



PAEDIATRICS

Neonatology Mastery

From the labour room to the nursery, with confidence.

7 days

live-online · recorded

Fee PKR 3,000

Coming soon

Day 1 Normal to Critical Newborn Care

The Foundation Every Other Day Builds On · 2 hours

Delivery Room Assessment & Resuscitation

Recognise

- The three rapid assessment questions at birth: term gestation? good tone? breathing or crying? — if all three are yes, the baby stays with mother; if any is no, proceed to the warmer
- APGAR scoring at 1 and 5 minutes as a communication and documentation tool — it does not, by itself, guide resuscitation decisions in real time

Confirm & Decide — The NRP Algorithm

Finding	Action
Not breathing / gasping, or HR <100	Positive pressure ventilation (PPV) within the Golden Minute — this is the single most important intervention in all of neonatal resuscitation
HR <60 despite 30 seconds of effective PPV (chest rise confirmed, corrective steps applied)	Begin chest compressions, coordinated 3:1 with ventilation; increase oxygen to 100%
HR remains <60 despite effective PPV and compressions	IV/IO epinephrine 0.01-0.03mg/kg (1:10,000 concentration), repeated every 3-5 minutes if needed
No response to the above	Consider hypovolaemia (volume expansion) and pneumothorax as reversible causes before assuming the resuscitation has failed

Thermoregulation — The Golden Hour

Recognise

- Normal neonatal temperature range: 36.5-37.5°C — both hypothermia and iatrogenic hyperthermia carry real, distinct risks and neither should be treated as a minor detail
- The four mechanisms of neonatal heat loss: evaporation (wet skin at birth — the largest and most preventable loss), conduction, convection, and radiation

Manage

- The golden hour bundle: dry immediately, skin-to-skin or radiant warmer, cap the head (a disproportionately large surface area for heat loss), delay the first bath, and keep the resuscitation area genuinely warm before the baby ever arrives in it
- Preterm infants under 32 weeks: polyethylene wrap without drying, directly onto the warmer, in addition to standard measures — drying a very preterm infant's fragile skin can itself cause injury
- Hypothermia on admission is independently associated with worse outcomes, including increased mortality in preterm infants — this is not a cosmetic vital sign, it is a genuine marker to actively prevent, not just record

Fluid & Feeding Basics

Manage — Day-One Fluid Blueprint

- Term infants on IV maintenance fluids (NICE NG29): 50-60mL/kg/day on day 1, 70-80mL/kg/day on day 2, 80-100mL/kg/day on day 3, 100-120mL/kg/day on day 4, and 120-150mL/kg/day from day 5
- Preterm infants need higher starting volumes given greater insensible water loss through immature skin — this is expanded in full, with the exact staged protocol, on Day 7

- Expect and do not over-correct: physiological weight loss of up to 8-10% in the first week is normal, reflecting genuine diuresis, not inadequate feeding

Recognise — Feeding Difficulty

- Effective breastfeeding cues: audible swallowing, a relaxed hand/arm during the feed, 6+ wet nappies by day 5, and weight regain to birth weight by 2 weeks
- Red flags for genuine feeding difficulty: poor latch that doesn't improve with positioning support, excessive sleepiness at the breast, weight loss beyond 10%, or delayed weight regain beyond 3 weeks

Recognising the Newborn Who Is Quietly Becoming Unwell

Recognise

- Newborns decompensate differently from older children — subtle, non-specific signs often precede an obvious crisis by hours, which is exactly why this skill matters more here than almost anywhere else in paediatrics
- The genuinely useful red flag combination: poor feeding PLUS lethargy/reduced handling response PLUS temperature instability (either direction) — any one alone is worth noting; two or more together warrants same-visit escalation
- Subtle respiratory signs worth active screening: mild grunting, nasal flaring, or a respiratory rate consistently above 60 even at rest — easy to miss on a brief OPD glance, and exactly the findings this workshop trains you to actively look for rather than passively observe

