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A E T C M

Vaccination & Preventive Drug Therapy

in Various Diseases — for India

Vaccines, boosters, immunoglobulins, post-exposure prophylaxis and preventive medicines — with age from birth, dose, route, repeat and booster schedules, arranged system-wise

National Immunization Schedule · IAP 2025 optional vaccines · Adult & elderly · Pregnancy · Rabies & tetanus PEP · HIV PEP / PrEP · TB preventive treatment · Travel & MDA · Cardiology · Haematology & asplenia · Oncology · Transplant & biologics · Surgery



By

Dr. Gireesh Kumar K.P.

For general practitioners, paediatricians, physicians, emergency doctors, nurses, interns and MBBS students

Vaccination and Preventive Drug Therapy in Various Diseases

A Practical Guide for India

National Immunization Schedule · IAP and adult schedules · Post-exposure prophylaxis
Immunoglobulins · Chemoprophylaxis · System-wise preventive drug therapy



Dr. Gireesh Kumar K.P.

Academy for Emergency, Trauma & Critical care Medicine (AETCM)

First Edition · October 2026

Disclaimer. This book is a quick-reference guide for registered medical practitioners. Vaccine schedules, product availability and national programme policies change frequently; doses and indications given here follow national (MoHFW, NACO, NTEP, NRCP, NCVBDC), IAP, API and international guidelines current at the time of writing (October 2026). Always confirm with the latest official guidance and the manufacturer's product information, and adjust for the individual patient (age, weight, renal and hepatic function, pregnancy, allergy and drug interactions). Brand names are given only as examples and do not imply endorsement. The author and publisher accept no liability for any consequence arising from the use of this information.

Preface

Prevention is the most powerful medicine we practise. A single dose of vaccine given on the right day, a course of isoniazid to a child living with a TB patient, rabies immunoglobulin infiltrated into a bite wound, benzathine penicillin every three weeks for a girl with rheumatic heart disease, a pneumococcal vaccine before splenectomy, or aspirin started at twelve weeks of a high-risk pregnancy — each of these quietly prevents a death that we would otherwise have to manage in the emergency department or the ICU.

Yet the information a doctor needs at that moment is scattered across the National Immunization Schedule, IAP and adult vaccination consensus statements, NACO, NTEP and rabies guidelines, cardiology and haematology society recommendations and product inserts. In a busy outpatient clinic or casualty, it is rarely at hand. This book brings it together in one place.

The first part covers the principles of immunisation and the schedules — the Universal Immunization Programme with the day-from-birth timing of each vaccine, the IAP 2025 optional vaccines, catch-up, newborns and children, adults and the elderly, and pregnancy. The second part deals with post-exposure and infection prophylaxis — rabies, tetanus and bites, HIV, hepatitis, the childhood exanthems, meningococcal and other contacts, tuberculosis preventive treatment, travel medicine and mass drug administration. The third part is system-wise: cardiology, neurology, haematology, oncology, rheumatology and transplantation, gastroenterology, nephrology, endocrinology, respiratory medicine, surgery and trauma, and other specialties.

Every table tries to answer the practical questions — which vaccine or drug, for whom, at what age or time, what dose and route, how many repeat doses, when the booster is due and when to stop. Indian programme guidance has been followed wherever it exists, with international guidance where it does not.

Schedules change, new vaccines arrive and old ones are withdrawn. I request readers to check the latest national guidance and to send their suggestions, so that future editions remain accurate and useful. I hope this book helps you prevent more disease than you treat.



Dr. Gireesh Kumar K.P.
Academy for Emergency, Trauma & Critical care Medicine (AETCM)
October 2026

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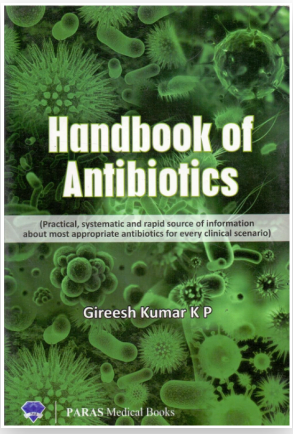
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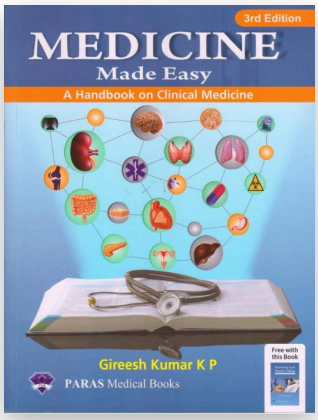
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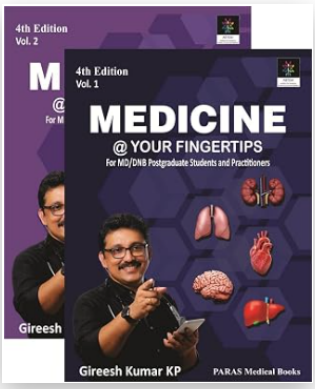
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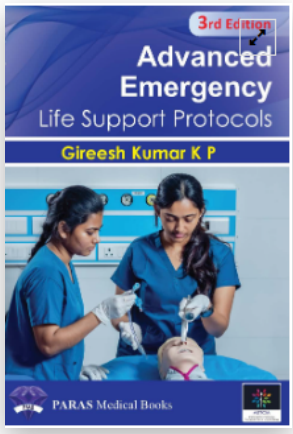
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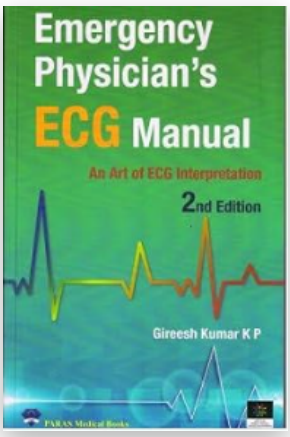
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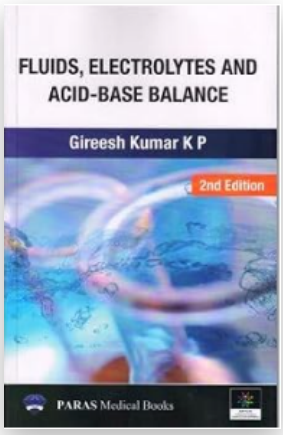
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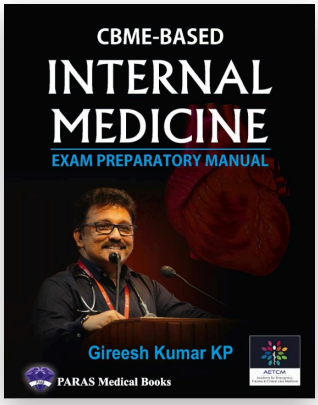
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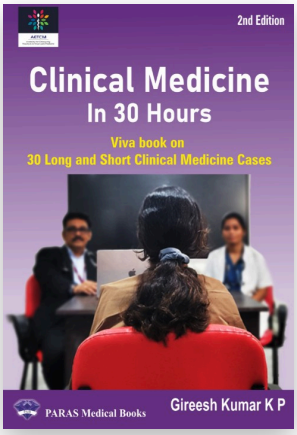
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CHAPTER 1

Principles of Immunisation and Preventive Therapy

The ground rules every prescriber must know before giving a vaccine, immunoglobulin or preventive drug

Types of prevention

Prevention in clinical practice works at three levels. **Primary prevention** stops a disease from starting (vaccines, chemoprophylaxis, aspirin in selected high-risk persons). **Secondary prevention** detects early or prevents recurrence (penicillin after rheumatic fever, statins after myocardial infarction). **Tertiary prevention** limits complications in established disease (antibiotic prophylaxis for spontaneous bacterial peritonitis, vaccines in cirrhosis or CKD). This book covers all three.

Tool	How it works	Onset of protection	Duration	Examples
Active immunisation (vaccine)	Body makes its own antibodies and memory cells	1–4 weeks after the series	Years to lifelong	BCG, MR, hepatitis B, HPV
Passive immunisation (immunoglobulin / monoclonal antibody)	Ready-made antibodies given	Immediate	Weeks to months	Rabies immunoglobulin, TIG, HBIG, VZIG, anti-D, nirsevimab
Chemoprophylaxis	Drug prevents infection or disease	Immediate (while taken)	Only while taken	Doxycycline for leptospirosis, cotrimoxazole in HIV, isoniazid TPT
Long-term preventive pharmacotherapy	Drug lowers risk of an event	Weeks to months	While taken	Aspirin, statins, anticoagulants, bisphosphonates

Types of vaccines

Type	Examples available in India	Key implications
Live attenuated	BCG, OPV (bOPV), MR/MMR, varicella, rotavirus, live hepatitis A, yellow fever, live JE (SA 14-14-2), oral typhoid Ty21a, LAIV	Avoid in pregnancy and significant immunosuppression; two live parenteral vaccines are given the same day or ≥4 weeks apart
Inactivated whole/split	IPV/fIPV, inactivated hepatitis A, influenza, killed JE (JENVAC/JEEV), rabies cell-culture vaccines, whole-cell pertussis (DTwP), oral cholera (killed)	Safe in immunosuppression (response may be lower); boosters often needed
Toxoid	Tetanus (TT/Td), diphtheria	Boosters needed for lifelong protection
Subunit / recombinant	Hepatitis B, HPV, recombinant zoster (RZV), acellular pertussis (aP)	Safe in immunosuppression and pregnancy (most)
Polysaccharide	PPSV23, older meningococcal and Vi-polysaccharide typhoid	Poor response <2 years; no boosting memory
Conjugate	PCV (10/13/14/15/20), Hib, MenACWY conjugate, typhoid conjugate (TCV)	Effective in infants; give memory
mRNA / vector	COVID-19 vaccines (no longer routine)	Special storage

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General rules for giving vaccines

- **Interchangeability:** Different brands of the same antigen can be used to complete a series if the original brand is not available.
- **Minimum intervals:** Doses given ≥5 days earlier than the minimum interval or age should not be counted (the 4-day grace period); repeat after the correct interval.
- **Interrupted schedules:** Never restart a series — continue from where it stopped, whatever the delay ("a dose given is a dose counted").
- **Simultaneous administration:** All vaccines can be given on the same day at different sites (≥2.5 cm apart), unless specifically stated.
- **Live vaccines:** Two parenteral live vaccines not given on the same day must be separated by at least 4 weeks. Oral live vaccines (OPV, rotavirus, Ty21a) have no such restriction.
- **Antibody-containing products:** Immunoglobulins and blood products can blunt the response to MR/MMR and varicella vaccines (see Appendix B). They do not affect inactivated vaccines, OPV, rotavirus or yellow fever.
- **Route matters:** Hepatitis B and rabies vaccines must not be given in the buttock (poor response). Use the anterolateral thigh in infants and deltoid in older children and adults.
- **Documentation:** Record vaccine, manufacturer, batch number, expiry, dose, route, site, date, and the vaccinator. Enter on U-WIN (children and pregnant women) and the Mother and Child Protection Card.

