



PAEDIATRICS

Pediatrics OPD Masterclass

Manage the everyday paediatric OPD with confidence.

7 days

live-online · recorded

Fee PKR 3,000

15 November 2026 · PKR 3,000

Day 1 The Sick Child — Assessment, Triage, Fever & Prescribing

Foundation Day · 2 hours

Pediatric Assessment Mastery

The Triadic Consultation — Parent, Child, Doctor

- The parent is your historian and your patient's most important advocate — engage them first
- Directed open questions vs structured closed questions: knowing when to switch
- The silent child tells you more than you think — observe before you touch
- Age-specific history frameworks: neonate, toddler, school-age, adolescent
- Gathering collateral from teachers, carers, previous treating physicians

Vital Signs — What's Normal at What Age?

- Heart rate, respiratory rate, blood pressure, temperature: age-stratified normal ranges
- The oxygen saturation trap: 96% is NOT fine if the child is working hard to breathe
- Measuring BP in children: right cuff size, right technique — most doctors get this wrong
- Capillary refill time: how to do it correctly and what it really tells you
- Temperature measurement methods: rectal (gold standard in infants), axillary, tympanic — limitations of each

Examination of the Uncooperative Child

- Save the most distressing examination (throat, ears) for last
- The 'distraction toolkit': toys, phones, blowing, funny noises
- Examining the crying infant: what you can still assess and how
- Parent as surrogate: using the parent's lap, parent's hands as positioning aids
- The opportunistic exam: respiratory rate in a sleeping child, fontanelle palpation, skin during undressing

Documentation & Medicolegal Aspects

- What every paediatric OPD note must contain (age, weight, vitals, diagnosis, dose with weight used)
- Prescription writing: drug name, dose in mg/kg, total dose, frequency, duration, formulation
- When NOT to write: verbal advice must be documented as 'parent counselled regarding...'
- Red flag sign-off: document explicitly if referral offered and declined by parents

Triage, Red Flags & Clinical Gestalt

Paediatric Early Warning Signs (PEWS) in OPD

- Behaviour/consciousness: AVPU scale — Alert, Voice, Pain, Unresponsive
- Cardiovascular: tachycardia for age, capillary refill >2 seconds, mottled skin, cold peripheries
- Respiratory: tachypnoea for age, subcostal and intercostal recession, grunting, nasal flaring, head bobbing
- The 'silent' chest in a wheezing child = obstruction so severe no air is moving — emergency

WHO IMCI Approach — Adapted for Pakistan OPD

- Assess for danger signs first: unable to drink/breastfeed, vomiting everything, convulsions, lethargic/unconscious
- Traffic light system: Green = reassure and treat at home; Amber = treat and monitor closely; Red = immediate referral

- IMCI classifications for common presentations: cough, diarrhoea, fever, ear problems, malnutrition

Clinical Gestalt — Trusting Your Gut

- 'This child doesn't look right' — validating and operationalising parental and physician instinct
- Parental concern is a red flag: if a parent says their child has never been this unwell, believe them (NICE NG143; Van den Bruel et al., Lancet 2010)
- When investigations are normal but the child looks sick: re-examine, repeat vitals, observe 30-60 minutes
- Chest X-ray does not diagnose pneumonia — your clinical assessment does

Fever in Children — Pakistan Context

Approach to Acute Fever

- Fever is not a disease — it is a symptom; the child's overall appearance matters more than the temperature reading
- Age-stratified approach: <28 days (admit all), 1-3 months (careful stratification), 3 months to 3 years (NICE fever guidelines), >3 years (clinical assessment-led)
- Fever without focus (FWF): occult bacteraemia risk, when to do blood culture, urinalysis is mandatory in all febrile children under 2
- Fever duration as a diagnostic clue: >5 days of continuous fever = always investigate further (Kawasaki, enteric, malignancy)

Dengue Fever — Staging and OPD Management

- Febrile phase (usually 2-7 days): fever, myalgia, headache, facial flushing — manage as OPD, NSI antigen positive
- Critical phase (around defervescence, usually days 3-7, lasting 24-48h): fever may settle but this is dangerous — plasma leakage begins; watch for warning signs
- Warning signs requiring urgent admission: abdominal pain, persistent vomiting, bleeding, rapid breathing, lethargy, liver >2cm, rising haematocrit with falling platelets
- Dengue haemorrhagic fever vs dengue shock syndrome: clinical differentiation at the OPD
- CBC timing: Day 3 onwards; haematocrit rise >20% = impending shock; do not wait for platelet nadir
- OPD discharge criteria: afebrile for at least 48h without antipyretics, improving clinical status, platelets rising, no warning signs

Typhoid — Changing Landscape in Pakistan

- Extensively Drug Resistant (XDR) typhoid: fluoroquinolone and 3rd-generation cephalosporin resistance — now endemic in Sindh and spreading
- Clinical presentation: stepladder fever, relative bradycardia, rose spots (rarely seen), splenomegaly, constipation (early) then diarrhoea
- Blood culture gold standard but low yield if antibiotics already given; Widal unreliable (false positives common in endemic areas)
- Treatment of XDR typhoid: azithromycin (oral) for uncomplicated; carbapenems for complicated
- Complications to watch for: intestinal perforation, encephalopathy, myocarditis — admit for any complication

Malaria in Pakistan

- Both *P. vivax* and *P. falciparum* present; *falciparum* more common in Sindh and Balochistan, *vivax* predominates in Punjab/KPK
- Rapid Diagnostic Test (RDT): high sensitivity, good for rural/quick OPD screening; confirm with thick/thin film
- *P. falciparum* danger signs: cerebral malaria, severe anaemia, respiratory distress, haemoglobinuria, hyperparasitaemia
- Treatment: artemisinin-based combination therapy (ACT) for *falciparum*; chloroquine for sensitive *vivax* + primaquine (check G6PD first)

Febrile Child with No Clear Source

- Urinary tract infection: most common occult bacterial infection in febrile children <2 years — always do urinalysis
- Sepsis recognition: SIRS criteria adapted for children (temperature >38.5 or <36, tachycardia, tachypnoea, leukocytosis or leukopenia)
- COVID-19 in children: usually mild; MIS-C (Multisystem Inflammatory Syndrome in Children) presenting 2-6 weeks post-infection — persistent fever + multi-organ involvement
- Brucellosis: underdiagnosed in Pakistan — rural exposure, animal contact, unpasteurised dairy; insidious onset, undulant fever, hepatosplenomegaly

Drug Dosing & Prescribing Safety in Paediatrics

Weight-Based Dosing Fundamentals

- Always use actual body weight; use ideal body weight for obese children to avoid toxicity (aminoglycosides, digoxin)
- Age-weight formulas only as emergency backup: (age+4)×2 for 1-12 years; birth weight 3.5kg, doubles at 5 months, triples at 1 year
- Maximum daily doses: always cross-check against adult maximum (e.g. paracetamol: 15mg/kg/dose ×4 but max 1g/dose)
- Drug dilution and concentration: know how to dilute oral liquid formulations for accurate small-volume dosing

Emergency Drug Doses — Memorise These

Drug	Indication	Exact Dose
Adrenaline 1:1000	Anaphylaxis	0.01mg/kg IM (max 0.5mg); i.e. 0.01mL/kg IM, lateral thigh
Diazepam (PR) / Midazolam (buccal)	Acute seizure	Diazepam 0.3-0.5mg/kg PR (max 10mg); midazolam buccal 0.2-0.3mg/kg (max 10mg) — easier in OPD
Dextrose 10%	Hypoglycaemia	2-5mL/kg IV bolus; NEVER give 50% dextrose to children
Normal Saline 0.9%	Shock / severe dehydration	10-20mL/kg bolus IV over 15-30 minutes; reassess after each bolus
Hydrocortisone	Acute adrenal crisis	2mg/kg IV bolus (max 100mg), then 50-100mg/m ² /day divided 6-hourly (about 2mg/kg 6-hourly)