Day 2 Respiratory Excellence

RDS, TTN, MAS, BPD, and the Ventilation Basics Every Neonatologist Needs · 2 hours

Respiratory Distress Syndrome (RDS)

Recognise

- Surfactant deficiency in the preterm lung — onset within minutes to hours of birth, worsening over the first 24-48 hours without treatment: grunting, nasal flaring, subcostal/intercostal recession, tachypnoea
- Chest X-ray: diffuse fine granular ('ground-glass') opacities with air bronchograms, low lung volumes — the classic pattern to recognise on sight

Manage — The Exact Blueprint

- Antenatal corticosteroids (betamethasone/dexamethasone) to the mother when preterm delivery is anticipated — the single most effective preventive intervention, reducing both RDS incidence and severity
- Early CPAP as the initial respiratory support strategy for spontaneously breathing preterm infants, reserving intubation and surfactant for those who fail CPAP or need it from the outset
- Surfactant (poractant alfa — Curosurf — is the most widely used preparation): dosed by weight, given via a LISA (less invasive surfactant administration) technique where the infant is breathing adequately, or via ETT if intubated; redose if ongoing high oxygen requirement
- Wean respiratory support based on oxygen requirement and work of breathing trending down, not by a fixed calendar schedule

Transient Tachypnoea of the Newborn (TTN)

Recognise

- Delayed clearance of fetal lung fluid — classically the term or late-preterm infant born by elective caesarean section without labour, presenting with tachypnoea within the first few hours
- Chest X-ray: prominent perihilar streaking, fluid in the horizontal fissure — a genuinely different pattern from RDS's ground-glass appearance, and this distinction matters for prognosis and counselling

Manage

- Supportive care — supplemental oxygen as needed, feeding support if respiratory rate is too high for safe oral feeding; typically resolves within 24-72 hours
- The key counselling point: this is self-limiting, and the family can be told this with genuine confidence once the diagnosis is clear

Meconium Aspiration Syndrome (MAS)

Recognise

- History of meconium-stained liquor plus respiratory distress in a term or post-term infant; can range from mild tachypnoea to severe respiratory failure with air trapping
- Chest X-ray: patchy, asymmetric infiltrates alongside areas of hyperinflation — a genuinely 'busy,' irregular pattern distinct from both RDS and TTN

Manage

- Supportive respiratory care matched to severity — from supplemental oxygen through to mechanical ventilation for severe disease; avoid unnecessary aggressive suctioning of a

vigorous infant, which current resuscitation guidance no longer recommends as routine

- Watch specifically for secondary PPHN, a genuinely common and dangerous complication of severe MAS, covered in full on Day 3

CPAP, Ventilation Basics & Weaning

Manage

- CPAP provides continuous distending pressure to keep alveoli open between breaths — the reasoning, not just the numbers, is what this session builds, so you understand WHY a pressure or flow change is being made, not just what number to dial in
- Basic ventilation strategy: the goal is adequate gas exchange with the LEAST possible pressure and oxygen exposure, since both ventilator-induced lung injury and oxygen toxicity are real, cumulative risks in the preterm lung
- Weaning principles: reduce the most injurious parameter first (typically pressure/FiO₂) as tolerated, guided by blood gas trends and clinical work of breathing, not a fixed protocol applied identically to every infant

Apnoea of Prematurity & Bronchopulmonary Dysplasia (BPD)

Recognise

- Apnoea of prematurity: pauses in breathing >20 seconds, or shorter with bradycardia/desaturation, in a preterm infant without another identifiable cause — a diagnosis of exclusion once sepsis, hypoglycaemia, and other causes are considered
- BPD: persistent oxygen requirement at 28 days of life (or 36 weeks corrected gestational age, depending on the definition used), reflecting the combined injury of prematurity, ventilation, and oxygen exposure on the developing lung

Manage

- Apnoea of prematurity: caffeine citrate (Peyona) is first-line — genuinely one of the best-evidenced neuroprotective interventions in all of neonatology, not just a respiratory stimulant, and this dual benefit is worth stating explicitly to trainees who may otherwise underrate its importance
- BPD: minimise ongoing lung injury (gentlest effective respiratory support), optimise nutrition for growth, and a role for diuretics or corticosteroids in selected, more severe cases under specialist guidance