Contraindications and precautions

Situation	Live vaccines	Inactivated vaccines
Anaphylaxis to a previous dose or component	Contraindicated	Contraindicated
Pregnancy	Contraindicated (except yellow fever in high-risk travel)	Generally safe (Td, influenza, hepatitis B, rabies)
Severe immunodeficiency (congenital, chemotherapy, high-dose steroids ≥2 mg/kg or ≥20 mg/day prednisolone for ≥14 days, biologics)	Contraindicated (wait 1–3 months after therapy, 6 months after anti-B-cell therapy)	Can be given; response may be reduced
Moderate–severe acute illness	Postpone until recovered	Postpone until recovered
Minor illness (cold, low fever, diarrhoea)	Not a contraindication	Not a contraindication
Progressive neurological disorder / encephalopathy within 7 days of pertussis vaccine	—	Pertussis component contraindicated; give DT/Td
History of intussusception	Rotavirus vaccine contraindicated	—
HIV infection	BCG not for symptomatic HIV infants; MR/varicella if CD4 ≥15% (≥200/µl in adults)	Safe

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KEY POINT **False contraindications** — prematurity, low birth weight (except BCG timing preferences), breastfeeding, mild illness, antibiotic therapy, malnutrition, family history of convulsions, stable neurological conditions, recent exposure to infection, egg allergy (influenza and MMR can be given). Do not miss a vaccination opportunity for these reasons.

Adverse events following immunisation (AEFI)

Every vaccination site must have an anaphylaxis kit and staff trained to use it. Observe every recipient for **30 minutes** after vaccination (15 minutes is the minimum in many private clinics; national programme advises 30 minutes).

Drug for anaphylaxis	Dose	Route	Repeat
Adrenaline 1:1000 (1 mg/ml)	0.01 ml/kg (max 0.5 ml adult, 0.3 ml child)	IM, anterolateral thigh	Every 5–15 minutes if needed
Oxygen, IV fluids (0.9% saline 20 ml/kg)	As needed	—	—
Antihistamine / hydrocortisone	Chlorpheniramine 0.1 mg/kg; hydrocortisone 4 mg/kg	IV/IM	Adjuncts only, never instead of adrenaline

- Report serious AEFIs (death, hospitalisation, disability, cluster, anaphylaxis) to the District Immunisation Officer within 24 hours on the national AEFI reporting format (CRF/SAFE-VAC portal).
- Common minor reactions — fever, local pain, irritability — are managed with paracetamol (15 mg/kg) and reassurance.

Cold chain basics

Vaccine group	Storage temperature	Freezing allowed?	Notes
OPV	+2 to +8 °C at facility (−15 to −25 °C at higher stores)	Yes (only OPV)	Vaccine vial monitor (VVM) must be checked
All other UIP vaccines (BCG, Penta, PCV, RVV, IPV, MR, JE, Td, HepB)	+2 to +8 °C	No — freezing destroys adsorbed vaccines	Shake test if freezing suspected
Reconstituted BCG, MR, JE (live)	+2 to +8 °C	—	Discard 4 hours after reconstitution (or end of session)
Open multi-dose vials (Penta, Td, HepB, IPV, PCV, OPV, RVV-Rotavac)	+2 to +8 °C	—	Usable up to 28 days under the open-vial policy if VVM and expiry are fine

Immunoglobulins available in India

Product	Indication	Usual dose
Human rabies immunoglobulin (HRIG)	Category III animal exposure	20 IU/kg infiltrated into wounds
Equine rabies immunoglobulin (ERIG, purified)	Category III exposure	40 IU/kg infiltrated into wounds
Rabies monoclonal antibody (Rabishield® single mAb; Twinrab® cocktail)	Category III exposure (as per product licence)	Rabishield 3.33 IU/kg; Twinrab 40 IU/kg — infiltrated into wounds
Tetanus immunoglobulin (TIG)	Tetanus-prone wounds in incompletely immunised	250 IU IM (500 IU if >24 h or heavy contamination); 3000–6000 IU in treatment
Hepatitis B immunoglobulin (HBIG)	Newborn of HBsAg-positive mother; needlestick/sexual exposure	Newborn 0.5 ml (100–200 IU) IM within 12 h; adult 0.06 ml/kg IM
Varicella-zoster immunoglobulin (VZIG)	High-risk contacts (immunocompromised, pregnant, newborns)	125 IU/10 kg (max 625 IU) IM within 10 days
Normal human immunoglobulin (IMIG/IVIG)	Measles exposure in high-risk; hepatitis A (where vaccine unsuitable)	0.5 ml/kg (max 15 ml) IM for measles; IVIG 400 mg/kg in severely immunocompromised
Anti-D immunoglobulin	Rh-negative mother with Rh-positive fetus	300 µg (1500 IU) IM; 50 µg <12 weeks

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Product	Indication	Usual dose
Nirsevimab (RSV monoclonal)	High-risk infants (IAP 2025)	50 mg if <5 kg; 100 mg if ≥5 kg; 200 mg in 2nd season

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CHAPTER 2

National Immunization Schedule (Universal Immunization Programme)

The compulsory, free government schedule for infants, children, adolescents and pregnant women

The Universal Immunization Programme at a glance

India's Universal Immunization Programme (UIP) provides free vaccines against **12 vaccine-preventable diseases** nationally — tuberculosis, diphtheria, pertussis, tetanus, polio, measles, rubella, hepatitis B, *Haemophilus influenzae* type b (Hib) pneumonia and meningitis, rotavirus diarrhoea and pneumococcal pneumonia — plus **Japanese encephalitis** in endemic districts. In **February 2026** a single-dose **HPV vaccine** for 14-year-old girls was added. Every vaccination is recorded on the **U-WIN** digital platform and on the Mother and Child Protection (MCP) card.

KEY POINT All UIP vaccines are free at government health facilities, Ayushman Arogya Mandirs, Anganwadi outreach sessions (Village Health Sanitation and Nutrition Days) and during Mission Indradhanush catch-up rounds.

Age-wise schedule (with age in days from birth)

Age	Approx. day from birth	Vaccines due
Birth	Day 0 (within 24 h for Hep B; OPV-0 within 15 days; BCG up to 1 year)	BCG, OPV-0, Hepatitis B birth dose
6 weeks	Day 42	OPV-1, Pentavalent-1, fIPV-1, Rotavirus-1, PCV-1
10 weeks	Day 70	OPV-2, Pentavalent-2, Rotavirus-2
14 weeks	Day 98	OPV-3, Pentavalent-3, fIPV-2, Rotavirus-3, PCV-2
9–12 months	Day 270–365	MR-1, JE-1 (endemic districts), PCV booster, fIPV-3, Vitamin A (1st dose)
16–24 months	Day 480–730	MR-2, JE-2, DPT booster-1, OPV booster, Vitamin A (2nd dose)
2–5 years	Every 6 months	Vitamin A doses 3 to 9 (2 lakh IU each)
5–6 years	—	DPT booster-2
10 years	—	Td
14 years (girls)	—	HPV — single dose (from 2026 campaign)
16 years	—	Td
Pregnancy	Early pregnancy and 4 weeks later	Td-1, Td-2 (or Td booster)

Vaccine-wise schedule — pregnant women

Vaccine	When to give	Dose	Route	Site
Td-1 (Tetanus and adult diphtheria)	Early in pregnancy	0.5 ml	Intramuscular	Upper arm
Td-2	4 weeks after Td-1	0.5 ml	Intramuscular	Upper arm

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Vaccine	When to give	Dose	Route	Site
Td booster	If two Td doses were received in a pregnancy within the last 3 years	0.5 ml	Intramuscular	Upper arm

Vaccine-wise schedule — infants

Vaccine	When to give	Dose	Route	Site
BCG (Bacillus Calmette–Guérin)	At birth or as early as possible till one year of age	0.1 ml (0.05 ml until 1 month of age)	Intradermal	Left upper arm
Hepatitis B birth dose	At birth or as early as possible within 24 hours	0.5 ml	Intramuscular	Anterolateral aspect of mid-thigh
OPV-0	At birth or as early as possible within the first 15 days	2 drops	Oral	Mouth
OPV-1, 2 & 3	6, 10 & 14 weeks (OPV can be given till 5 years of age)	2 drops	Oral	Mouth
Pentavalent-1, 2 & 3 (DPT + HepB + Hib)	6, 10 & 14 weeks (can be given till one year of age)	0.5 ml	Intramuscular	Anterolateral aspect of left mid-thigh
Pneumococcal conjugate vaccine (PCV)	Two primary doses at 6 and 14 weeks, booster at 9–12 months	0.5 ml	Intramuscular	Anterolateral right mid-thigh (booster on left thigh where JE is given)
Rotavirus vaccine (RVV)	6, 10 & 14 weeks (RVV-1 can be given till one year of age)	Rotavac 5 drops; Rotasiil liquid 2 ml	Oral	Mouth
Fractional IPV (fIPV)	Three fractional doses at 6 and 14 weeks and 9–12 months	0.1 ml	Intradermal	fIPV-1 and 2: right upper arm; fIPV-3: left upper arm
Measles–Rubella (MR) 1st dose	9 completed months – 12 months (can be given till 5 years)	0.5 ml	Subcutaneous	Right upper arm
Japanese encephalitis (JE)-1 (killed vaccine)	9 completed months – 12 months (endemic districts)	0.5 ml	Intramuscular	Anterolateral aspect of right mid-thigh
Vitamin A (1st dose)	At 9 completed months with MR	1 ml (1 lakh IU)	Oral	Mouth