Antibiotic Stewardship in Paediatric OPD

- URTI in children: >90% viral — no antibiotic needed; amoxicillin is NOT a 'safe' routine choice
- AOM with bulging tympanic membrane in a child <2 years: amoxicillin 90mg/kg/day for 10 days
- Community-acquired pneumonia (non-severe): amoxicillin; add azithromycin for atypical coverage if indicated

- Skin infections: cloxacillin or cefalexin for mild SSTI; remember to dose correctly (cloxacillin 50-100mg/kg/day divided 6-hourly; cefalexin 25-50mg/kg/day)
- Diarrhoea: no routine antibiotics; exceptions include dysentery (ceftriaxone or azithromycin), cholera (azithromycin), immunocompromised hosts

Common Prescribing Errors to Avoid

- 10-fold dosing errors: paracetamol 150mg/kg instead of 15mg/kg — know the difference
- Using '5mL = one teaspoon' without knowing the concentration of the suspension
- Writing '1 tablet' for paediatric formulations that have adult-strength tablets
- Prescribing medications contraindicated in children: ciprofloxacin (generally avoided), tetracyclines (<8 years), aspirin (<16 years in febrile illness)
- Missed renal/hepatic dose adjustment in critically ill children

Day 2 Respiratory & ENT Mastery

Cough, Wheeze, Stridor, TB, Asthma, ENT — The Complete OPD Approach · 2 hours

Cough — The Master Differential

Cough Classification

- Acute (<3 weeks): URTI, lower respiratory tract infection, foreign body (always consider), croup
- Subacute (3-8 weeks): post-infectious, Bordetella pertussis, Mycoplasma pneumoniae
- Chronic (>8 weeks): asthma, allergic rhinitis with post-nasal drip, GERD, TB, habit cough, anatomical
- Wet vs dry cough: wet = productive (infection, bronchiectasis, CF); dry = bronchospasm, habit, post-viral, ACE inhibitor (if adolescent on medication)

Pertussis — The 100-Day Cough

- Classic phases: catarrhal (1-2 weeks, like URTI), paroxysmal (2-8 weeks, whooping, post-tussive vomiting, apnoea in infants), convalescent
- The 'whoop' is absent in infants <6 months — they present with apnoea or cyanotic spells (more dangerous)
- PCR nasal swab most sensitive in first 3 weeks; cultures often negative by paroxysmal phase
- Treatment: azithromycin (5 days) or clarithromycin (7 days); treat household contacts
- Pakistan context: vaccination uptake gaps, pertussis re-emerging in vaccinated populations due to waning immunity

TB in Children — The Pakistan Imperative

- Primary complex presentation: fever, weight loss, night sweats, cervical lymphadenopathy, and history of contact with an adult TB case
- Diagnostic challenge: children rarely produce sputum; diagnosis is often clinical-radiological-epidemiological
- TST (Mantoux): >10mm significant in Pakistan regardless of BCG status; >5mm in immunocompromised
- IGRA (Quantiferon-TB Gold): preferred in BCG-vaccinated children >5 years; less affected by BCG background
- CXR findings: hilar lymphadenopathy, primary focus (Ghon lesion), miliary pattern, consolidation, pleural effusion
- Diagnosis of childhood TB: Stegen-Toledo score system — contact, symptoms, TST, CXR, response to treatment
- Drug-resistant TB: MDR, XDR — suspect if treatment failure or contact with known DR-TB; refer to tertiary centre
- Latent TB infection treatment: isoniazid preventive therapy for 6 months for household contacts <5 years or immunocompromised

Psychogenic/Habit Cough

- Typically a dry, loud, honking or barking cough; completely absent during sleep (pathognomonic)
- Often a teenager, competitive academic environment, significant school absence
- Reassure parents: no underlying disease; explanation + breathing exercises; refer to child psychologist if persistent

Wheeze, Asthma & Bronchiolitis

First Episode Wheeze — Not Always Asthma

- Differential for first wheeze in a toddler: bronchiolitis (RSV), viral-triggered wheeze, bronchopneumonia, cardiac wheeze, foreign body
- Cardiac wheeze: look for tachycardia, hepatomegaly, poor feeding, failure to thrive — refer for echo
- Age matters: <1 year = bronchiolitis most likely; 1-5 years = viral-triggered or early asthma; >5 years = asthma until proven otherwise

Asthma Diagnosis in OPD

- GINA 2026: diagnosis based on characteristic symptoms (wheeze, cough, shortness of breath) plus variable expiratory airflow limitation
- History of atopy (eczema, allergic rhinitis, food allergy, family history): strongest predictor of true asthma
- PRAM (Preschool Respiratory Assessment Measure) and Pediatric Asthma Severity Score for acute assessment
- Spirometry in cooperative children >6 years: FEV1/FVC below the lower limit of normal for age at baseline, plus reversibility with bronchodilator
- In children <5 years: diagnosis is clinical — trial of short-acting bronchodilator and ICS; reassess response

GINA-Based Management in OPD

- Step 1 (symptoms <2 days/week): age ≥12 years — as-needed low-dose ICS-formoterol; age 6-11 years — low-dose ICS taken whenever SABA is taken (as-needed-only ICS-formoterol is for ≥12 years)
- Step 2 (>2 days/week): regular low-dose ICS + as-needed SABA; montelukast as add-on in rhinitis-comorbid cases
- Step 3 (moderate persistent): medium-dose ICS or low-dose ICS + long-acting beta agonist (LABA); age 6-11 years: very-low-dose ICS-formoterol maintenance-and-reliever therapy (MART) is an option from Step 3; ICS-LABA combination for children >5 years only
- Step 4 (severe): high-dose ICS-LABA; refer to tertiary care for biologics consideration
- Asthma Control Test (ACT) and Children's ACT (cACT): use at every visit to assess control and adjust step
- Written Asthma Action Plan: every patient must leave with one — green, yellow, red zone guidance

Inhaler Device Training — The Skill Most OPD Doctors Skip

- MDI + spacer: gold standard for all children <12 years; children >8 years can use MDI without spacer if technique is verified
- Nebulisation: reserve for severe acute episodes; not superior to MDI+spacer in mild-moderate exacerbations
- Turbuhaler and Accuhaler: for children >6 years who can generate adequate inspiratory flow
- Practical teaching: demonstrate on yourself first, then watch the parent/child do it, then correct errors

Bronchiolitis

- RSV bronchiolitis: peak age 2-6 months, winter months, bilateral wheeze + crackles, fever variable

- WHO criteria for admission: oxygen saturation <92% on room air, respiratory rate >70, poor feeding, apnoea
- Treatment: supportive — nasal saline drops + suction, positioning, adequate hydration, oxygen if needed
- Salbutamol is NOT evidence-based in bronchiolitis; high-flow nasal oxygen in a hospital setting for moderate-severe cases
- Palivizumab prophylaxis: for high-risk infants (prematurity, congenital heart disease, immunocompromised)

Stridor & Upper Airway Emergencies

Stridor — Approach by Age

- Inspiratory stridor: obstruction above or at the glottis (larynx); expiratory stridor: lower trachea/bronchi; biphasic: subglottic or tracheal
- Neonatal stridor: laryngomalacia (resolves by 18 months), vocal cord paralysis, subglottic stenosis, vascular ring
- Toddler stridor (acute): croup most common; foreign body; bacterial tracheitis; peritonsillar/retropharyngeal abscess
- Croup (laryngotracheobronchitis): barking cough + inspiratory stridor + hoarse voice; viral aetiology (parainfluenza) now dominant since diphtheria's elimination by vaccination

Croup Management

Westley Score	Severity	Management
≤2	Mild	Oral dexamethasone 0.15mg/kg, single dose, manage at home
3-5	Moderate	Oral dexamethasone 0.15-0.6mg/kg single dose (commonly 0.6mg/kg, max 16mg); nebulised budesonide 2mg is an alternative; add nebulised adrenaline for moderate-to-severe distress
6-11	Severe	Nebulised adrenaline 1:1000, 5mL (no dilution) + dexamethasone; observe 2-4 hours post-adrenaline for rebound
≥12	Impending respiratory failure	Nebulised adrenaline 1:1000, 5mL + dexamethasone; call senior, anaesthetic and PICU help immediately for airway support