Day 3 Cardiovascular Care

PDA, PPHN, Shock, and the Heart Disease You Cannot Afford to Miss · 2 hours

Patent Ductus Arteriosus (PDA)

Recognise

- Continuous or systolic murmur at the left upper sternal border, bounding pulses, widened pulse pressure, and in a haemodynamically significant PDA — a hyperdynamic precordium, feeding difficulty, and worsening respiratory status in a preterm infant
- Confirm with echocardiography before treating — clinical signs alone correlate poorly with genuine haemodynamic significance

Manage — The Exact Blueprint

- First: conservative management — supportive care, fluid restriction if appropriate, and watchful waiting, particularly in the first 1-2 weeks, is now the appropriate default for most preterm infants rather than an outdated 'wait and see'
- If pharmacological closure is genuinely indicated: ibuprofen, indomethacin, or paracetamol (acetaminophen) are all evidence-supported options — paracetamol shows comparable efficacy with a more favourable side-effect profile and is a genuinely useful alternative where NSAIDs are contraindicated (renal impairment, active bleeding, thrombocytopenia)
- Surgical ligation or transcatheter device closure is reserved for infants who fail medical therapy or have a contraindication to it, with a hemodynamically significant PDA causing ongoing clinical compromise

Persistent Pulmonary Hypertension of the Newborn (PPHN)

Recognise

- Failure of the normal postnatal fall in pulmonary vascular resistance — presents as severe hypoxaemia disproportionate to the degree of parenchymal lung disease seen on chest X-ray, often with labile oxygenation
- Pre- and post-ductal saturation difference (greater than 10%, or any meaningful gradient) supports right-to-left shunting across the ductus — a genuinely useful, fast bedside confirmatory sign
- Common associations: MAS, sepsis, severe RDS, and pulmonary hypoplasia (e.g. with congenital diaphragmatic hernia)

Manage

- Optimise oxygenation and ventilation first — adequate lung recruitment genuinely reduces pulmonary vascular resistance and should not be skipped in favour of jumping straight to pulmonary vasodilators
- Inhaled nitric oxide as the primary selective pulmonary vasodilator where available; sildenafil as an oral/enteral option, particularly where inhaled nitric oxide access is limited
- Maintain adequate systemic blood pressure — a genuinely important adjunct principle, since a falling systemic pressure worsens right-to-left shunting through the ductus/foramen ovale regardless of how well the pulmonary vasculature itself is treated
- ECMO as an escalation option in refractory cases where available, though this remains inaccessible in most Pakistani centres and is worth acknowledging honestly as a resource-limited-setting reality

Neonatal Shock & Inotrope Selection

Recognise

- Poor perfusion signs: prolonged capillary refill, cool peripheries, weak pulses, mottling, reduced urine output — blood pressure alone is a late and unreliable sole indicator in neonates, particularly preterm infants

Manage — Inotrope Selection by Shock Type

Shock Type	First-Line Approach
Septic shock	Epinephrine (start 0.05mcg/kg/min) or norepinephrine (start 0.02-0.1mcg/kg/min) are now preferred over dopamine as the first vasoactive in septic shock (SSC 2020; the SSC 2026 children's guideline, which applies from 37 weeks' gestation, prefers neither over the other — epinephrine suits cold shock with poor cardiac function, norepinephrine warm vasodilatory shock); start through a good peripheral line rather than waiting for central access; use dopamine (start 5-10mcg/kg/min, maximum ~20mcg/kg/min) only where neither is available, and follow unit protocol in preterm infants, who were not included in the SSC guidelines
PDA-related hypotension	Dopamine, starting lower at 5mcg/kg/min, incrementing by 2mcg/kg/min every 20 minutes; use conservative fluid boluses (10mL/kg) rather than large-volume resuscitation
Cardiogenic shock (e.g. post-asphyxia)	No single agent has clearly superior evidence — dopamine, dobutamine, or epinephrine are all reasonable depending on the specific physiology, ideally guided by functional echocardiography
Refractory shock despite an adequately titrated inotrope	Consider hydrocortisone for catecholamine-resistant shock — a rising or high epinephrine/norepinephrine requirement despite adequate fluids (the SSC guidelines leave this to clinician judgement)