Vaccine-wise schedule — children and adolescents

Vaccine	When to give	Dose	Route	Site
DPT booster-1	16–24 months	0.5 ml	Intramuscular	Anterolateral aspect of left mid-thigh
MR 2nd dose	16–24 months	0.5 ml	Subcutaneous	Right upper arm
OPV booster	16–24 months	2 drops	Oral	Mouth
JE-2 (killed vaccine)	16–24 months	0.5 ml	Intramuscular	Anterolateral aspect of right mid-thigh
Vitamin A (2nd to 9th dose)	16–18 months, then one dose every 6 months up to 5 years	2 ml (2 lakh IU)	Oral	Mouth

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Vaccine	When to give	Dose	Route	Site
DPT booster-2	5–6 years	0.5 ml	Intramuscular	Left upper arm
Td	10 years and 16 years	0.5 ml	Intramuscular	Upper arm
HPV (quadrivalent, Gardasil®)	Girls aged 14 years (national campaign launched 28 February 2026)	0.5 ml, single dose	Intramuscular	Deltoid (upper arm)

Catch-up rules in the UIP

Vaccine	Upper age limit in UIP	If missed
BCG	1 year	Give any time before 1 year
Hepatitis B birth dose	24 hours (effective up to 7 days in some guidance)	Do not give after 24 h in UIP; child gets Pentavalent
OPV	5 years	Give missed doses ≥4 weeks apart
Pentavalent	1 year	After 1 year give DPT (3 doses, 4 weeks apart) instead
Rotavirus	First dose by 1 year	Do not start after 1 year
PCV	1 year (booster by 24 months in some states)	Follow state guidance
MR	5 years	Two doses ≥4 weeks apart
JE	15 years (campaigns)	Single dose per state guidance
DPT booster-1 / 2	7 years	After 7 years give Td

KEY POINT **Minimum interval** between doses of the same antigen in the primary series is **4 weeks**. Never restart a series.

Other national programme components

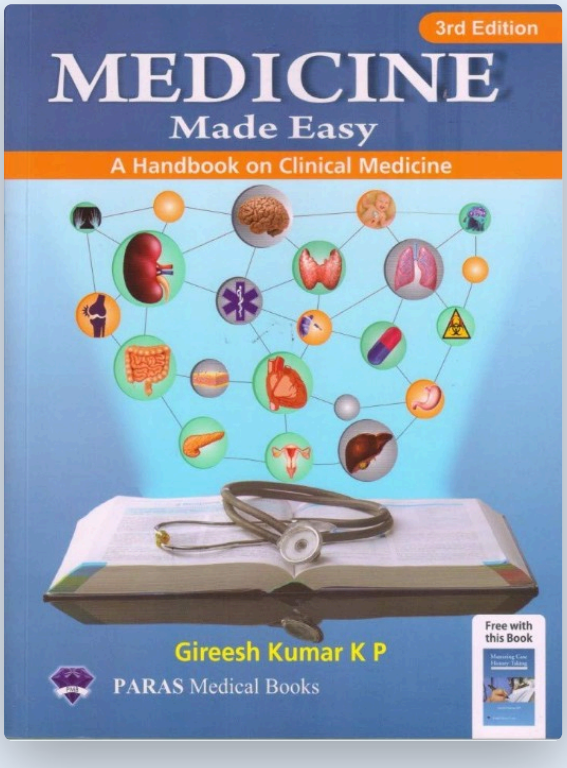
- **Pulse Polio Immunisation (PPI):** Supplementary OPV for all children under 5 years during national/sub-national rounds, regardless of previous doses.
- **Mission Indradhanush / Intensified Mission Indradhanush (IMI):** Catch-up rounds for unvaccinated and partially vaccinated children and pregnant women.
- **Measles–Rubella elimination:** Mass MR campaigns (9 months–15 years) as notified; the routine 2-dose MR schedule continues.
- **Adult JE vaccination:** In highly endemic districts, adults 15–65 years have been given killed JE vaccine through campaigns.
- **Adult BCG (TB Mukt Bharat, 2024 onward):** Several States have offered BCG, with consent, to adults at high risk of TB (elderly ≥60 y, past TB, household contacts, malnourished, diabetics, smokers) — follow your State programme guidance.
- **Vitamin A supplementation:** 9 doses from 9 months to 5 years (1 lakh IU, then 2 lakh IU six-monthly).
- **Anemia Mukt Bharat and National Deworming Day:** See Chapter 4.

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CHAPTER 3

IAP Recommended Schedule and Optional (Private) Vaccines

Indian Academy of Pediatrics ACVIP schedule 2025 (published April 2026) for children aged 0–18 years

IAP ACVIP schedule 2025 — birth to 18 years

Age	Day from birth	IAP-recommended vaccines	Comment
Birth	Day 0	BCG, OPV-0, Hepatitis B-1	Hep B within 24 h
6 weeks	Day 42	DTwP/DTaP-1, IPV-1, Hib-1, Hep B-2, Rotavirus-1, PCV-1	Hexavalent/pentavalent combinations acceptable
10 weeks	Day 70	DTwP/DTaP-2, IPV-2, Hib-2, Hep B-3, Rotavirus-2, PCV-2	RV1 (Rotarix) is a 2-dose vaccine
14 weeks	Day 98	DTwP/DTaP-3, IPV-3, Hib-3, Hep B-4, Rotavirus-3, PCV-3	4th Hep B dose allowed with combination vaccines
6 months	Day 180	Influenza-1 (trivalent); TCV single dose (6–9 months)	Influenza dose 2 after 4 weeks
7 months	Day 210	Influenza-2	Then annually until 5 years
9 months	Day 270	MMR-1	(UIP gives MR)
12 months	Day 365	Hepatitis A-1	Live vaccine — single dose; inactivated — 2 doses
15 months	Day 455	MMR-2, Varicella-1, PCV booster	
16–18 months	Day 480–540	DTwP/DTaP booster-1, Hib booster, IPV booster-1	
18–19 months	Day 540–570	Hepatitis A-2 (inactivated only), Varicella-2	Varicella-2 may be given 3–6 months after dose 1
4–6 years	—	DTwP/DTaP booster-2, IPV booster-2, MMR-3	Do not replace with Tdap at this age
9 to <15 years	—	HPV — girls: single dose; boys: 2 doses (0 and 6 months)	Minimum 5 months between doses
10 (10–12) years	—	Tdap	Regardless of previous Tdap
15–18 years	—	HPV 3 doses (0, 1–2, 6 months) if starting ≥15 y; Td/Tdap at 16–18 years	

Optional vaccines in detail

Vaccine	Who	Schedule	Booster / repeat	Key notes
Influenza (inactivated, trivalent or quadrivalent)	All children 6 months–5 years; high-risk children of any age; adults	6 m–8 y first year: 2 doses 4 weeks apart (0.5 ml each); thereafter 1 dose yearly	Every year before the season (April–May in most of India; Sept–Oct in North-East/hills per local data)	Egg allergy is not a contraindication

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Vaccine	Who	Schedule	Booster / repeat	Key notes
Typhoid conjugate vaccine (TCV)	All children from 6 months	Single dose 0.5 ml IM (6–9 months preferred)	IAP 2025: no routine booster	Vi-polysaccharide is not used <2 y
Hepatitis A — live attenuated (Biovac-A)	≥12 months	Single dose 0.5 ml SC	None	Avoid in immunocompromised
Hepatitis A — inactivated (Havrix, Avaxim, Havisure)	≥12 months	2 doses IM, 6–12 months apart	None	Preferred in immunocompromised and liver disease
Varicella (live)	≥12 months	2 doses: 15 months and 18 months–4 years (≥3 months apart); ≥13 y: 2 doses 4 weeks apart	None	Avoid in pregnancy; 4-week gap from MMR if not same day
MMR	Private practice (replaces MR)	9 months, 15 months, 4–6 years	—	Adds mumps protection
Meningococcal conjugate (MenACWY: Menactra, Menveo, MenQuadfi, Nimenrix; MenFive ACWYX)	High-risk only: asplenia, complement deficiency, HIV, travel (Hajj, meningitis belt), outbreaks, laboratory staff, students in hostels	Menactra 9–23 months: 2 doses 3 months apart; ≥2 years: single dose	Every 5 years if risk continues (3 years if first dose given <7 y)	MenFive (ACWYX, Serum Institute) licensed for special situations
Rabies pre-exposure prophylaxis	Children in high-risk settings (dogs at home, rural areas), travellers, veterinary/animal handlers	IM 1 vial or ID 0.1 ml (2 sites) on days 0 and 7 (WHO); national guidance days 0, 7, 21/28	No routine booster; on re-exposure 2 doses (days 0, 3) without RIG	Highly recommended by IAP for high-risk children
Cholera (killed oral: Hillchol, Shanchol, Euvichol)	Endemic or outbreak areas, travel	2 doses 14 days apart (≥1 year)	After 3 years if risk persists	Not in routine schedule
Japanese encephalitis (live SA 14-14-2 or killed JENVAC/JEEV)	Residents/travellers to endemic areas	Killed: 2 doses 4 weeks apart (JENVAC as per label); live: single dose at 9 months	Per product	Free in UIP in endemic districts
Pneumococcal polysaccharide (PPSV23)	High-risk children ≥2 years (asplenia, CKD, nephrotic syndrome, cochlear implant, CSF leak, immunodeficiency)	1 dose ≥8 weeks after the last PCV	Second dose after 5 years in asplenia/immunodeficiency	Not useful <2 years

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Vaccine	Who	Schedule	Booster / repeat	Key notes
Nirsevimab (RSV monoclonal antibody)	High-risk infants only: born <32 weeks, chronic lung disease, haemodynamically significant CHD, severe immunodeficiency, severe neuromuscular disease (<24 months)	1 IM dose before/at start of RSV season: 50 mg if <5 kg; 100 mg if ≥5 kg	2nd season (high-risk <24 months): 200 mg (2 × 100 mg)	IAP 2025 does not recommend universal use
Dengue (Qdenga®, TAK-003, live attenuated tetravalent)	Approved in India in July 2026; follow label age limits	2 doses 0.5 ml SC, 3 months apart	Not established	No pre-vaccination screening required per manufacturer; not yet in IAP/UIP schedules — individualise
HPV (Gardasil 4, Gardasil 9, Cervavac)	Girls and boys 9–26 years; adults to 45 years after counselling	9–14 y: girls 1 dose (IAP 2025), boys 2 doses 6 months apart; ≥15 y or immunocompromised: 3 doses (0, 1–2, 6 months)	None	National UIP campaign: girls 14 y single dose (2026)
Tdap	10–12 years; pregnancy (every pregnancy, 27–36 weeks)	0.5 ml IM once	Td every 10 years	Tdap can replace one Td dose