- Nebulised adrenaline onset 10-15 minutes, duration approximately 2 hours — must observe for rebound 2-4 hours post-dose
- Prednisolone 1mg/kg as an alternative to dexamethasone where unavailable
- Epiglottitis: sudden onset, high fever, toxic appearance, drooling, tripod position, NO cough — DO NOT examine the throat; immediate ENT and anaesthetic team; no tongue depressor
- Bacterial tracheitis: looks like severe croup but does not respond to croup treatment; toxic, copious secretions, requires intubation

Foreign Body Aspiration

- Clinical clue: sudden choking episode (may be witnessed or unwitnessed), then apparent recovery — the 'honeymoon period'
- Examination: unilateral air trapping or collapse, asymmetric breath sounds, hyperresonance on the affected side
- CXR: inspiratory and expiratory films to detect unilateral air trapping (ball-valve effect); most objects are radiolucent
- Management: if choking — Heimlich manoeuvre for children >1 year; back blows + chest thrusts for infants <1 year; rigid bronchoscopy if stable

Recurrent RTIs, ENT & Allergic Rhinitis

When to Worry About Recurrent Respiratory Infections

- Normal for children in daycare: 8-12 viral URTIs per year; school-age children: 5-7 per year — NOT pathological
- Red flags for an underlying cause: infections requiring IV antibiotics, caused by unusual organisms, involving unusual sites, failure to thrive, persistent oral candidiasis, family history of immunodeficiency
- The Jeffrey Modell Foundation 10 warning signs of primary immunodeficiency: ≥ 4 new ear infections within 1 year, ≥ 2 serious sinus infections within 1 year, ≥ 2 months on antibiotics with little effect, ≥ 2 pneumonias within 1 year, failure of an infant to gain weight or grow normally, recurrent deep skin or organ abscesses, persistent thrush in the mouth or fungal infection on the skin, need for IV antibiotics to clear infections, ≥ 2 deep-seated infections including septicaemia, family history of primary immunodeficiency

Allergic Rhinitis — Pakistan's Hidden Epidemic

- Often misdiagnosed as 'chronic sinusitis' or 'adenoids': rhinorrhoea, sneezing, nasal congestion, itchy eyes
- Allergen triggers in Pakistan: house dust mite (most common), cockroach, moulds (*Aspergillus*), grass pollens
- Rhinitis-asthma connection: 'one airway, one disease'; treating rhinitis improves asthma control
- Treatment stepladder: intranasal steroid (mometasone, fluticasone) is first-line; oral non-sedating antihistamine as adjunct; allergen immunotherapy for moderate-severe refractory cases

Otitis Media & Hearing Loss

- Acute otitis media (AOM): fever, ear pain, bulging erythematous tympanic membrane; watchful waiting for 48-72h in children >2 years if not severe; amoxicillin 90mg/kg/day for <2 years or bilateral/perforated disease
- Otitis media with effusion ('glue ear'): conductive hearing loss; the commonest cause of hearing impairment in Pakistani children; most resolves spontaneously; grommets if >3 months bilateral
- Hearing loss screening: ask about speech delay, not responding to name by 12 months, not turning to sounds — refer for BERA or OAE
- Recurrent AOM (>4 /year): investigate adenoid hypertrophy, atopy, immunodeficiency; consider referral for grommet insertion

Tonsils & Adenoids

- Recurrent tonsillitis: Paradise criteria for tonsillectomy — 7 episodes in the past year, or 5/year for 2 years, or 3/year for 3 years
- Adenoid hypertrophy: mouth breathing, snoring, hyponasal voice, recurrent AOM, failure to thrive
- Paediatric obstructive sleep apnoea: snoring + apnoeic episodes + daytime sleepiness + behavioural problems; adenotonsillectomy is first-line treatment
- Peritonsillar abscess: unilateral swelling, uvular deviation, muffled voice, trismus — emergency ENT referral

Day 3 Vomiting & Diarrhoea

Age-Based Differentials, Red Flags and the Complete OPD Approach · 2 hours

Vomiting — Age-Based Differential Diagnosis

Neonatal & Infant Vomiting

- Bilious vomiting at any age = surgical emergency until proven otherwise; malrotation, volvulus, intestinal atresia
- Pyloric stenosis: male, first-born, 2-8 weeks old; projectile non-bilious vomiting post-feed; olive-shaped mass in epigastrium; hypochloraemic hypokalaemic metabolic alkalosis
- Gastro-oesophageal reflux (GOR): effortless regurgitation in a well-growing, thriving infant = physiological; distinguish from GERD (disease)
- GERD in infants: poor weight gain, excessive crying, arching, feeding refusal, recurrent aspiration pneumonia — warrants treatment
- Cow's milk protein allergy (CMPA): vomiting + diarrhoea + blood in stool in a formula-fed infant; trial of extensively hydrolysed or amino acid formula

Vomiting in Toddlers & Older Children

- Acute vomiting: gastroenteritis, UTI, otitis media (don't miss it), appendicitis, intussusception, meningitis, DKA
- Cyclic vomiting syndrome (CVS): stereotypical episodes of severe vomiting (not diarrhoea) with complete wellness between episodes; strong family/personal migraine history; Rome IV criteria
- Functional nausea: pervasive, school-related, normal investigations; gastric emptying study may be abnormal
- Eosinophilic oesophagitis: dysphagia, food impaction, chest pain, poor response to PPI; needs endoscopy + biopsy; elemental or elimination diet
- Raised ICP: vomiting on waking, no preceding nausea, associated headache, papilloedema — urgent neuro-imaging

Diarrhoea — Acute to Chronic

Acute Diarrhoea — Beyond ORS

- WHO definition: 3 or more loose stools per 24 hours; acute = <14 days
- Dehydration assessment: mild (<5%) = thirsty, normal exam; moderate (5-10%) = sunken eyes, reduced skin turgor, tachycardia; severe (>10%) = shock
- ORS: WHO low-osmolality ORS (245 mOsm/L); 50-100mL/kg over 3-4 hours for mild-moderate dehydration
- Zinc supplementation: 10mg/day (<6 months), 20mg/day (>6 months) for 10-14 days — reduces severity and duration
- No routine antibiotics: give antibiotics only for dysentery (E. coli, Shigella), suspected cholera, immunocompromised hosts, neonates, or severe malnutrition

Chronic Diarrhoea — The Differentials That Get Missed

- Coeliac disease: autoimmune gluten enteropathy; presentations include chronic diarrhoea, abdominal distension, poor weight gain, short stature, iron deficiency anaemia, aphthous ulcers, dermatitis herpetiformis
- Coeliac diagnosis: IgA tissue transglutaminase (tTG-IgA) antibodies (check total IgA first for IgA deficiency); Marsh grading on duodenal biopsy

- IBD in children: Crohn's disease (any segment, transmural, skip lesions, perianal disease) vs ulcerative colitis (continuous, mucosal, from the rectum); PCDAI for Crohn's activity
- Toddler's diarrhoea: 1-4 years old, frequent loose stools with undigested food, no failure to thrive, normal growth — functional; reassure, increase fat in diet, reduce fruit juice
- Post-infectious enteropathy: persistent diarrhoea >14 days after acute gastroenteritis — secondary lactose intolerance, disrupted microbiome
- Giardiasis: frothy, greasy, malodorous stools; duodenal aspirate or stool PCR; metronidazole treatment
- Short bowel syndrome, microvillous inclusion disease, IPEX syndrome: rare but life-threatening causes of protracted diarrhoea in infancy