Critical Congenital Heart Disease (CCHD) Screening

Recognise

- Duct-dependent lesions — hypoplastic left heart, critical coarctation, transposition of the great arteries, critical pulmonary atresia — can look deceptively well in the first hours of life, precisely while the ductus remains open, then decompensate rapidly as it closes
- Screen at approximately 24 hours of age in the well-baby nursery; do not screen infants already on supplemental oxygen
- Pulse oximetry alone does NOT reliably detect all duct-dependent lesions, particularly some left-sided obstructive lesions like coarctation — a normal screen does not override genuine clinical concern (poor femoral pulses, differential upper/lower limb blood pressure, a murmur, or respiratory distress)
- Any suspected duct-dependent lesion: start prostaglandin E1 immediately to maintain ductal patency while arranging urgent cardiology assessment — this single action buys the time that definitive management requires

Day 4 Neurology Focused

HIE, Seizures, Neuroprotection & Development · 2 hours

Hypoxic-Ischaemic Encephalopathy (HIE) & Therapeutic Hypothermia

Recognise

- A history of a significant perinatal hypoxic-ischaemic event, plus evidence of encephalopathy on examination (altered consciousness, abnormal tone, abnormal reflexes, seizures) — Sarnat staging (mild/moderate/severe) to grade severity and guide the cooling decision
- Eligibility for therapeutic hypothermia is time-critical: cooling should begin within 6 hours of birth to have genuine neuroprotective benefit

Manage

- Whole-body cooling to a core temperature of 33.5°C for 72 hours, followed by controlled, gradual rewarming — this remains the single most effective proven neuroprotective intervention in moderate-severe HIE
- Continuous aEEG/EEG monitoring throughout cooling, both to grade background severity and to detect the seizures that are extremely common in this population, often subclinical

Neonatal Seizures

Recognise

- Only focal clonic and focal tonic seizures can be reliably diagnosed by clinical observation alone — every other seizure type needs EEG or aEEG confirmation, since clinical observation alone is genuinely unreliable for most neonatal seizure types
- Subtle seizures (lip smacking, cycling movements, eye deviation) are easily missed or misattributed to normal neonatal behaviour without a genuinely high index of suspicion

Manage — Typical Loading Doses

- Phenobarbital: loading dose 20mg/kg IV, with further 10mg/kg increments up to a total of 40mg/kg if seizures continue
- Levetiracetam: loading dose 40-60mg/kg
- Phenytoin: loading dose 20mg/kg, with cardiac monitoring during infusion given arrhythmia risk
- Use phenobarbital for the shortest duration clinically appropriate, with early discontinuation once acute, provoked seizures are controlled, rather than defaulting to prolonged maintenance

Neuroprotection Beyond Cooling

Manage

- Antenatal magnesium sulphate, given to mothers at risk of imminent preterm birth (typically under 30-34 weeks depending on local protocol): a 2024 Cochrane update (6 trials, women at risk of birth before 34 weeks) confirmed a genuine reduction in cerebral palsy (relative risk 0.71, 95% CI 0.57-0.89; number needed to treat about 60) and in the combined outcome of death or cerebral palsy — one of the best-evidenced neuroprotective interventions in all of neonatology, and one that happens well before the baby you'll be examining is even born
- Caffeine citrate for apnoea of prematurity carries a genuine neurodevelopmental benefit beyond its respiratory effect, ranking well in recent network meta-analyses for reducing

neurodevelopmental impairment — reinforcing why this should never be thought of as 'just' a respiratory drug