Catch-up vaccination (IAP) — key rules

Vaccine	Catch-up age limit	Catch-up schedule
Hepatitis B	Any age	3 doses: 0, 1, 6 months
DTP / Td / Tdap	DTP up to 7 years; Td/Tdap after 7 years	≥7 years: Tdap once, then Td at 1 and 6–12 months
IPV	Up to 5 years (later if travelling)	2 doses 2 months apart, then booster after 6 months
Hib	Up to 5 years	6–12 m: 2 doses + booster; 12–15 m: 1 dose + booster; 15 m–5 y: single dose
PCV	Up to 5 years (healthy); any age in high risk	7–11 m: 2 doses + booster; 12–23 m: 2 doses 8 weeks apart; 2–5 y: single dose
Rotavirus	First dose by 15 weeks; last by 8 months (Rotavac 5D: last dose before 32 weeks of age)	Do not start late
MMR	Any age	2 doses ≥4 weeks apart
Varicella	Any age (non-immune)	<13 y: 2 doses 3 months apart; ≥13 y: 2 doses 4 weeks apart
Hepatitis A	Any age	Live: 1 dose; inactivated: 2 doses 6 months apart
TCV	Up to 45 years (per label)	Single dose
HPV	Up to 26 years (to 45 after counselling)	Age-appropriate doses as above

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CHAPTER 4

Preventive Therapy in Newborns, Infants and Children

Micronutrients, deworming, special-risk children and vaccination in special situations

Preventive drugs for every newborn and child

Preventive measure	Who	Dose / schedule	Duration / repeat	Notes
Vitamin K1 (phytomenadione)	Every newborn	1 mg IM at birth (0.5 mg if birth weight <1000 g)	Single dose	Prevents vitamin K deficiency bleeding
Vitamin D	All infants, especially exclusively breastfed and preterm	400 IU orally daily	From first weeks of life to 1 year (IAP); longer in deficiency risk	Preterm: 400–800 IU/day
Iron (IFA syrup) — Anemia Mukt Bharat	Children 6–59 months	1 ml IFA syrup (20 mg elemental iron + 100 µg folic acid)	Twice weekly, continuous	Given by ASHA; bottle with auto-dispenser
Iron (IFA pink tablet)	Children 5–9 years	1 pink tablet (45 mg iron + 400 µg folic acid)	Once weekly	School-based
Iron (IFA blue tablet)	Adolescents 10–19 years	1 blue tablet (60 mg iron + 500 µg folic acid)	Once weekly (WIFS)	Boys and girls
Iron for preterm/LBW	Preterm and LBW infants	2–3 mg/kg/day elemental iron	From 2–6 weeks of age to 12 months	Start earlier if erythropoietin used
Deworming — albendazole	Children 1–19 years (National Deworming Day, February and August)	1–2 years: 200 mg (½ tablet); 2–19 years: 400 mg chewable	Every 6 months	Not for sick children or those with fever on that day
Vitamin A	9 months–5 years	1 lakh IU at 9 months; 2 lakh IU every 6 months from 16–18 months	Total 9 doses to 5 years	Extra doses in measles (see Chapter 9)
Zinc + ORS (prevention of severe diarrhoea outcomes)	Every child with diarrhoea	Zinc 10 mg (<6 months) or 20 mg daily	14 days	Reduces duration and recurrence for 2–3 months
Chlorhexidine 7.1% cord care	Newborns in home deliveries/high-mortality settings (per State policy)	Apply once to the cord stump	Single application	Dry cord care elsewhere

Preterm and low-birth-weight infants

- Vaccinate by **chronological age**, not corrected age, at the same doses (except hepatitis B birth dose response in <2 kg).
- **Hepatitis B:** If birth weight <2 kg, the birth dose is not counted — give 3 further doses (total 4) starting at 1 month or with the 6-week vaccines.
- **BCG:** Give before discharge when medically stable; OPV-0 and Hep B birth dose as usual.

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- **Rotavirus:** Give at chronological age if clinically stable; can be given on discharge from NICU (start before 15 weeks).
- **Influenza:** Two doses from 6 months; vaccinate household contacts (cocooning).
- **RSV:** Nirsevimab for infants born <32 weeks and those with chronic lung disease (IAP 2025).

HIV-exposed and HIV-infected children

Intervention	Schedule	Notes
Infant ARV prophylaxis	Nevirapine daily for 6 weeks (low risk); high risk: zidovudine + nevirapine for 6 weeks, then nevirapine for a further 6 weeks	As per NACO guidelines (Chapter 8)
Cotrimoxazole prophylaxis	From 6 weeks of age, 4 mg/kg/day (TMP component) once daily	Continue until HIV infection excluded after cessation of breastfeeding; in infected children per CD4 and age criteria
BCG	At birth if asymptomatic; do not give to symptomatic HIV-infected infants	—
MR/MMR, varicella	Give if CD4 ≥15% (age ≥1 year)	Avoid in severe immunosuppression
Inactivated vaccines	All as per schedule	Consider extra PCV/PPSV23 and annual influenza
TB preventive therapy	Isoniazid or 3HP per NTEP/NACO eligibility after ruling out active TB	Chapter 10

Children with chronic disease and immunosuppression

Condition	Extra vaccines / prophylaxis	Avoid
Nephrotic syndrome	PCV + PPSV23, influenza yearly, varicella when in remission and off high-dose steroids	Live vaccines during high-dose steroids
High-dose steroids (≥2 mg/kg/day or ≥20 mg/day prednisolone ≥14 days)	Inactivated vaccines can continue	Live vaccines until 4 weeks after stopping
Chemotherapy (ALL, solid tumours)	Inactivated influenza annually; re-vaccinate 3–6 months after chemotherapy ends (Chapter 15)	Live vaccines until ≥3 months after chemotherapy
Asplenia / sickle cell disease	PCV + PPSV23, Hib, MenACWY, influenza, penicillin prophylaxis (Chapter 14)	—
Chronic liver disease	Hepatitis A and B vaccines (check response)	—
Chronic kidney disease / dialysis	Hepatitis B (double dose), PCV + PPSV23, influenza	Live vaccines after transplant
Cochlear implant / CSF leak	PCV then PPSV23 ≥8 weeks later; Hib	—
Congenital heart disease / chronic lung disease	Influenza yearly, PCV ± PPSV23, nirsevimab (<24 months, significant CHD)	—
Household contacts of immunocompromised	All routine vaccines including MMR, varicella and annual influenza; rotavirus allowed (hand hygiene with nappies)	Avoid OPV if available alternative (IPV)

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Antibiotic prophylaxis in children

Indication	Drug and dose	Duration
Vesicoureteric reflux (grades III–V) or recurrent febrile UTI	Cotrimoxazole 2 mg/kg TMP at night, or nitrofurantoin 1–2 mg/kg at night (cephalexin 10 mg/kg in infants <3 months)	Until reflux resolves/surgery or 1–2 years without UTI; review regularly
Asplenia / sickle cell disease (<5 years)	Penicillin V 125 mg twice daily (<3 y) or 250 mg twice daily (3–5 y and older)	At least until 5 years of age; longer after splenectomy (Chapter 14)
Rheumatic fever (secondary prophylaxis)	Benzathine penicillin 1.2 MU (0.6 MU if <27 kg) IM every 3 weeks	Chapter 12
Close contacts of meningococcal disease	Rifampicin 10 mg/kg (5 mg/kg <1 month) 12-hourly × 2 days, or ceftriaxone 125 mg IM single (<15 y)	Within 24 h of index diagnosis
Pertussis contacts	Azithromycin 10 mg/kg day 1 then 5 mg/kg × 4 days (<6 months: 10 mg/kg × 5 days)	5 days

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CHAPTER 5

Adult and Elderly Immunisation

Life-course vaccination for adults in India (Indian Consensus Guidelines on Adult Immunization, 2026 update; API)

Adult schedule by age band

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
Influenza (annual)	Yearly if risk factor (all adults advisable)	Yearly if risk factor	Yearly — strongly recommended	Yearly — strongly recommended (high-dose/adjuvanted where available)
Td / Tdap	Tdap once if not received, then Td every 10 years	Td every 10 years	Td every 10 years	Td every 10 years
Pneumococcal (PCV20 single dose, or PCV13/15 followed by PPSV23 ≥1 year later)	If risk condition	If risk condition	Recommended (all ≥50 per API)	Recommended
Recombinant zoster vaccine (RZV, Shingrix)	Immunocompromised ≥18 y	Immunocompromised ≥18 y	2 doses, 2–6 months apart	2 doses, 2–6 months apart
HPV	3 doses (0, 1–2, 6 months) up to 26 years	Shared decision 27–45 years (men and women)	—	—
Hepatitis B	3 doses (0, 1, 6 months) if non-immune	3 doses if non-immune	3 doses if non-immune/at risk	If at risk
Hepatitis A	2 doses (inactivated) or 1 (live) if non-immune and at risk	If at risk	If at risk	—
MMR	2 doses if no evidence of immunity	1–2 doses if non-immune	—	—
Varicella	2 doses 4–8 weeks apart if non-immune	2 doses if non-immune	—	—
Typhoid conjugate vaccine	Single dose up to 45 years	Single dose up to 45 years	Vi-PS for travel/risk	—
Meningococcal, rabies PrEP, JE, cholera, yellow fever	Risk-based / travel	Risk-based / travel	Risk-based / travel	Risk-based / travel
RSV (prefusion F vaccine)	—	—	High-risk 50–59 years where available	≥60–75 years where available (limited availability in India)

Pneumococcal vaccination in adults — sequence

Situation	Recommendation
Never vaccinated, ≥50 years or risk condition	PCV20 single dose — no further doses needed; OR PCV13/PCV15 followed by PPSV23 after ≥1 year (≥8 weeks in immunocompromised, asplenia, CSF leak, cochlear implant)

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Situation	Recommendation
Previously received PPSV23 only	PCV20 (or PCV13/15) ≥1 year after PPSV23
Previously received PCV13 only	PPSV23 ≥1 year later (≥8 weeks if high risk) or PCV20 ≥1 year later
High-risk groups	Chronic heart, lung, liver, kidney disease; diabetes; alcoholism; smoking; asplenia; HIV; malignancy; transplant; immunosuppressive therapy; CSF leak; cochlear implant