Bloody Diarrhoea — When to Panic

- E. coli O157:H7 (STEC): bloody diarrhoea + abdominal pain; HUS triad: microangiopathic haemolytic anaemia + thrombocytopenia + AKI — do NOT give antibiotics (increases HUS risk)
- Shigella dysentery: fever + bloody mucoid stool + tenesmus; treat with azithromycin in Pakistan (ciprofloxacin resistance increasing)
- Intussusception: 'redcurrant jelly' stool (blood + mucus), colicky abdominal pain with periods of wellness, palpable sausage-shaped mass; ultrasound diagnostic; pneumatic/hydrostatic reduction
- Henoch-Schönlein purpura (IgA vasculitis): bloody diarrhoea + colicky pain + rash on buttocks/lower limbs + arthritis; mesenteric vasculitis

Day 4 Abdominal Pain, Nutrition & Hepatology

Surgical Abdomen, Functional Pain, Malnutrition and Liver Disease in OPD · 2 hours

Abdominal Pain & Constipation

Acute Abdominal Pain — Not Missing the Surgical Abdomen

- Appendicitis: the most common surgical emergency in children; classic presentation in older children (periumbilical pain migrating to RIF + fever + anorexia); atypical in young children (vomiting, generalised pain, often perforated by presentation)
- Pediatric Appendicitis Score (PAS, Samuel 2002): cough/percussion/hopping tenderness in RIF (2), RIF tenderness (2), migration of pain to RIF (1), anorexia (1), nausea/vomiting (1), fever $\geq 38^{\circ}\text{C}$ (1), leukocytosis $>10,000/\text{mm}^3$ (1), neutrophilia $>7,500/\text{mm}^3$ (1) — total 10; score >6 = high risk
- Mesenteric adenitis: follows a URTI, diffuse or periumbilical tenderness, cervical lymphadenopathy; ultrasound shows enlarged mesenteric nodes; self-limiting
- Intussusception: peak 3 months to 3 years; intermittent colicky screaming + drawing up knees + pallor; 'dance sign' on palpation; ultrasound is the gold standard
- Ovarian torsion: always consider in girls with acute abdominal pain; rapid diagnosis with Doppler ultrasound; time-critical for ovarian salvage

Recurrent Abdominal Pain — The Functional Diagnosis

- Rome IV criteria for Functional Abdominal Pain Disorder (FAPD): pain at least 4 days/month for 2 months, no structural/biochemical cause, associated with functional symptoms
- Subtypes: IBS in children (pain with altered bowel habit), functional dyspepsia (meal-related pain, early satiety, nausea), abdominal migraine (episodic severe pain with vomiting, pallor, strong family migraine history), functional abdominal pain disorder (NOS)
- School avoidance is a major feature and a perpetuating factor — address this directly with parents
- Management: biopsychosocial model — dietary modifications (low FODMAP for IBS), cognitive behavioural therapy, tricyclic antidepressants in severe refractory cases

Constipation — Functional vs Organic

- Functional constipation: the most common cause; Rome IV definition — 2 or more of the following for at least 1 month (in children ≥ 4 years, occurring at least once a week for at least 1 month): 2 or fewer defecations/week, painful defecation, retentive posturing, soiling, large stool in rectum, large diameter stools
- Hirschsprung's disease (HSCR) red flags: failure to pass meconium beyond 48h, ribbon stools, gross abdominal distension, failure to thrive, enterocolitis
- HSCR vs functional: HSCR presents from birth with no soiling (a sentinel sign) and an empty rectum on exam, confirmed by positive suction rectal biopsy; functional constipation typically has onset after the first year, associated soiling, and a loaded rectum
- Disimpaction: oral (high-dose PEG 1-1.5g/kg/day for 3-6 days) or rectal (phosphate enema if oral fails)
- Maintenance: PEG (polyethylene glycol) 0.4g/kg/day, titrated; continue for 3-6 months minimum

Nutrition, Failure to Thrive & Micronutrient Deficiency

Failure to Thrive — The Systematic Approach

- Definition: weight below the 3rd centile, crossing 2 major centile lines downward, or weight-for-height below 70%
- Organic causes: inadequate intake (GERD, cleft palate, neurodisability), malabsorption (coeliac, IBD, CF, SIBO), increased losses (chronic diarrhoea), increased demand (chronic infection, congenital heart disease, metabolic disease)
- Non-organic causes: incorrect formula preparation, feeding difficulties, neglect, poverty — the most common cause globally
- Investigations: basic screen (CBC, U&E, LFTs, TFTs, tTG-IgA, urine MC&S, zinc level, vitamin D); further tests guided by clinical suspicion

Malnutrition in Pakistan — SAM & MAM

- Severe Acute Malnutrition (SAM): MUAC <11.5cm in children 6-59 months, OR oedema, OR weight-for-height Z-score <-3; admit for F-75, then F-100 or therapeutic food
- Moderate Acute Malnutrition (MAM): MUAC 11.5-12.5cm, OR weight-for-height Z-score -2 to -3; managed with community-based supplementary feeding
- RUTF (Ready-to-Use Therapeutic Food, e.g. Plumpy'Nut): approximately 500 kcal/packet; dosed at approximately 200 kcal/kg/day during the catch-up growth phase
- Complications of SAM: hypoglycaemia, hypothermia, sepsis, anaemia, electrolyte disturbance; cautious, staged fluid management is essential in severe malnutrition

Key Micronutrient Deficiencies

Deficiency	Recognition	Treatment Blueprint
Iron deficiency anaemia	Most common nutritional deficiency worldwide and in Pakistan	Elemental iron 3-6mg/kg/day for 3 months; recheck Hb at 4 weeks, ferritin at 3 months
Vitamin D deficiency / rickets	High prevalence in Pakistan — exclusive breastfeeding without supplementation, dark skin, low sun exposure, veiled mothers; rachitic rosary, Harrison's groove, bowing of legs	High-dose D3 loading, then maintenance dosing
Zinc deficiency	Acrodermatitis enteropathica, frequent diarrhoea, impaired wound healing, poor growth	Elemental zinc 1mg/kg/day
Vitamin B12 deficiency	Vegetarian/vegan mothers, exclusively breastfed infants; developmental regression, hypotonia, megaloblastic anaemia	IM or high-dose oral B12

Liver & Hepatology in OPD

Hepatomegaly — Approach

- Confirm it is genuine hepatomegaly (measure liver span from dullness to the scratch sign) vs a Riedel's lobe or a pushed-down liver
- Tender hepatomegaly: hepatitis (A, B, E), abscess, cardiac (right heart failure), storage disease
- Non-tender hepatomegaly: storage diseases (Gaucher's, Niemann-Pick), glycogen storage disease, haematological causes (thalassaemia, sickle cell, lymphoma), fatty liver (MASLD)
- Hepatosplenomegaly: portal hypertension, haematological disease, storage disease, infections (CMV, EBV, malaria)

Hepatitis in Children

- Hepatitis A: the most common cause of acute hepatitis in Pakistani children; food/waterborne; generally self-limiting; admit if coagulopathy, encephalopathy, or ALT >10x

normal

- Hepatitis B in children: vertical (perinatal) transmission is most common; asymptomatic carrier state common; HBsAg + HBeAg = high infectivity; treatment with entecavir or tenofovir for eligible patients
- Hepatitis C: vertical transmission, blood transfusion; now treated in children >3 years with sofosbuvir/ledipasvir or similar DAA regimens — cure rates >95%

Wilson's Disease — The Treatable Cause Not to Miss

- Autosomal recessive; copper accumulation in liver, brain, and cornea; presents between 5 and 35 years
- Presentations: unexplained liver disease (hepatitis, cirrhosis), neurological symptoms (dysarthria, tremor, behaviour change), acute haemolytic anaemia with Coombs-negative haemolysis
- Kayser-Fleischer rings: golden-brown corneal deposits seen on slit lamp; present in >90% of neurological Wilson's disease, 65% of hepatic presentations
- Diagnosis: low serum ceruloplasmin (<0.2g/L), elevated 24-hour urine copper, liver biopsy copper quantification
- Treatment: D-penicillamine or trientine (chelation); zinc for maintenance; liver transplant for acute liver failure