- Erythropoietin/darbepoetin have NOT shown convincing neuroprotective benefit in large modern trials, despite earlier promise — worth knowing so you don't overstate this option to a family asking about it

Intraventricular Haemorrhage (IVH)

Recognise

- Screen with cranial ultrasound in the first week of life for all infants born at $\leq 30+6$ weeks, repeated at 4-6 weeks of age (AAP 2020 clinical report); scan more mature or larger preterm infants (e.g. 31-32 weeks or under 1500g) when they have risk factors, or per local protocol

Manage

- Management is largely supportive for the haemorrhage itself; the real ongoing task is surveillance for post-haemorrhagic ventricular dilatation (PHVD) with serial head circumference measurement and ultrasound
- Progressive PHVD may need temporising measures (ventricular access device, ventriculosubgaleal shunt) before a definitive VP shunt if hydrocephalus persists
- Prevention remains the best treatment: antenatal steroids, delayed cord clamping, and avoiding rapid swings in blood pressure or sodium in the vulnerable first days

Neurodevelopmental Follow-Up

Manage

- Every high-risk NICU graduate (significant prematurity, HIE, IVH, prolonged ventilation) needs a structured follow-up plan established before discharge, not arranged reactively if a problem is later noticed
- Always track growth and developmental milestones using CORRECTED age, not chronological age, for at least the first 2 years — a common and avoidable source of false parental alarm or false reassurance when this is forgotten
- Prechtl's General Movements Assessment (watching for 'fidgety' movements at around 3 months corrected age) and the Hammersmith Infant Neurological Examination are the best-validated early tools for predicting cerebral palsy, well before it would otherwise become clinically obvious
- Follow-up should genuinely extend to school age for the highest-risk graduates, since behavioural and learning difficulties often emerge only once academic demands increase, well beyond the point most NICU follow-up clinics discharge a 'developmentally normal' toddler

Day 5 Infections in Neonates

Sepsis Evaluation, Antibiotics & Infection Control · 2 hours

Early-Onset Sepsis (EOS) — Risk Stratification

Recognise

- Risk factors: maternal fever, prolonged rupture of membranes, chorioamnionitis, maternal GBS colonisation with inadequate intrapartum prophylaxis, prematurity of unclear cause
- Clinical signs are frequently non-specific: temperature instability, respiratory distress, poor feeding, lethargy, or simply 'not looking right' — the same subtle picture covered on Day 1, now with sepsis specifically in mind

Manage — First-Line Antibiotics (NICE NG195)

- EOS: IV benzylpenicillin + gentamicin (gentamicin dosed once daily) — this remains first-line empirical therapy
- If Gram-negative sepsis is confirmed, add an agent such as cefotaxime and stop benzylpenicillin
- Late-onset sepsis (LOS): narrower-spectrum combinations guided by local resistance patterns, such as IV flucloxacillin + gentamicin; add anaerobic cover (metronidazole) if NEC is suspected

Neonatal Meningitis

Manage

- Perform a lumbar puncture with strong clinical suspicion or overt signs of meningitis — bulging fontanelle, seizures, or a genuinely unwell infant with sepsis; aim for CSF results within 4 hours where feasible, given how much this changes immediate management
- Gram-negative organism on CSF: cefotaxime. Confirmed *Listeria*: amoxicillin/ampicillin plus gentamicin. Avoid vancomycin monotherapy given variable, unreliable CSF penetration
- Treatment duration is genuinely longer than for uncomplicated sepsis — typically a minimum of 14 days for Group B strep, and 21 days or more for Gram-negative meningitis, reflecting the harder-to-sterilise CNS compartment

Congenital Infections & Invasive Candidiasis

Recognise — Congenital CMV

- The leading NON-genetic cause of sensorineural hearing loss in children — worth actively considering in any infant with growth restriction, microcephaly, petechiae, hepatosplenomegaly, or a failed newborn hearing screen