Adults with medical conditions — vaccines to add

Condition	Recommended vaccines
Diabetes mellitus	Influenza yearly; pneumococcal; hepatitis B (<60 y; ≥60 y by shared decision); Tdap/Td; RZV ≥50 years (≥18 if immunocompromised)
Chronic heart or lung disease (COPD, asthma, heart failure)	Influenza; pneumococcal; Tdap; RZV ≥50; RSV ≥60 where available
Chronic kidney disease / dialysis	Hepatitis B high-dose (40 µg at 0, 1, 2, 6 months) with anti-HBs check; pneumococcal; influenza; RZV
Chronic liver disease	Hepatitis A and B; pneumococcal; influenza
HIV	All inactivated vaccines; pneumococcal; hepatitis B (double dose if CD4 low); HPV to 45; MMR/varicella only if CD4 ≥200/µl; RZV
Asplenia / sickle cell	Pneumococcal, MenACWY (2 doses 8 weeks apart; booster every 5 years), MenB where available, Hib, influenza (Chapter 14)
Immunosuppression / transplant / biologics	Inactivated vaccines ideally ≥2 weeks before therapy; live vaccines ≥4 weeks before and not during therapy (Chapter 16)
Pregnancy	Td/Tdap, influenza; avoid live vaccines (Chapter 6)

Healthcare workers and occupational groups

Group	Vaccines	Notes
All healthcare workers (including students, nurses, laboratory staff)	Hepatitis B 3 doses with anti-HBs 1–2 months after the series; influenza yearly; Tdap once; MMR 2 doses and varicella 2 doses if non-immune; COVID-19 per current national advice	Anti-HBs ≥10 mIU/ml = protected for life; non-responders repeat a full series once
Microbiology / research laboratory staff	Add typhoid, meningococcal, rabies PrEP (rabies labs), hepatitis A as relevant	—
Veterinarians, animal handlers, dog catchers, wildlife staff	Rabies PrEP (days 0, 7, 21/28); serology every 6 months–2 years in high-risk labs	—
Sewage, sanitation and flood relief workers	Hepatitis A, typhoid, Td; leptospirosis chemoprophylaxis during exposure (Chapter 9)	—
Food handlers	Typhoid, hepatitis A	—
Military / paramilitary / travellers to endemic areas	Meningococcal, JE, typhoid, hepatitis A, rabies PrEP, malaria chemoprophylaxis as needed	—

Elderly (≥60 years) — the essential four

- **Influenza** every year before the season.

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- **Pneumococcal** — PCV20 single dose (or PCV13/15 → PPSV23).
- **Recombinant zoster vaccine** — 2 doses, 2–6 months apart (even after previous shingles; wait until the rash has resolved).
- **Td/Tdap** every 10 years — tetanus is still common in elderly people in India.

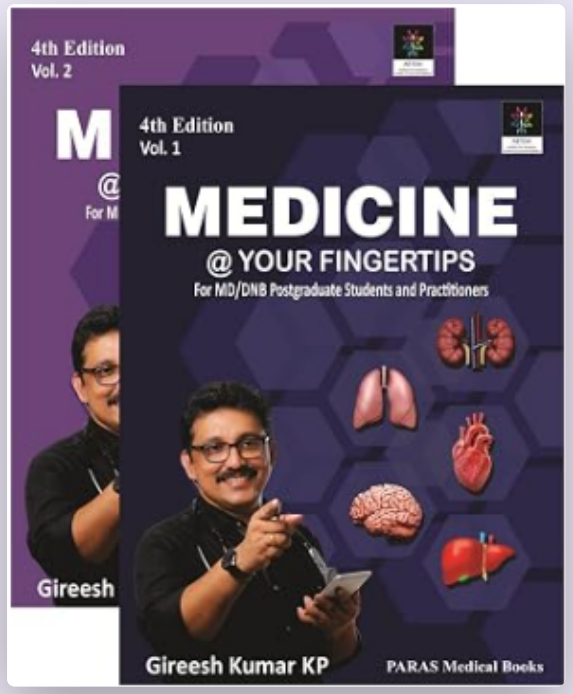
> **KEY POINT** Keep an **adult immunisation card** for every adult patient; digital records and EHR linkage are recommended by the 2026 consensus guidelines.

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CHAPTER 6

Pregnancy, Lactation and Women's Health

Vaccines and preventive drugs for the mother and the newborn

Vaccines in pregnancy

Vaccine	When	Dose	Comment
Td (UIP)	Td-1 early in pregnancy, Td-2 4 weeks later; one Td booster if two doses were given in a pregnancy within the last 3 years	0.5 ml IM, upper arm	Prevents maternal and neonatal tetanus
Tdap (private/IAP/FOGSI)	Every pregnancy, 27–36 weeks (as early as possible in this window)	0.5 ml IM	Protects young infant against pertussis; can replace one Td dose
Influenza (inactivated)	Any trimester, especially before/during the season	0.5 ml IM	Protects mother and infant <6 months
Hepatitis B	If non-immune and at risk	0, 1, 6 months	Safe in pregnancy
Rabies PEP	After any exposure	Full PEP with RIG as indicated	Pregnancy is never a contraindication
Hepatitis A, meningococcal, typhoid (inactivated), JE (killed), cholera (killed)	If clear risk	As per schedule	Inactivated vaccines can be given
COVID-19	Per current national advice	—	—

KEY POINT **Avoid live vaccines in pregnancy** — MR/MMR, varicella, live hepatitis A, live JE, oral typhoid, LAIV, BCG. Yellow fever only if travel to a high-risk area cannot be avoided. Advise avoiding pregnancy for 4 weeks after MR/MMR or varicella; inadvertent vaccination is **not** an indication for termination.

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Preventive drugs in pregnancy (national programme and FOGSI/WHO guidance)

Drug	Who	Dose	Duration
Folic acid	All women planning pregnancy	400 µg daily (5 mg daily if previous NTD, epilepsy on valproate/carbamazepine, diabetes, obesity, sickle cell)	From ≥1 month before conception to 12 weeks
Iron–folic acid (IFA red tablet, Anemia Mukt Bharat)	All pregnant women	60 mg elemental iron + 500 µg folic acid daily	From 4th month (2nd trimester) for 180 days; continue 180 days postpartum
Iron — therapeutic	Hb <11 g/dl in pregnancy	Two IFA tablets daily or IV iron (ferric carboxymaltose 500–1000 mg) per severity	Until Hb normal + 3 months
Calcium	All pregnant women	1 g elemental calcium daily (500 mg twice daily, apart from iron)	From 14 weeks till 6 months postpartum
Albendazole	Pregnant women in 2nd trimester	400 mg single dose	Once in pregnancy

Drug	Who	Dose	Duration
Low-dose aspirin (pre-eclampsia prevention)	High risk: previous pre-eclampsia, chronic hypertension, diabetes, renal disease, autoimmune disease, multiple pregnancy, or ≥2 moderate risk factors	75–150 mg at night (FIGO: 150 mg)	From 12–16 weeks (before 16 weeks) until 36 weeks
Low-molecular-weight heparin	Previous VTE, thrombophilia, antiphospholipid syndrome, high VTE risk scores	Enoxaparin 40 mg SC daily (weight-adjusted)	Antenatal and/or 6 weeks postpartum per risk
Iodine	All (through iodised salt)	Iodised salt (≥15 ppm at household)	Throughout
Vitamin D	Deficient or at risk	1000–2000 IU daily (or as per level)	During pregnancy

Prevention of preterm-birth complications

Drug	Indication	Dose	Notes
Antenatal corticosteroids (dexamethasone)	Imminent preterm birth 24–34 weeks (WHO ACTION criteria)	Dexamethasone 6 mg IM 12-hourly × 4 doses	Or betamethasone 12 mg IM 24-hourly × 2
Magnesium sulphate (fetal neuroprotection)	Imminent birth <32 weeks	4 g IV over 20–30 min, then 1 g/hour until birth (max 24 h)	Monitor reflexes, respiration, urine output
Progesterone	Short cervix (≤25 mm) or previous spontaneous preterm birth	Vaginal micronised progesterone 200 mg nightly	From diagnosis (16–24 weeks) to 36 weeks
Antibiotics in PPROM	Preterm prelabour rupture of membranes	Erythromycin 250 mg 6-hourly × 10 days (or azithromycin regimen)	Avoid co-amoxiclav (NEC risk)

Rh isoimmunisation prevention

Event (Rh-negative, non-sensitised mother)	Anti-D dose
Routine antenatal prophylaxis	300 µg (1500 IU) IM at 28 weeks (single dose), where available
After birth of Rh-positive baby	300 µg IM within 72 hours (extra dose if Kleihauer test shows large fetomaternal haemorrhage)
Abortion, ectopic, molar pregnancy, CVS, amniocentesis <12 weeks	50 µg (250 IU) IM within 72 hours
Same events, antepartum haemorrhage, external cephalic version, abdominal trauma ≥12 weeks	300 µg IM within 72 hours

Prevention of mother-to-child transmission (PPTCT)

Infection	Mother	Newborn
HIV	Lifelong ART (TLD) as soon as diagnosed	Nevirapine 6 weeks; high-risk: zidovudine + nevirapine 6 weeks then nevirapine 6 weeks; cotrimoxazole from 6 weeks (Chapter 8)
Hepatitis B (HBsAg-positive)	Tenofovir (TDF 300 mg daily) from 24–28 weeks if HBV DNA >2 × 10^5 IU/ml (or HBeAg positive) until delivery/postpartum	Hepatitis B vaccine + HBIG (0.5 ml) within 12 hours of birth; complete schedule; test anti-HBs and HBsAg at 9–12 months

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Infection	Mother	Newborn
Syphilis	Benzathine penicillin 2.4 MU IM (early) or weekly × 3 (late/unknown); treat partner	Evaluate and treat if mother inadequately treated
Group B streptococcus	Intrapartum penicillin/ampicillin if risk-based indication (no universal screening in India)	Observation
Varicella in mother 5 days before to 2 days after delivery	—	VZIG to newborn as soon as possible

Lactation and postpartum

- All vaccines **except** smallpox and yellow fever (in infants <6 months) are safe during breastfeeding — complete Td, give influenza, hepatitis B, MR/MMR (if non-immune) and HPV postpartum.
- **Postpartum MR/MMR and varicella** for non-immune mothers before discharge.
- Continue IFA and calcium for 6 months postpartum.