MASLD in Children — The Growing Epidemic

- Metabolic dysfunction-Associated Steatotic Liver Disease (MASLD, formerly NAFLD): increasing in Pakistani children with obesity and type 2 diabetes
- Screen obese children and adolescents with ALT every 2 years; MASLD diagnosis by ultrasound plus exclusion of other causes
- Management: weight loss (primary treatment), physical activity, dietary modification; metformin for concurrent T2DM

Day 5 Neurology, Cardiology, Renal & Endocrine

Seizures, Headache, Murmurs, Nephrology, Diabetes, Growth · 2 hours

Paediatric Neurology in OPD

Seizures — Classification and OPD Approach

- ILAE 2025 classification: focal (consciousness preserved vs impaired), generalised (absence, generalised tonic-clonic and other generalised types such as myoclonic, atonic, tonic, clonic and negative myoclonus), unknown whether focal or generalised, and unclassified
- New-onset seizure workup: glucose FIRST (always), electrolytes (Na, Ca, Mg), full blood count; LP if meningitis suspected; EEG after a 2nd unprovoked seizure; MRI for focal seizures
- When to start an AED: after a 2nd unprovoked seizure, OR after the 1st seizure if high recurrence risk (structural brain abnormality, EEG abnormality, nocturnal seizure, focal seizure)

Febrile Seizures — Counselling Parents Correctly

- Simple febrile seizure: <15 minutes, generalised, occurs once in 24 hours, full recovery; no AED needed; EEG and LP not routinely indicated
- Complex febrile seizure: focal, >15 minutes, more than once in 24 hours, prolonged postictal period; investigate for meningitis or a structural cause
- Recurrence risk: approximately 30% overall; higher with first seizure under 1 year, low-grade fever at the time, or a family history of febrile seizures
- Prognosis: risk of epilepsy is under 2% with simple febrile seizures; only modestly higher with complex febrile seizures
- Parental education: seizure first aid (lateral position, no tongue depressor, time the seizure, do not restrain), buccal midazolam prescription for home use

Epilepsy Syndromes to Know in OPD

- Childhood absence epilepsy: 4-8 years, brief (5-30 second) staring spells with eyelid fluttering; precipitated by hyperventilation; EEG shows 3Hz spike-wave; ethosuximide is first-line
- Juvenile myoclonic epilepsy (JME): morning myoclonus + generalised tonic-clonic seizures + possibly absence seizures; EEG shows 4-6Hz polyspike-wave; valproate first-line (caution in girls of reproductive age)
- West syndrome (infantile spasms): 4-12 months; brief flexion spasms in clusters; EEG shows hypsarrhythmia; vigabatrin + ACTH; guarded prognosis
- Dravet syndrome: SCN1A mutation; fever-triggered prolonged seizures in the first year of life; valproate is used; AVOID sodium channel blockers (carbamazepine, lamotrigine)

Headache in Children — Red Flags vs Benign

- SNOOP4 red flags: Systemic symptoms, Neurological signs, Onset sudden, Older patient (pattern change), Positional, Progressive, Precipitated by Valsalva, Papilloedema
- Migraine in children: ICHD-3 criteria — 5 attacks, 2-72 hours each, 2 of (unilateral, pulsating, moderate/severe, worse with activity), 1 of (nausea/vomiting, photo/phonophobia); childhood migraine is often bilateral and shorter than adult migraine
- Migraine treatment: acute — ibuprofen 10mg/kg (most effective), sumatriptan nasal spray for children >12 years; antiemetic (metoclopramide); preventive for >4 attacks/month — topiramate, amitriptyline, propranolol

- Pseudotumour cerebri (IIH): obese adolescent girls, vitamin A excess, minocycline; daily headache + pulsatile tinnitus + diplopia (6th nerve palsy) + papilloedema; LP opening pressure >25cmH₂O; acetazolamide
- Tension-type headache: bilateral, pressing/tightening, no vomiting; analgesics + sleep hygiene + reduced screen time
- Medication overuse headache (MOH): headache >15 days/month, analgesic use >10 days/month; withdraw the offending medication

Neurodevelopmental Disorders in OPD

Global Developmental Delay & Intellectual Disability

- GDD: significant delay (>2 SD below the mean) in 2 or more developmental domains in children under 5 years
- Workup: chromosomal microarray (highest-yield genetic test), metabolic screen (thyroid, amino acids, organic acids, ammonia), MRI brain, hearing/vision assessment, FISH for specific syndromes if suspected
- Treatable causes to actively exclude: phenylketonuria (heel prick screen), congenital hypothyroidism, biotinidase deficiency, pyridoxine-dependent epilepsy

Autism Spectrum Disorder — Recognition & Early Referral

- ASD red flags (modified CHAT): no babbling/pointing/waving by 12 months, no single words by 16 months, no two-word phrases by 24 months, any regression at any age
- M-CHAT-R/F (Modified Checklist for Autism in Toddlers, Revised with Follow-Up): screening tool at 18 and 24 months; score 0-2 = low risk; 3-7 = positive screen — complete the Follow-Up interview and refer if still positive; ≥8 = high risk, refer directly
- OPD role: screen, refer to a developmental paediatrician/child psychologist for formal assessment, support parents, early intervention (ABA, speech therapy)
- Associated conditions: intellectual disability (50%), epilepsy (25-30%), ADHD (50%), anxiety

ADHD — OPD Diagnosis and Management

- DSM-5: 6 or more symptoms of inattention AND/OR hyperactivity-impulsivity, present for >6 months, in 2 or more settings, onset before 12 years, causing functional impairment
- Inattentive presentation: daydreaming, forgetful, losing things, not following instructions — often missed, especially in girls
- Hyperactive-impulsive presentation: fidgeting, leaving seat, running/climbing, talking excessively, interrupting
- Comorbidities to screen for: anxiety, depression, oppositional defiant disorder, specific learning disability
- Treatment: psychoeducation first; behavioural therapy; methylphenidate (start 5mg in the morning, titrate up, monitor weight, heart rate, blood pressure); lisdexamfetamine as an alternative
- Methylphenidate monitoring: weight, height, BP, HR every 3 months; consider medication holidays in summer for growth rebound

Cardiology & Renal in OPD

Heart Murmurs — Innocent vs Pathological

- Features of innocent murmurs (the 7 S's): Soft (<3/6), Systolic only, Short, Sensitive to position (decreases on sitting/standing), no radiation (no Spread), no Symptoms, no Structural abnormality on CXR or ECG

- Still's murmur: the most common innocent murmur; low-pitched, musical, vibratory quality; louder when supine, quieter on sitting
- Venous hum: continuous murmur (systole + diastole) beneath the clavicles; disappears with jugular compression or turning the head
- Pathological features: harsh, pansystolic, radiates, associated with a thrill, right-sided, diastolic, or accompanied by symptoms (cyanosis, poor feeding, failure to thrive, syncope)
- When to refer: any doubt, a diastolic murmur, a loud systolic murmur, any accompanying symptom, an abnormal CXR or ECG, or a family history of HOCM or Marfan syndrome

Kawasaki Disease — Complete and Incomplete

- Classic (complete) Kawasaki: fever >5 days plus 4 of 5 criteria — (1) bilateral non-exudative conjunctival injection, (2) oral changes (strawberry tongue, fissured lips), (3) polymorphous rash, (4) cervical lymphadenopathy >1.5cm, (5) extremity changes (erythema/oedema of palms/soles, periungual desquamation)
- Incomplete Kawasaki: fever >5 days plus 2-3 criteria plus an echo abnormality; more common in infants <6 months — and this group carries a higher risk of coronary artery aneurysm
- MIS-C: fever plus multisystem inflammation 2-6 weeks after COVID-19; shares features with Kawasaki disease; cardiac involvement, rash, elevated inflammatory markers; treat with IVIG plus steroids
- Treatment: IVIG 2g/kg as a single dose plus high-dose aspirin (80-100mg/kg/day) until afebrile; then low-dose aspirin for 6-8 weeks, or longer if coronary involvement is present