Manage — Congenital CMV

- Symptomatic, moderate-to-severe disease: oral valganciclovir 16mg/kg twice daily, started within the first month of life, for a full 6-month course — this duration is a deliberate, evidence-based choice, not an arbitrary long course
- Severe or life-threatening CNS disease, or where enteral absorption is uncertain: IV ganciclovir for 2-6 weeks initially, then transition to oral valganciclovir to complete the 6 months
- Monitor absolute neutrophil count, platelets, and liver enzymes during treatment — neutropenia occurs in a genuinely meaningful proportion of treated infants and needs active surveillance, not just awareness

Manage — Invasive Candidiasis

- Fluconazole prophylaxis (3-6mg/kg twice weekly for 6 weeks) is recommended for infants under 1000g birth weight in units with high rates (over 10%) of invasive candidiasis (IDSA 2016), and may be considered for infants under 1500g in such high-incidence units; where rates are low, follow unit protocol and focus on prevention (line care, antibiotic stewardship); oral nystatin is an alternative where fluconazole is unsuitable
- Established invasive infection: amphotericin B, fluconazole, or an echinocandin depending on the specific picture, combined with prompt removal of any central line — source control matters as much as the antifungal choice itself

Necrotising Enterocolitis (NEC)

Recognise & Stage — Modified Bell's Criteria

Stage	Features
I — Suspected	Non-specific systemic signs (temperature instability, apnoea, lethargy) with mild intestinal signs (feed intolerance, mild abdominal distension); non-specific or normal radiology
II — Definite	As above, plus pneumatosis intestinalis and/or portal venous gas on imaging — this is the point at which the diagnosis becomes radiologically confirmed
III — Advanced	Peritonitis, bowel perforation, and shock — a surgical emergency

Manage

- Stage I-II: nil by mouth, gastric decompression, broad-spectrum antibiotics with anaerobic cover, and supportive care, with serial abdominal examination and imaging to track progression or resolution
- Stage III (perforation): surgical intervention — laparotomy or peritoneal drainage depending on the infant's stability and local surgical resources
- Serial abdominal ultrasound alongside plain radiographs is an increasingly used adjunct for earlier detection of evolving disease before perforation occurs

Infection Control in the NICU

Manage — CLABSI Prevention Bundle

- Insertion bundle: hand hygiene, maximal sterile barrier precautions, chlorhexidine skin antisepsis, and a checklist-driven, standardised insertion process every time, regardless of operator seniority
- Maintenance bundle: minimise how often the line hub is accessed, use chlorhexidine-impregnated dressings where appropriate, and review the line daily for whether it's still genuinely needed — prompt removal once a line is no longer required is itself a core infection-prevention measure, not just a housekeeping task
- This bundled approach, now standard across current SHEA/CDC guidance, has consistently demonstrated real reductions in central-line-associated bloodstream infection rates where genuinely, consistently implemented

Day 6 Jaundice, Haematology & Metabolic Care

The Day With the Most Genuinely Counter-Intuitive Findings in Neonatology · 2 hours

Neonatal Jaundice

Recognise

- Physiological jaundice: appears after 24 hours of age, peaks around day 3-5, resolves by 2 weeks — a diagnosis you make by this pattern, not by exclusion alone
- Pathological jaundice red flags: onset within the first 24 hours (always pathological until proven otherwise), rapidly rising bilirubin, conjugated hyperbilirubinaemia at any point, or jaundice persisting beyond 2 weeks in a term infant (3 weeks in a preterm infant)

Manage

- Use current age-in-hours and risk-factor-specific phototherapy and exchange transfusion threshold charts (per 2022 AAP guidance) rather than a single fixed number — the same total bilirubin level can be observation-only in one infant and an exchange-transfusion threshold in another, depending on gestational age and risk factors
- Intensive phototherapy as first-line treatment; exchange transfusion reserved for bilirubin approaching neurotoxic levels or failure to respond adequately to intensive phototherapy
- Any conjugated (direct) hyperbilirubinaemia is never physiological and always warrants further work-up for neonatal cholestasis — this distinction is one of the most important, and most commonly rushed past, points in the entire jaundice work-up