Women's health — cancer prevention

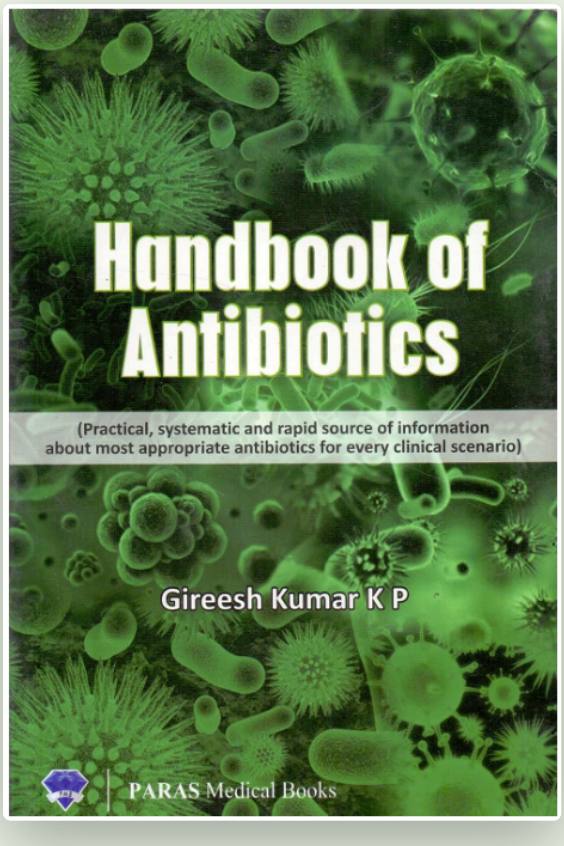
Measure	Who	Schedule
HPV vaccine	Girls 9–14 y (single dose under IAP/UIP 2026); women up to 26 y (3 doses), 27–45 y after counselling	See Chapter 3
Hepatitis B vaccine	All non-immune women	0, 1, 6 months
Tamoxifen / raloxifene chemoprevention	High-risk women for breast cancer (specialist decision)	Tamoxifen 20 mg daily (or 5 mg low-dose) × 5 years; raloxifene 60 mg daily (postmenopausal)

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CHAPTER 7

Rabies, Tetanus and Animal Bites

Post-exposure prophylaxis that saves lives every day in Indian emergency departments

Rabies — categories of exposure (WHO / National Guidelines)

Category	Type of contact	Action
I	Touching or feeding animals; licks on intact skin; contact of intact skin with secretions	No prophylaxis if history reliable; wash
II	Nibbling of uncovered skin; minor scratches or abrasions without bleeding	Wound washing + rabies vaccine immediately (no RIG)
III	Single or multiple transdermal bites or scratches (bleeding); licks on broken skin; contamination of mucous membranes with saliva; any contact with bats	Wound washing + RIG/monoclonal antibody + rabies vaccine immediately

Wound management (all categories)

- Wash immediately and thoroughly with soap and running water for **15 minutes**; flush deep punctures.
- Apply povidone-iodine or alcohol after washing.
- **Do not suture** immediately; if unavoidable, suture loosely after RIG infiltration (infiltrate RIG first, suture after a few hours).
- Give **tetanus** prophylaxis and consider antibiotics (co-amoxiclav) for deep, hand/face, or contaminated wounds.
- Never delay PEP to observe the animal; vaccine may be stopped after day 7 only if the dog or cat stays healthy for 10 days (WHO allows; follow local policy).

Rabies PEP vaccine schedules (cell-culture vaccines: PCECV, PVRV, PDEV)

Regimen	Days	Dose and site	Total vials/visits
Intramuscular (Essen) — national	0, 3, 7, 14, 28	1 full vial (0.5 or 1 ml) IM, deltoid (anterolateral thigh in small children); never gluteal	5 visits
Intramuscular (Zagreb)	0 (2 doses, both deltoids), 7, 21	1 vial per dose	3 visits
Intradermal — updated Thai Red Cross (national: 2-2-2-0-2)	0, 3, 7, 28	0.1 ml ID at 2 sites (both deltoids) per visit	4 visits; economical in ARV clinics
Intradermal 1-week (WHO 2018: IPC regimen)	0, 3, 7	0.1 ml ID at 2 sites per visit	3 visits (where adopted)

KEY POINT Day 0 = day of first dose (not day of bite). If doses are delayed, **continue** the schedule — do not restart. Change of brand/route is allowed if unavoidable; continue the new route's schedule.

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Rabies immunoglobulins and monoclonal antibodies (Category III)

Product	Dose	How to give
Human RIG (HRIG)	20 IU/kg body weight (maximum)	Infiltrate as much as possible into and around all wounds; remaining volume IM at a site distant from the vaccine (or close to the wound per national guidance)
Equine RIG (purified ERIG, F(ab')2)	40 IU/kg	As above; skin test not required for purified products (keep adrenaline ready)
Rabies monoclonal antibody (Rabishield®, Serum Institute)	3.33 IU/kg	Infiltrate into wounds only (as per label)
Rabies monoclonal antibody cocktail (Twinrab®, Zydus)	40 IU/kg	Infiltrate into wounds (as per label)

- Give RIG **with the first dose of vaccine** (day 0) or up to day 7 of vaccination; not after day 7 (it may interfere with the active response).
- For multiple or large wounds, dilute RIG with saline to infiltrate all wounds — never exceed the maximum dose.
- RIG is given to **all** Category III exposures in India, including those presenting late.

Previously vaccinated persons (re-exposure)

Situation	Action
Documented complete PEP or PrEP in the past (any time)	Wound care + vaccine on days 0 and 3 (1 IM dose or 0.1 ml ID each day); **no RIG**
Documented complete PEP within the last 3 months	Wound washing alone may suffice (national guidance)
Incomplete or undocumented previous vaccination	Treat as not previously vaccinated (full PEP + RIG if Category III)

Pre-exposure prophylaxis (PrEP)

Who	Schedule	Booster
Veterinarians, animal handlers, dog catchers, laboratory staff, rabies ward staff, wildlife staff, travellers, children in high-risk areas	IM 1 vial or ID 0.1 ml on days 0, 7 and 21 or 28 (national); WHO allows days 0 and 7	Routine boosters not needed; laboratory workers: check titre (≥0.5 IU/ml) every 6 months–2 years

Other animal and human bites

Bite	Main risks	Prophylaxis
Dog / cat	Rabies, Pasteurella, Capnocytophaga	Rabies PEP as above; co-amoxiclav 625 mg 8-hourly × 3–5 days for high-risk wounds (cat bites, hand, deep, immunocompromised)
Monkey	Rabies; Herpes B (macaques, rare in India)	Rabies PEP (Category III); wound care
Rodent (rat) bite	Rat-bite fever, leptospirosis	No rabies PEP needed in India as a rule; antibiotics if infected
Human bite	Polymicrobial, HBV/HIV rarely	Co-amoxiclav × 3–5 days; tetanus; consider HBV/HIV PEP if blood exposure
Bats	Rabies-related lyssaviruses	Category III PEP

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Tetanus prophylaxis in wound management

Previous tetanus toxoid doses	Clean, minor wound	All other wounds (dirty, puncture, burns, crush, bites, >6 h old)
Unknown or fewer than 3 doses	Td/TT now (complete the primary series); no TIG	Td/TT now + TIG 250 IU IM (500 IU if >24 h or heavy contamination), different site
3 or more doses, last dose <5 years ago	Nothing	Nothing
3 or more doses, last dose 5–10 years ago	Nothing	Td booster
3 or more doses, last dose >10 years ago	Td booster	Td booster

KEY POINT Immunocompromised patients (HIV, chemotherapy) with tetanus-prone wounds should receive **TIG regardless** of vaccination history. Neonatal tetanus is prevented by maternal Td/TT and clean delivery.

Snake and scorpion envenomation

- There is **no prophylactic** antivenom; anti-snake venom (ASV) is given only for signs of systemic envenomation.
- Prevent with footwear, torches and raised beds; in neuroparalytic bites with risk, keep atropine–neostigmine and ventilatory support ready.
- Scorpion sting: prazosin is used early in autonomic storm (treatment, not prophylaxis).

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CHAPTER 8

HIV — Primary and Secondary Prevention

PEP, PrEP, PPTCT, and prophylaxis of opportunistic infections in people living with HIV

Primary prevention of HIV

Measure	Who	Regimen / details
Condoms and safe practices	Everyone at risk	Correct, consistent use; lubricants with condoms
Post-exposure prophylaxis (PEP)	Occupational (needlestick, mucosal) and non-occupational (sexual assault, unprotected sex with known/possible HIV-positive partner) exposures	**TLD** (tenofovir 300 mg + lamivudine 300 mg + dolutegravir 50 mg) one tablet daily × **28 days**; start as early as possible, ideally within 2 hours, not after 72 hours
Pre-exposure prophylaxis (oral PrEP)	HIV-negative persons at substantial risk (sero-discordant couples, men who have sex with men, sex workers, people who inject drugs)	TDF 300 mg + emtricitabine 200 mg (or lamivudine) once daily; event-driven "2-1-1" regimen for MSM; available through selected programme sites/private sector in India
Long-acting PrEP	—	Cabotegravir 2-monthly and lenacapavir 6-monthly injections are WHO-recommended; not yet in India's national programme
Prevention of mother-to-child transmission	All pregnant women tested; HIV-positive women	Lifelong ART; infant prophylaxis (below)
Harm reduction	People who inject drugs	Needle–syringe programmes, opioid substitution (buprenorphine, methadone)
Blood safety and universal precautions	Health facilities	NAT-screened blood; standard precautions

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PEP — step by step

Step	Action
1. First aid	Wash wound with soap and water (do not squeeze or scrub); flush mucosa/eyes with water/saline
2. Assess exposure	Type (percutaneous > mucosal > intact skin — no PEP), volume, depth, source status
3. Source testing	HIV rapid test, HBsAg, anti-HCV with consent; if source HIV-negative and no recent risk, stop PEP
4. Baseline tests of exposed person	HIV, HBsAg/anti-HBs, anti-HCV, (creatinine if TDF), pregnancy test
5. Start TLD	Within 2 hours ideally; up to 72 hours; 28 days
6. Hepatitis B	Vaccine ± HBIG as per Chapter 9
7. Follow-up	HIV test at 4–6 weeks and 3 months (with 4th-generation test); counsel safe sex/no blood donation until follow-up complete

Infant prophylaxis (NACO PPTCT)