Syncope in Children — Approach

- Vasovagal (neurocardiogenic) syncope: the most common cause; triggered by prolonged standing, pain, an emotional trigger, or a hot environment; a prodrome (nausea, diaphoresis, tunnel vision) precedes loss of consciousness under 1 minute, with rapid recovery
- Cardiac syncope red flags: exertional syncope, syncope during exercise, no prodrome, family history of sudden cardiac death, palpitations before syncope — ECG is mandatory
- ECG interpretation in syncope: prolonged QTc (>450ms in males, >460ms in females) suggests long QT syndrome; pre-excitation (short PR plus a delta wave) suggests WPW; also look for complete heart block and a HOCM pattern
- Orthostatic hypotension: BP drop >20/10mmHg on standing; seen in adolescents, dehydration, and certain medications (ADHD medications, antidepressants)

UTI — Diagnosis, Treatment, Investigation

- Diagnosis: urine microscopy plus culture; midstream clean catch (>6 months); suprapubic aspiration is the gold standard in neonates
- Significant bacteriuria: >100,000 CFU/mL of a single organism with pyuria; dipstick nitrite plus leukocyte esterase is a reasonable screening approach
- Treatment: E. coli is the commonest organism (80%); amoxicillin-clavulanic acid, nitrofurantoin, or trimethoprim depending on local sensitivity; 3-7 days for lower UTI, 7-14 days for febrile UTI
- When to investigate further: first febrile UTI in a child under 2 years — renal ultrasound; if the ultrasound is abnormal or the UTI is recurrent — DMSA scan (for cortical scarring); MCUG/VCUG if vesicoureteral reflux is suspected

Nephrotic Syndrome — OPD Management

- Definition: proteinuria (>40mg/m²/hr or 3+ on dipstick) plus hypoalbuminaemia (<25g/L) plus oedema plus hypercholesterolaemia

- 80% of children have steroid-sensitive minimal change disease (MCNS); diagnose clinically — biopsy is not routinely needed in 1-12 year olds with a typical presentation
- First episode treatment: prednisolone 60mg/m²/day (max 60mg) for 4-6 weeks, then alternate-day dosing for a further 4-6 weeks
- Complications to monitor: infection (peritonitis, cellulitis), thromboembolism (anticoagulate if prolonged hypoalbuminaemia), hypovolaemia, dyslipidaemia
- Frequent relapsers and steroid-dependent disease: cyclophosphamide, levamisole, mycophenolate; refer to a paediatric nephrologist

Endocrinology in OPD

Short Stature — Systematic Approach

- Mid-parental height (MPH) calculation: boys = (father's height + mother's height + 13)/2; girls = (father's height + mother's height - 13)/2; ± 10 cm is the target centile range
- Constitutional delay of growth and puberty (CDGP): the most common cause in boys; delayed bone age; family history; reassure, testosterone if psychologically distressing
- Familial short stature: normal bone age, normal growth velocity, target height matches the family; no treatment needed
- Pathological short stature: growth velocity <4cm/year, growth crossing centiles downward, features of hypothyroidism, Cushing's syndrome, growth hormone deficiency, Turner syndrome (45,X), or chronic illness
- Investigations: bone age (left wrist X-ray), IGF-1, IGFBP-3, thyroid function, karyotype (all short girls), coeliac screen, renal function

Precocious Puberty

- Definition: breast development before 8 years in girls, testicular volume >4mL or pubic hair before 9 years in boys
- Central precocious puberty (CPP): gonadotrophin-dependent; usually idiopathic in girls; in boys it always needs imaging — brain MRI to exclude a tumour
- Peripheral precocious puberty: gonadotrophin-independent; congenital adrenal hyperplasia (the most common cause in boys), McCune-Albright syndrome, adrenal tumour
- Investigations: LH, FSH, oestradiol/testosterone, bone age, GnRH stimulation test, pelvic ultrasound, brain MRI
- Treatment of CPP: GnRH agonist (monthly depot leuprolide) to arrest progression and protect final height

Diabetes Mellitus Type 1 in Children

- Presentation: polyuria, polydipsia, weight loss, fatigue; DKA at presentation in up to 30% — abdominal pain, vomiting, Kussmaul breathing
- OPD vs admit decision: if no DKA and the child is able to drink, treatment can be initiated in OPD with close follow-up within 24 hours; DKA always means admission
- Initial insulin regimen: basal-bolus (MDI) is preferred; basal insulin (glargine or detemir) plus a bolus rapid-acting analogue (lispro, aspart) before each meal
- HbA_{1c} targets: under 7% (53 mmol/mol) for most children (ISPAD 2022); individualise for hypoglycaemia-unaware or very young children
- Sick day rules: never stop insulin; increase monitoring frequency; test ketones; know when to present to emergency care
- Hypoglycaemia management: the Rule of 15 — 15g of fast-acting carbohydrate, recheck in 15 minutes; every patient should have a glucagon kit prescribed

Thyroid Disorders in Children

- Hypothyroidism: Hashimoto's thyroiditis is the most common acquired cause; more common in girls; goitre, weight gain, constipation, cold intolerance, delayed bone age, poor academic performance
- Diagnosis: elevated TSH with low free T4; TPO antibodies are positive in Hashimoto's; treat with levothyroxine 2-5mcg/kg/day (dose varies by age)
- Hyperthyroidism: Graves' disease; goitre, tachycardia, tremor, weight loss, exophthalmos; suppressed TSH with elevated free T4/T3; TRAb positive
- Treatment of Graves' disease: carbimazole (0.5mg/kg/day) plus propranolol for symptom control; titrate against thyroid function tests at 4-6 weeks; remission in 20-40%; definitive treatment is radioiodine (>10 years) or surgery

Type 2 Diabetes — Rising in Pakistani Adolescents

- Risk factors: obesity (BMI >95th centile), family history of T2DM, acanthosis nigricans, polycystic ovarian syndrome, maternal gestational diabetes
- Screening: obese children with 2 or more risk factors should have fasting glucose or HbA1c checked at 10 years of age or at onset of puberty, whichever is earlier
- Management: lifestyle modification (diet, exercise, reduced screen time), metformin starting at 500mg once daily increasing to twice daily; insulin if HbA1c >9% or the child is symptomatic

Day 6 Fever of Unknown Origin, Haematology & Rheumatology

The Diseases That Hide, and the Ones That Kill If You Miss Them · 2 hours

Fever of Unknown Origin & Periodic Fever Syndromes

Fever of Unknown Origin — Systematic Approach

- Petersdorf definition (adapted for children): fever $>38.3^{\circ}\text{C}$ documented on multiple occasions for >3 weeks, with diagnosis unclear after 3 outpatient visits or 3 inpatient days
- Categories: Infectious (most common in Pakistan — TB, brucellosis, typhoid, EBV/CMV, osteomyelitis, endocarditis), Neoplastic (leukaemia, lymphoma, neuroblastoma), Rheumatological (JIA — particularly systemic JIA, SLE, vasculitis), Miscellaneous (drug fever, inflammatory bowel disease, autoinflammatory syndromes)
- Fever curve as a diagnostic clue: a daily single spike suggests systemic JIA; high quotidian fever with chills suggests malaria or bacteraemia; step-ladder fever suggests typhoid; undulant fever suggests brucellosis; periodic fever suggests an autoinflammatory syndrome
- Investigations: first tier (CBC with differential, CRP, ESR, LFTs, U&E, blood culture $\times 3$, urine MC&S, CXR, Mantoux/IGRA); second tier (Brucella serology, EBV/CMV PCR, ANA, ferritin, LDH, bone marrow biopsy if haematological features are present)