Haemolytic Disease of the Newborn & Rh Isoimmunisation

Recognise & Manage

- Direct Coombs (antiglobulin) test confirms an immune-mediated haemolytic process — essential for distinguishing this from other causes of neonatal jaundice and anaemia
- Severity ranges from mild jaundice through to hydrops fetalis in the most severe antenatal cases; postnatal management combines aggressive phototherapy, IVIG in defined circumstances to reduce haemolysis, and exchange transfusion for the most severe cases
- Anti-D prophylaxis in Rh-negative mothers remains the single most effective preventive measure at a population level — worth reinforcing even though it happens well before your postnatal encounter with the baby

Neonatal Anaemia & Polycythaemia

Recognise & Manage

- Anaemia: consider blood loss (feto-maternal or twin-to-twin transfusion), haemolysis, or reduced production; transfusion thresholds are genuinely more conservative in current practice than older teaching suggested, guided by the infant's clinical status and respiratory support needs rather than a single haemoglobin number alone
- Polycythaemia: venous haematocrit above the defined threshold, symptomatic infants (lethargy, poor feeding, respiratory distress, hypoglycaemia) may need partial exchange transfusion; asymptomatic, modestly elevated haematocrit is generally managed with hydration and observation alone

Neonatal Thrombocytopenia

- Always consider the cause alongside the number — sepsis, NEC, and immune-mediated causes (including fetal/neonatal alloimmune thrombocytopenia) each carry different additional management considerations beyond the platelet count itself

- Active bleeding, or a planned invasive procedure, genuinely changes the threshold for transfusion regardless of the PlaNeT-2 findings, which apply specifically to the stable, non-bleeding preterm infant

Neonatal Hypoglycaemia

Manage

- Use a current, staged, symptom-and-risk-adjusted framework rather than treating every low glucose reading identically — an asymptomatic, at-risk infant with a modestly low first reading is managed differently from a symptomatic infant with a persistently low glucose despite feeding
- First-line for the feeding, at-risk infant: buccal dextrose gel plus a feed, with a recheck — a genuinely effective, non-invasive first step that reduces the need for NICU admission and IV access in many at-risk infants
- Persistent or symptomatic hypoglycaemia: IV dextrose bolus followed by an infusion titrated to maintain euglycaemia, escalating the glucose infusion rate as needed; investigate for an underlying cause (hyperinsulinism, an endocrine disorder, an inborn error of metabolism) if hypoglycaemia proves persistent or recurrent beyond the expected transitional period

Electrolyte Disturbances & Fluid Management

Manage

- Hyperkalaemia: stage your response by severity and ECG changes — from dietary/input review and monitoring for mild, asymptomatic elevations, through to calcium gluconate for cardiac membrane stabilisation, insulin-dextrose, and salbutamol to shift potassium intracellularly for more significant or symptomatic elevations
- Hypocalcaemia: early (first 3 days, often in preterm or infants of diabetic mothers) versus late (after day 3, often related to phosphate load) — recognise which pattern you're seeing, since it changes the likely cause and the counselling
- Sodium disturbances in the first week most often reflect free-water balance rather than true sodium excess or deficit — rising sodium usually means increase free water; falling sodium usually means restrict free water — and unstable, swinging sodium levels in the first 96 hours are themselves associated with a higher risk of IVH, making smooth, gradual correction a genuine safety priority, not just a lab-value target

Inborn Errors of Metabolism — When to Suspect

Recognise

- A previously well infant who deteriorates after starting feeds, with poor feeding, vomiting, lethargy, seizures, or an unusual odour, especially with a history of parental consanguinity or a previous unexplained neonatal death in the family — a genuinely important pattern in a Pakistani population given consanguinity rates well above global averages
- Basic first-line work-up when suspected: blood gas (looking specifically for a metabolic acidosis or alkalosis pattern), ammonia, lactate, and glucose — abnormalities in this basic panel should prompt urgent specialist involvement and further metabolic work-up rather than a 'wait and see' approach

