan

Write a short reflective account against this course for your revalidation portfolio. The prompts below are a starting point, not a form to fill in.

A breathless patient whose assessment changed what happened next. What did you notice, and what did you do?

Something you now do differently with oxygen, or with escalation, because of this course.

A gap you still have, and how you will close it.

Agreed actions

Action	How it will be evidenced	By when

Section 10. Assessment of competence and sign-off

Completed by a competent assessor after direct observation in practice, when every applicable criterion in sections 1 to 5 is at level I and sections 6 and 7 have been answered satisfactorily.

Requirement	Date	Assessor initials
Sections 1, 2, 4 and 5: every criterion observed at level I		
Section 3: completed at level I, or marked not applicable because the practitioner is not authorised to take arterial samples		
Section 6: underpinning knowledge answered satisfactorily		
Section 7: scenarios answered satisfactorily, including the oxygen and escalation scenarios		
Section 8: supervised practice log and blood gas log completed to the number your employer requires		
Section 9: reflection and action plan completed with the practitioner		

Scope of this sign-off

Signed off for	Not signed off (delete as applicable)
Respiratory assessment and NEWS2 scoring	Arterial puncture
Oxygen administration to a prescription, and titration within it	Sampling from an arterial line
Interpretation of arterial blood gas results	Non-invasive ventilation
Escalation, SBAR handover and documentation	Any procedure requiring separate sign-off

Assessor declaration

I confirm that the practitioner named in this record has completed The Respiratory System and Arterial Blood Gas Analysis e-learning, has been directly observed in practice, and has demonstrated every applicable criterion at level I. They are assessed as competent to carry out respiratory assessment, to administer and titrate oxygen within a prescription, to interpret arterial blood gas results, and to escalate appropriately, independently and within this organisation's policy, subject to ongoing review.

Assessor name, signature and date	Practitioner signature and date	Reassessment due

What this record does not cover

Passing the e-learning does not authorise arterial blood gas sampling. Sampling is authorised by your employer, in writing, and section 3 of this record evidences competence in it only where that authorisation already exists. This record does not authorise any change to an oxygen prescription, the initiation of non-invasive ventilation, or any other procedure requiring separate training and sign-off, and it does not replace your employer's own competency framework.

Built on: NMC Code; British Thoracic Society guideline for oxygen use in healthcare and emergency settings (2017); Royal College of Physicians NEWS2 (2017); NICE NG115 (COPD) and NG191 (COVID-19 rapid guideline) where relevant; Resuscitation Council UK guidelines; GOV.UK and local policy on blood gas analyser quality assurance. Local policy applies where it differs.