HLH — The Disease That Kills If You Miss It

- Haemophagocytic Lymphohistiocytosis: uncontrolled macrophage activation; primary (genetic — PRF1, UNC13D mutations) or secondary (infection-triggered, JIA, malignancy)
- HLH-2004 diagnostic criteria — 5 of 8: fever, splenomegaly, cytopenias affecting 2 or more cell lines, hypertriglyceridaemia, hypofibrinogenaemia, elevated ferritin (>500 , often $>10,000$), elevated sCD25, reduced or absent NK cell activity
- Ferritin $>10,000$ has approximately 90% sensitivity and 96% specificity for HLH in the right clinical context — always check ferritin in a sick child with unexplained cytopenias and hepatosplenomegaly
- Treatment: the HLH-94/2004 protocol (dexamethasone plus etoposide); stem cell transplant for primary HLH

Periodic Fever Syndromes

- PFAPA (Periodic Fever, Aphthous Stomatitis, Pharyngitis, Adenitis): the most common; strict periodicity every 3-8 weeks; episodes last 12-72 hours; the child is well in between; a single dose of prednisolone (1-2mg/kg) aborts the episode within hours
- Familial Mediterranean Fever (FMF): autosomal recessive; MEFV gene; more common with Mediterranean/Middle Eastern ancestry; recurrent peritonitis/pleuritis/arthritis with fever; colchicine is a genuinely life-changing treatment
- HIDS (Hyper IgD Syndrome): MVK gene; high IgD; fever every 4-8 weeks; cervical lymphadenopathy, vomiting, diarrhoea, abdominal pain, rash
- TRAPS (TNF Receptor-Associated Periodic Syndrome): TNFRSF1A gene; longer episodes (1-3 weeks), migratory myalgia, periorbital oedema, monocytic fasciitis; etanercept is used for treatment
- Brucellosis: grossly underdiagnosed in Pakistan; rural exposure, animal contact, unpasteurised milk/cheese; serological diagnosis; doxycycline plus rifampicin (children >8 years) or TMP-SMX plus rifampicin (younger children) for 6 weeks

Haematology in OPD

Pallor — Systematic Approach

- Microcytic (MCV <80fl): iron deficiency anaemia (most common), thalassaemia trait, lead poisoning, anaemia of chronic disease (variable)
- Normocytic (MCV 80-100fl): acute blood loss, haemolysis (G6PD deficiency, spherocytosis, sickle cell), bone marrow suppression, chronic disease
- Macrocytic (MCV >100fl): B12 deficiency, folate deficiency, hypothyroidism, drugs (methotrexate, AZT), liver disease
- Iron deficiency vs thalassaemia trait: both are microcytic; the Mentzer index (MCV divided by RBC count) under 13 favours thalassaemia trait, over 13 favours iron deficiency; confirm with haemoglobin electrophoresis

Iron Deficiency Anaemia — Common But Commonly Mismanaged

- Diagnosis: Hb below the age-specific norm plus MCV <70fl plus serum ferritin <12mcg/L (or <30 if infection coexists); serum iron low, TIBC elevated
- Treatment: elemental iron 3-6mg/kg/day in 2-3 divided doses for 3 months (continue 2 months past Hb normalisation for stores repletion)
- Why is it not responding? Check compliance (black stool shows the iron is being taken, not that it is absorbed; its absence suggests non-adherence), ongoing loss (dietary history, blood loss, malabsorption), and whether the diagnosis is actually correct (thalassaemia major/intermedia, sideroblastic anaemia)
- Prevention: term infants — iron supplementation from 4-6 months if exclusively breastfed; preterm infants — from 4 weeks after birth

Thalassaemia — Pakistan's Genetic Emergency

- Beta thalassaemia major: transfusion-dependent from 6-12 months; presents with pallor, failure to thrive, hepatosplenomegaly, frontal bossing, chipmunk facies, growth retardation
- Beta thalassaemia intermedia: less severe; maintains Hb 7-8g/dL without regular transfusion; may need occasional transfusion; hydroxyurea can help
- Beta thalassaemia trait (carrier): mild microcytic anaemia; Hb 10-13g/dL; DO NOT treat with iron unless concurrent iron deficiency is proven; haemoglobin electrophoresis shows elevated HbA2 >3.5%
- Genetic counselling is MANDATORY: carrier × carrier gives a 25% risk of major disease per pregnancy; test parents, siblings, and extended family; offer prenatal diagnosis for future pregnancies
- Iron chelation in major disease: deferoxamine (SC overnight infusion) or deferasirox (oral); aim to keep ferritin under 1000mcg/L; monitor cardiac iron loading with annual cardiac T2* MRI

Bleeding Disorders

- ITP (Immune Thrombocytopenic Purpura): the most common cause of isolated thrombocytopenia in children; often post-viral; petechiae plus purpura; platelets under 100,000; a diagnosis of exclusion
- Bleeding score: WHO Bleeding Assessment Tool; grade 0-2 = observe; grade 3+ = treat; treatment options are IVIG 0.8-1g/kg, OR anti-D immunoglobulin (Rh-positive patients only), OR steroids; splenectomy for chronic ITP
- Hemophilia A/B: X-linked; boys affected; haemarthroses, muscle bleeds, prolonged APTT with normal PT and normal platelets; treated with factor VIII or IX replacement
- Von Willebrand disease: the most common inherited bleeding disorder; epistaxis, menorrhagia, easy bruising; prolonged APTT, low VWF antigen/activity; DDAVP for mild disease, VWF concentrate for severe disease

- DIC: disseminated intravascular coagulation in severe sepsis; prolonged PT/APTT plus low fibrinogen plus elevated D-dimer plus thrombocytopenia; treat the underlying cause

Lymphadenopathy — When It Is Not Just Infection

- Reactive lymphadenopathy: the most common cause; associated with infection, tender, under 3cm, mobile, no constitutional symptoms; resolves in 2-4 weeks
- Red flags: over 3cm, firm/hard, fixed, non-tender, supraclavicular location (always biopsy), associated mediastinal widening on CXR, hepatosplenomegaly, unexplained weight loss, night sweats
- Leukaemia presentation: pallor plus fatigue plus bruising plus bone pain plus hepatosplenomegaly plus lymphadenopathy; peripheral film may show blasts; urgent bone marrow biopsy is needed
- Lymphoma: Hodgkin's disease (more common in young adults, cervical/mediastinal, B symptoms, night sweats) vs Non-Hodgkin's disease (younger children, extranodal, CNS, GI involvement)
- Biopsy timing: if there is no resolution at 4-6 weeks with antibiotics, no reduction in size, or any red flag is present — proceed to excision biopsy

Rheumatology & Vasculitis

Juvenile Idiopathic Arthritis (JIA)

- Definition: arthritis in a child under 16 years, persisting more than 6 weeks, with other causes excluded
- Subtypes: Oligoarticular (the most common, large joints, ANA-positive, uveitis risk — eye screening is mandatory); Polyarticular (RF-positive or RF-negative, resembles adult rheumatoid arthritis); Systemic JIA (sJIA — quotidian fever, salmon-coloured rash, serositis, hepatosplenomegaly, the highest risk subtype for macrophage activation syndrome)
- Macrophage Activation Syndrome (MAS): a catastrophic complication of sJIA; features overlap with HLH; ferritin suddenly rises and cytopenias develop in a previously well-controlled sJIA patient — a medical emergency
- Treatment: NSAIDs (indomethacin, naproxen) plus physiotherapy for oligoarticular disease; methotrexate for polyarticular disease; biologics (anakinra, tocilizumab, canakinumab) for sJIA

Systemic Lupus Erythematosus in Children

- Childhood SLE is more severe than adult-onset SLE; renal involvement in over 50%, CNS involvement more common
- ACR/EULAR 2019 criteria: an ANA titre >1:80 is the entry criterion, followed by domain scoring including constitutional, haematological, neuropsychiatric, mucocutaneous, serosal, musculoskeletal, and renal features
- Investigations: ANA (sensitive but not specific), anti-dsDNA (specific for SLE), complement C3 and C4 (low in active disease), anti-Smith, urinalysis, CBC, renal function
- Lupus nephritis: the most important prognostic determinant; classified by ISN/RPS criteria; treated with hydroxychloroquine plus steroids plus mycophenolate (class III/IV disease) or cyclophosphamide