Day 7 Practical NICU Management

Protocols, Drug Dosing, Lines, Monitoring & Complications · 2 hours

Umbilical Line Insertion & Care

Manage

- UVC (umbilical venous catheter): correct tip position is at the IVC-right atrium junction, confirmed radiographically — increasingly, real-time ultrasound guidance during insertion is used to improve first-pass tip accuracy and reduce malposition, hepatic injury, and line-associated infection compared with X-ray confirmation alone
- UAC (umbilical arterial catheter): 'high' position (T6-T9) or 'low' position (L3-L4) depending on local protocol — both frontal AND lateral radiographs improve accuracy of tip localisation over a frontal film alone, particularly for the UVC

Fluid & Electrolyte Management — The Complete Protocol

Manage

- Preterm infants need meaningfully higher starting fluid volumes than term infants, reflecting substantially higher insensible water loss through immature, thin skin — humidified incubators and plastic wraps genuinely reduce this loss and should be used deliberately, not just when convenient
- Expect and do not fight the normal physiological pattern: diuresis, natriuresis, and weight loss in the first week are expected, not a sign that fluids need increasing
- Track trends, not single values — a single sodium reading matters less than its trajectory; smooth, gradual correction of any electrolyte abnormality is safer than rapid correction, particularly for sodium, given the genuine association between sodium swings and IVH risk covered on Day 4 and Day 6

Neonatal Pain Assessment & Management

Recognise

- Use a validated scale rather than subjective impression: PIPP-R (Premature Infant Pain Profile-Revised) and NIPS (Neonatal Infant Pain Scale) for procedural pain from as early as 28 weeks' gestation; N-PASS for prolonged or persistent pain and sedation assessment in ventilated infants

Manage

- FIRST-LINE for procedural pain is non-pharmacological, and genuinely effective, not just a gentler-sounding alternative: skin-to-skin (kangaroo) care has the largest effect size in the evidence base, alongside breastfeeding or expressed breast milk, oral sucrose/glucose, non-nutritive sucking, and facilitated tucking/swaddling
- Reserve opioids and sedatives for significant pain — post-operative recovery, mechanical ventilation — with careful monitoring given a genuine, evidence-based increased apnoea risk; they are not first-line for routine procedural pain such as heel pricks or IV cannulation

Parenteral Nutrition

Manage

- Start amino acids and lipids from DAY 1 in very preterm infants rather than delaying — early nutrition genuinely improves growth and outcome; start amino acids at no less than 1.5g/kg/day on day 1 and lipids from birth (no later than day 2), advancing toward a target of

approximately 2.5-3.5g/kg/day amino acids (ESPGHAN 2018: do not exceed 3.5g/kg/day) and 3-4g/kg/day lipid

- Composite lipid emulsions (combining soybean, MCT, olive, and fish oil components) are increasingly preferred over older soybean-only formulations, reflecting a more favourable fatty acid and antioxidant profile
- Monitor triglycerides, electrolytes (including phosphate and potassium — refeeding-pattern derangements are genuinely common in the first days of PN), and watch for PN-associated cholestasis with prolonged use, transitioning to enteral feeding as soon as it is genuinely tolerated

Safe Neonatal Prescribing

Manage

- Always dose against a recognised neonatal formulary (BNFc or an equivalent neonatal-specific reference) rather than extrapolating from adult or general paediatric dosing — neonatal pharmacokinetics, particularly in preterm infants, are genuinely, meaningfully different, not just 'smaller doses of the same thing'
- Gentamicin and vancomycin require therapeutic drug monitoring — check levels, don't assume a calculated dose is automatically achieving a safe and effective level in every infant
- Build the habit of double-checking any dose that surprises you before administering it — this single habit catches more genuine prescribing errors over a career than any other single practice

That closes the seven days. The thread running through all of it — from the first Golden Minute of resuscitation to the last line you'll ever adjust based on a lab trend — has been the same four-step framework you started with: Assess, Diagnose, Decide, Manage. Applied consistently, across every system, it's what actually turns a long list of neonatal diagnoses into confident, repeatable clinical practice.