Infant risk	Regimen	Duration
Low risk (mother on ART ≥4 weeks before delivery, breastfeeding)	Nevirapine once daily: 10 mg if birth weight 2.0–2.49 kg; 15 mg if ≥2.5 kg (2 mg/kg if <2 kg)	6 weeks
High risk (mother diagnosed late/ART <4 weeks, high viral load, or not on ART)	Zidovudine + nevirapine for 6 weeks, then nevirapine alone	Total 12 weeks
All HIV-exposed infants	Cotrimoxazole prophylaxis from 6 weeks	Until HIV infection excluded after stopping breastfeeding
Testing	DNA PCR at 6 weeks, 6 months, 12 months; antibody test at 18 months	—

Prophylaxis of opportunistic infections in people living with HIV (NACO)

Infection	Indication	Drug and dose	When to stop
Pneumocystis, toxoplasmosis, bacterial infections, malaria (cotrimoxazole preventive therapy, CPT)	CD4 ≤350/µl or WHO clinical stage 3–4; all HIV-exposed infants; all children <5 years with HIV	Cotrimoxazole 960 mg (1 DS tablet) once daily (child 4 mg/kg TMP)	When CD4 >350/µl on two occasions 6 months apart on ART (adults); continue if clinically indicated
Tuberculosis (TB preventive treatment)	All PLHIV after active TB ruled out (symptom screen ± CXR)	6H (isoniazid 300 mg daily × 6 months + pyridoxine), 3HP (weekly × 12 doses), or 1HP (daily isoniazid + rifapentine × 1 month; NACO 2024 guidance)	Single course (repeat per guidelines after re-exposure)
Cryptococcal meningitis (pre-emptive)	CD4 <200/µl: screen serum CrAg; if positive without meningitis	Fluconazole 800 mg daily × 2 weeks, 400 mg daily × 8 weeks, then 200 mg daily	Stop maintenance when CD4 >100–200 on ART with suppressed viral load for ≥6 months
Recurrent candidiasis / histoplasmosis	Not routine	Secondary prophylaxis only after disease	—
Mycobacterium avium complex	Not recommended routinely in India (prompt ART preferred)	Azithromycin 1200 mg weekly only in special cases	When CD4 >100 on ART

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Vaccination in people living with HIV

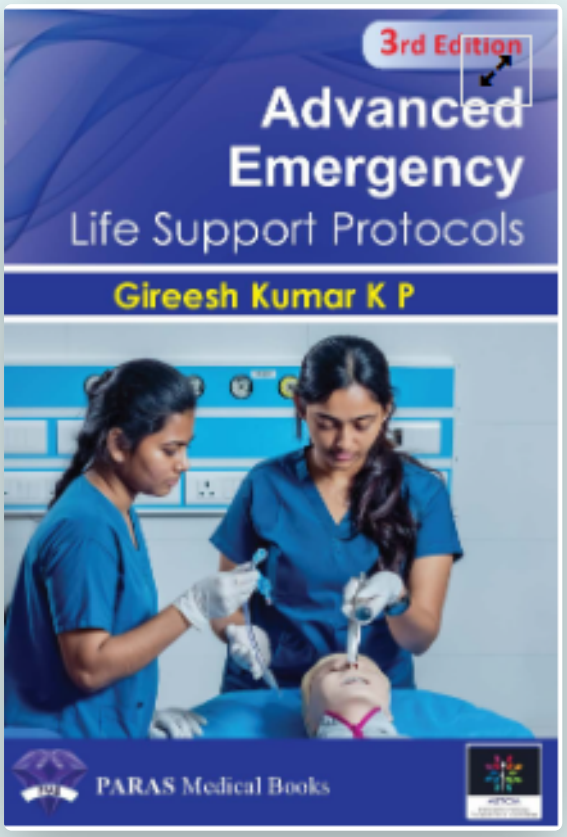
Vaccine	Recommendation
Inactivated (influenza, pneumococcal, Td/Tdap, hepatitis A, HPV, typhoid, meningococcal)	Give as for others; HPV 3 doses up to 45 years; pneumococcal PCV20 or PCV13→PPSV23
Hepatitis B	Double dose (40 µg) at 0, 1, 2, 6 months; check anti-HBs; revaccinate non-responders
Live vaccines (MMR, varicella, yellow fever)	Only if CD4 ≥200/µl (≥15% in children); never BCG in HIV-infected adults
Recombinant zoster vaccine	2 doses for adults ≥18 years

KEY POINT Best protection for PLHIV is **early ART with sustained viral suppression ("U = U": undetectable = untransmittable)**.

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CHAPTER 9

Post-Exposure Prophylaxis for Other Infections

Hepatitis, childhood exanthems, meningococcus, pertussis, diphtheria, influenza, zoonoses and sexual assault

Hepatitis B — after percutaneous, mucosal or sexual exposure

Exposed person's status	Source HBsAg positive (or unknown, high risk)	Source HBsAg negative
Unvaccinated / incomplete	HBIG 0.06 ml/kg IM (within 24 h; up to 7 days) + start/complete HB vaccine (0, 1, 6 months)	Start/complete HB vaccine
Vaccinated responder (anti-HBs ever ≥10 mIU/ml)	Nothing	Nothing
Vaccinated non-responder after 1 series	HBIG × 1 + start second vaccine series	Start second series
Non-responder after 2 series	HBIG × 2 doses, 1 month apart	Nothing
Response unknown	Test anti-HBs now: if <10 → HBIG + booster; if ≥10 → nothing	Test anti-HBs; booster if <10

KEY POINT Newborn of HBsAg-positive mother: **HB vaccine + HBIG 0.5 ml within 12 hours**, complete 3–4 doses, test at 9–12 months.

Hepatitis C and hepatitis A

Infection	PEP available?	What to do
Hepatitis C	No vaccine or PEP	Baseline anti-HCV; HCV RNA at 3–6 weeks and anti-HCV at 3–6 months; treat early infection with DAAs (sofosbuvir–velpatasvir 12 weeks) if it occurs
Hepatitis A (household/sexual contacts, outbreaks)	Yes	Hepatitis A vaccine within 2 weeks of exposure (≥1 year of age); immunoglobulin 0.1 ml/kg for <1 year, immunocompromised, or chronic liver disease
Hepatitis E	No vaccine licensed in India	Safe water; pregnant women at particular risk

Childhood exanthems and vaccine-preventable contacts

Exposure	Susceptible contact	PEP	Timing
Measles	Unvaccinated child ≥6 months, non-immune adult	MR/MMR vaccine	Within 72 hours
Measles	Infant <6 months, pregnant non-immune, immunocompromised	Normal human immunoglobulin 0.5 ml/kg IM (max 15 ml) or IVIG 400 mg/kg	Within 6 days
Measles case (treatment-prevention of complications)	Child with measles	Vitamin A: <6 m 50,000 IU; 6–11 m 1 lakh IU; ≥1 y 2 lakh IU — on day 1 and day 2 (3rd dose at 4 weeks if eye signs)	At diagnosis

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Exposure	Susceptible contact	PEP	Timing
Varicella	Healthy non-immune ≥12 months	Varicella vaccine	Within 3–5 days
Varicella	Immunocompromised, pregnant non-immune, neonates (maternal varicella 5 days before–2 days after birth), preterm	VZIG 125 IU/10 kg (max 625 IU) IM; if unavailable, oral acyclovir 20 mg/kg 6-hourly (adult 800 mg 5 times daily) from day 7–10 after exposure for 7 days	VZIG within 10 days
Mumps / rubella	Non-immune	MMR (does not prevent current infection but protects later)	—

Bacterial infections — chemoprophylaxis of contacts

Disease	Who should receive	Drug and dose
Meningococcal disease	Household and close contacts (within 7 days), those exposed to oral secretions (intubation without mask)	Rifampicin 600 mg 12-hourly × 2 days (child 10 mg/kg); OR ciprofloxacin 500 mg single dose (adults); OR ceftriaxone 250 mg IM single (125 mg <15 y) — preferred in pregnancy; plus MenACWY vaccine for outbreak strains
Haemophilus influenzae type b	Household with unvaccinated child <4 years or immunocompromised	Rifampicin 20 mg/kg (max 600 mg) once daily × 4 days
Pertussis	Household and high-risk contacts (infants, pregnant women in 3rd trimester)	Azithromycin 500 mg day 1, then 250 mg days 2–5 (child 10 mg/kg day 1, 5 mg/kg days 2–5); or clarithromycin/cotrimoxazole
Diphtheria	Close contacts	Benzathine penicillin 1.2 MU IM single (0.6 MU <6 y) or erythromycin 40 mg/kg/day × 7–10 days; Td/DPT booster; throat swab
Invasive group A streptococcal disease	Household contacts at high risk (per local policy)	Penicillin V or azithromycin × 10 days (5 days)
Plague	Close contacts of pneumonic plague	Doxycycline 100 mg 12-hourly × 7 days (or ciprofloxacin)
Anthrax (inhalational exposure)	Exposed persons	Ciprofloxacin 500 mg 12-hourly or doxycycline 100 mg 12-hourly × 60 days
Cholera	Household contacts in outbreaks	Oral cholera vaccine (2 doses); single-dose doxycycline only for household contacts in some outbreak protocols
Leptospirosis	High exposure (floods, paddy fields, sewage, animal farming)	Doxycycline 200 mg orally once weekly during exposure (children: azithromycin per local guidance)
Scrub typhus	Not routinely recommended	Protective clothing; repellents
Scabies	Household and close contacts	Permethrin 5% cream neck down (repeat after 7 days) or ivermectin 200 µg/kg (repeat after 7–14 days) at the same time as the patient

Influenza

Measure	Dose	Duration
Oseltamivir chemoprophylaxis (unvaccinated high-risk household contacts, outbreaks in institutions)	75 mg once daily (child by weight: ≤15 kg 30 mg; 15–23 kg 45 mg; 23–40 kg 60 mg; >40 kg 75 mg)	10 days after household exposure (7 days after last exposure in outbreaks)
Annual vaccination	0.5 ml IM	Every year (Chapter 5)

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Malaria — prevention

Group	Drug	Dose	Duration
Short-term travellers to high-transmission areas (<6 weeks)	Doxycycline	100 mg daily (child >8 y: 1.5 mg/kg)	Start 2 days before; continue during stay and 4 weeks after leaving
Long-term stay / travellers to chloroquine-resistant areas	Mefloquine	250 mg once weekly (child 5 mg/kg)	Start 2 weeks before; continue during and 4 weeks after
Pregnant women	Avoid travel to high-risk areas; mefloquine (2nd/3rd trimester) if unavoidable	—	—
Everyone in endemic areas	Long-lasting insecticidal nets, repellents, indoor residual spray	—	—