IgA Vasculitis (Henoch-Schönlein Purpura)

- Palpable purpuric rash (non-thrombocytopenic) on the buttocks and lower limbs, plus arthritis, plus abdominal pain (colicky, with intussusception risk), plus renal involvement (haematuria, proteinuria)

- Serum IgA is elevated in about 50%; skin biopsy shows IgA deposition on immunofluorescence; complement levels are normal
- Management: supportive for mild cases; steroids for severe abdominal pain or orchitis; monitor urine for 6 months, since nephritis can develop late
- ANCA-associated vasculitis (GPA, microscopic polyangiitis): haematuria plus pulmonary haemorrhage plus sinusitis — rare but catastrophic; serum ANCA plus renal biopsy for diagnosis

Day 7 Dermatology, Immunology, Oncology & Adolescent Health

Rashes, Primary Immunodeficiency, Cancer Red Flags and the Adolescent Consultation · 2 hours

Dermatology, Immunology & Oncology Red Flags

Approach to Rashes — Morphology First

- Macular/papular: viral exanthems (measles, rubella, roseola, EBV, enterovirus), drug reactions, early meningococcaemia
- Vesicular: chickenpox (lesions at different stages simultaneously), hand-foot-mouth disease (oral ulcers plus acral vesicles), herpes zoster, bullous impetigo
- Petechial/purpuric: ITP (thrombocytopenic, non-palpable), HSP/IgA vasculitis (non-thrombocytopenic, palpable, dependent distribution), meningococcaemia (stellate, rapidly spreading)
- Eczematous: atopic dermatitis (flexural, itchy, onset under 5 years), contact dermatitis, seborrhoeic dermatitis (scalp/face/nappy area)

Atopic Dermatitis — Management in Pakistan OPD

- The stepladder approach: emollient therapy for every patient (the cornerstone of treatment), a mild topical steroid for flares (hydrocortisone 1% for face/flexures; mometasone for the body), tacrolimus/pimecrolimus as steroid-sparing alternatives
- Trigger identification: house dust mite (use mattress covers), soaps/detergents, food allergens (in severe refractory infant cases — an exclusion diet trial), sweat
- Secondary infection: Staphylococcal infection presents as weeping, crusting, yellow exudate; treat with antibiotics (cefalexin) plus a short course of topical steroid; herpes simplex (eczema herpeticum) presents with painful vesicles and high fever, requiring IV aciclovir

Primary Immunodeficiency — Recognition & Referral

- Jeffrey Modell Foundation 10 warning signs of primary immunodeficiency: ≥ 4 new ear infections within 1 year, ≥ 2 serious sinus infections within 1 year, ≥ 2 months on antibiotics with little effect, ≥ 2 pneumonias within 1 year, failure of an infant to gain weight or grow normally, recurrent deep skin or organ abscesses, persistent thrush in the mouth or fungal infection on the skin, need for IV antibiotics to clear infections, ≥ 2 deep-seated infections including septicaemia, family history of primary immunodeficiency
- Key PID presentations: XLA (X-linked agammaglobulinaemia — recurrent bacterial infections in boys after 6 months, very low immunoglobulins); CVID (Common Variable Immunodeficiency — older age, recurrent sinopulmonary infections, autoimmunity); DiGeorge syndrome (22q11 deletion — cardiac defects plus hypocalcaemia plus T-cell lymphopenia); SCID (severe combined immunodeficiency — life-threatening infections from birth, absent lymphocytes)
- HIV in Pakistani children: vertical transmission; consider in a child with recurrent infections, failure to thrive, oral candidiasis, or lymphadenopathy — HIV testing with appropriate consent

Oncology Red Flags — Do Not Miss Childhood Cancer

- Leukaemia: pallor plus bone pain plus hepatosplenomegaly plus lymphadenopathy plus bleeding; CBC shows pancytopenia or an abnormal leukocyte count; blasts may be seen on peripheral film
- Brain tumours: morning headache plus vomiting plus progressive neurological symptoms plus papilloedema plus ataxia; the most common solid tumour in children after leukaemia

- Wilms tumour: an abdominal mass in a child under 5 years; do NOT repeatedly palpate it (risk of rupture); ultrasound first; check urine for haematuria
- Neuroblastoma: an abdominal mass crossing the midline plus periorbital ecchymoses ('raccoon eyes') plus opsoclonus-myoclonus; elevated urinary catecholamines
- Bone tumours: Ewing's sarcoma (diaphyseal, onion-skin periosteal reaction) and osteosarcoma (metaphyseal, sunburst pattern); bone pain plus swelling in an adolescent needs urgent imaging

Adolescent Medicine & Functional Disorders

The Adolescent Consultation

- Creating a safe space: see the adolescent alone for part of the consultation after age 12; assure confidentiality within limits
- HEADSS assessment: Home, Education/Employment, Activities, Drugs, Sexuality, Suicide/Self-harm/Depression
- Menstrual irregularities: primary amenorrhoea (no menarche by 15, or 3 years after thelarche); secondary amenorrhoea (absent for more than 3 months); PCOS (oligomenorrhoea plus hyperandrogenism plus polycystic ovaries); dysmenorrhoea (primary vs secondary — consider endometriosis)
- PCOS in adolescents: insulin resistance, acne, hirsutism, obesity; lifestyle modification first-line; metformin plus OCP for symptom control

Mental Health in Children & Adolescents

- Depression: PHQ-A (Patient Health Questionnaire-Adolescent) as a screening tool; persistent low mood, anhedonia, sleep and appetite disturbance, hopelessness for more than 2 weeks
- Anxiety disorders: generalised anxiety, separation anxiety, social anxiety, school refusal — often presents as somatic complaints (headache, abdominal pain)
- Eating disorders: anorexia nervosa (BMI under 17.5, intense fear of weight gain, body dysmorphia) — medical complications include bradycardia, QTc prolongation, and refeeding syndrome; ask about food avoidance in any notably thin adolescent girl
- Suicidal ideation: ask directly — 'Have you ever felt like you don't want to be here anymore?' — asking does not increase risk; it saves lives; refer urgently if active ideation is present

Functional Somatic Syndromes

- Functional Neurological Symptom Disorder (conversion): non-epileptic seizures, functional weakness, gait abnormalities — diagnosed by positive clinical features, not just exclusion; MRI/EEG normal; psychotherapy is the primary treatment
- Chronic Fatigue Syndrome/ME: profound fatigue, post-exertional malaise, cognitive dysfunction, sleep disturbance; school attendance severely affected; graded exercise therapy (controversial) plus cognitive behavioural therapy plus pacing
- Fibromyalgia in adolescents: widespread musculoskeletal pain plus tender points plus fatigue plus sleep disturbance; normal inflammatory markers; low-dose amitriptyline plus physiotherapy plus CBT

Child Abuse Recognition in OPD

- Physical abuse: bruising in unusual locations (non-mobile infants, ears, neck, buttocks), multiple bruises at different healing stages, patterned bruising, unexplained fractures (metaphyseal corner fractures, rib fractures, spiral humerus fractures)

- Child sexual abuse: genital/anal injuries, an STI in a prepubertal child, sexualised behaviour inappropriate for age, recurrent UTIs in girls
- Neglect: severe malnutrition/failure to thrive, poor hygiene, missed vaccinations, untreated medical conditions
- Disclosure: believe the child; do not interrogate; document accurately; there is a mandatory reporting obligation; involve social services

Vaccine Catch-Up — The OPD Opportunity

- Check at every OPD visit: is the child up to date on the Pakistan EPI schedule? Every contact is an opportunity
- Important catch-up vaccines: MMR (2 doses), Hepatitis B (complete series), HPV for girls 9-14 years, typhoid conjugate vaccine (TCV) from 6-9 months of age (given at 9 months in the Pakistan EPI schedule), annual influenza for high-risk children
- COVID-19 vaccine: follow current national guidance on eligibility, particularly for children with high-risk conditions; discuss with parents