Sexual assault — preventive care package

Prevent	Regimen
Pregnancy	Levonorgestrel 1.5 mg single dose within 72 h (up to 120 h); or copper IUD within 5 days
HIV	TLD × 28 days if within 72 h
Hepatitis B	HB vaccine ± HBIG (as above)
Gonorrhoea, chlamydia, syphilis, trichomoniasis	Ceftriaxone 500 mg IM + azithromycin 1 g PO single dose (or doxycycline 100 mg 12-hourly × 7 days) + metronidazole 2 g single dose (can be delayed to avoid vomiting)
Tetanus	Td if indicated by wounds
Psychological support	Counselling and follow-up (MoHFW 2014 protocol)

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CHAPTER 10

Tuberculosis Prevention

BCG and TB preventive treatment (TPT) under the National TB Elimination Programme

BCG

Item	Detail
Schedule (UIP)	At birth, or as early as possible till 1 year
Dose and route	0.05 ml (<1 month) or 0.1 ml intradermal, left upper arm (deltoid insertion)
Expected reaction	Papule at 2–3 weeks, ulcer, scar by 12 weeks; absence of scar is not an indication to revaccinate
Contraindications	Symptomatic HIV, congenital immunodeficiency, infants of mothers with active TB (give after 6 months of isoniazid/TPT, then BCG)
Adult BCG	Offered in several States since 2024 to high-risk adults (elderly, past TB, contacts, diabetics, malnourished, smokers) — follow State guidance

Who should get TB preventive treatment (PMTPT guidelines, MoHFW)

Group	Test before TPT	Regimen options
Household contacts of pulmonary TB, children <5 years	Rule out active TB (symptoms ± CXR); no TBI test needed	6H or 3HP (≥2 years)
Household contacts aged ≥5 years	Rule out active TB; TB infection test (IGRA/TST/Cy-TB) where available	6H or 3HP
People living with HIV (adults, adolescents, children)	Rule out active TB	6H, 3HP or 1HP (NACO 2024 addendum)
Other risk groups (dialysis, anti-TNF therapy, transplant, silicosis, high-dose steroids)	Rule out active TB + TBI test positive	6H or 3HP
Contacts of MDR/RR-TB (fluoroquinolone-sensitive)	Rule out active TB (NAAT if symptomatic)	6Lfx (levofloxacin daily × 6 months) — national expansion 2025
Contacts of isoniazid-resistant, rifampicin-sensitive TB	Rule out active TB	4R (rifampicin daily × 4 months)

TPT regimens and doses

Regimen	Drugs	Dose	Duration
6H	Isoniazid daily + pyridoxine	Adults 5 mg/kg (max 300 mg); children 10 mg/kg (7–15) daily; pyridoxine 10–25 mg	6 months (180 doses)
3HP	Isoniazid + rifapentine once weekly	Adults >30 kg: isoniazid 900 mg + rifapentine 900 mg weekly; children by weight band (FDC 300/300 mg)	12 weekly doses (3 months)
1HP	Isoniazid + rifapentine daily	Adults: isoniazid 300 mg + rifapentine 600 mg daily	28 doses (1 month); PLHIV ≥13 years per NACO
6Lfx	Levofloxacin daily	>14 y: 750 mg (<45 kg) or 1 g (≥45 kg); children 15–20 mg/kg	6 months

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Regimen	Drugs	Dose	Duration
4R	Rifampicin daily	10 mg/kg (≥10 y); 15 mg/kg (<10 y); max 600 mg	4 months

KEY POINT Rifapentine- and rifampicin-based regimens interact with many drugs (dolutegravir — no dose change with 3HP per WHO, follow current NACO guidance for 1HP and rifampicin; hormonal contraceptives; warfarin; azole antifungals). Monitor for hepatitis; stop if jaundice, vomiting or ALT >3× with symptoms.

Follow-up

- Contacts are followed up every 6 months for 2 years after TPT completion and recorded in Ni-kshay.
- Nutritional support (Ni-kshay Poshan Yojana) and Ni-kshay Mitra community support help adherence.

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CHAPTER 11

Travel Medicine, Outbreaks and Mass Drug Administration

Vaccines and drugs for travellers, pilgrims and public-health campaigns in India

Pre-travel consultation (ideally 4–6 weeks before departure)

- Review routine vaccines first — Td/Tdap, MMR, varicella, hepatitis B, influenza, COVID-19.
- Then add destination-specific vaccines, malaria prevention, altitude and traveller's diarrhoea advice.
- Record all doses in an International Certificate of Vaccination (ICV) where required.

Travel vaccines

Vaccine	Indication	Schedule	Booster / validity
Yellow fever (17D live)	Travel to/from endemic countries of Africa and South America; India requires a valid certificate from travellers arriving from endemic areas (else 6-day quarantine)	0.5 ml SC single dose ≥10 days before travel, at designated Yellow Fever Vaccination Centres (APHO, ports, selected hospitals)	Lifelong validity (WHO 2016); avoid <9 months, pregnancy, severe immunosuppression, egg anaphylaxis, thymus disease, age ≥60 (caution)
Meningococcal ACWY conjugate	Hajj and Umrah pilgrims (mandatory, Saudi Arabia), sub-Saharan "meningitis belt", students to USA/UK	Single dose 0.5 ml IM ≥10 days before arrival	Hajj certificate: conjugate vaccine valid 5 years (polysaccharide 3 years)
Oral/injectable polio (IPV/OPV)	Residents/long-stay visitors travelling from polio-affected countries; India requires polio vaccination for travellers from certain countries (Afghanistan, Pakistan, Nigeria, etc.)	One dose of OPV/IPV ≥4 weeks before departure	Certificate valid 12 months
Typhoid conjugate vaccine	Travel within South Asia, poor sanitation	0.5 ml IM single dose	Booster not routinely needed for TCV (Vi-PS: every 3 years)
Hepatitis A	All non-immune travellers to endemic areas	Inactivated: 2 doses 6–12 months apart	Lifelong after 2 doses
Japanese encephalitis	Rural stay >1 month in endemic areas during transmission season; JE-endemic districts of India	Live SA-14-14-2 single dose; or inactivated (JENVAC) 2 doses 28 days apart	Adult booster at 1–2 years for inactivated if ongoing risk
Rabies PrEP	Long stays, remote areas, children, cyclists, cave explorers	Days 0 and 7 (± 21/28)	No routine booster
Cholera (oral killed: Shanchol, Euvichol, Hillchol)	Humanitarian workers, outbreaks	2 doses 14 days apart (≥1 year)	Booster after 2–3 years if risk continues
Tick-borne encephalitis, Kyasanur Forest disease (KFD)	KFD vaccine (formalin-inactivated) for forest-exposed people in Karnataka, Kerala, Goa, Maharashtra when supplied by the State; supply has been interrupted — check with the district	KFD: 2 doses 1 month apart	Booster at 6–9 months and then 5-yearly during exposure

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Malaria chemoprophylaxis for travellers

Drug	Adult dose	Start	Continue after return	Avoid in
Doxycycline	100 mg once daily	1–2 days before	4 weeks	Pregnancy, children <8 years; take upright with water, sun protection
Mefloquine	250 mg once weekly	2–3 weeks before	4 weeks	Epilepsy, psychiatric illness, cardiac conduction defects
Atovaquone–proguanil (limited availability in India)	250/100 mg once daily	1–2 days before	7 days	Severe renal impairment, pregnancy
Chloroquine	300 mg base weekly	1 week before	4 weeks	Only where P. falciparum is chloroquine-sensitive (rare); not for most of India

KEY POINT No chemoprophylaxis is 100% effective — **any fever during or within 3 months after travel needs a malaria test.** Use long-lasting insecticidal nets, DEET repellents, long sleeves.

High-altitude illness (Ladakh, Sikkim, Himalayan treks, Kailash–Mansarovar)

Measure	Dose	When
Graded ascent	Above 3000 m, sleep ≤500 m higher per day; rest day every 3–4 days	Throughout
Acetazolamide (AMS prevention)	125 mg twice daily (child 2.5 mg/kg 12-hourly)	Start 24 hours before ascent; continue 2 days at the highest altitude or until descent
Dexamethasone (alternative, sulfa allergy)	2 mg 6-hourly or 4 mg 12-hourly	Same period; short duration only
Nifedipine SR (HAPE-prone individuals)	30 mg twice daily	Start 24 hours before ascent

Traveller's diarrhoea

- Food and water hygiene; ORS sachets.
- Antibiotic **prophylaxis is not routinely recommended**; carry standby azithromycin 1 g single dose (or 500 mg daily × 3 days) for moderate–severe diarrhoea.

Mass drug administration (MDA) and public-health prophylaxis in India

Programme	Drugs	Dose	Frequency
Lymphatic filariasis elimination (NCVBDC) — DA	Diethylcarbamazine (DEC) + albendazole	DEC 6 mg/kg (2–5 y: 100 mg; 6–14 y: 200 mg; ≥15 y: 300 mg) + albendazole 400 mg	Once a year (annual MDA rounds, e.g. February/August campaigns)
Lymphatic filariasis — IDA (selected districts)	Ivermectin + DEC + albendazole	Ivermectin by height (90–119 cm 3 mg; 120–140 cm 6 mg; 141–158 cm 9 mg; >158 cm 12 mg) + DEC + albendazole	Once a year; not for children <2 y (DEC/albendazole) or <90 cm (ivermectin), pregnant women, seriously ill
National Deworming Day	Albendazole	1–2 y: 200 mg (½ tablet); 2–19 y: 400 mg chewed	Twice a year (February and August)
Vitamin A (biannual)	Vitamin A solution	9 m: 1 lakh IU; 16 m to 5 y: 2 lakh IU every 6 months	9 doses up to 5 years

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Programme	Drugs	Dose	Frequency
Iodine deficiency programme	Iodised salt	≥15 ppm at household	Lifelong
Cholera outbreak response	Oral cholera vaccine campaigns (Shanchol/Euvichol/Hillchol)	2 doses	Outbreak
Leptospirosis in floods (Kerala model)	Doxycycline	200 mg weekly during flood clean-up	Duration of exposure
Kala-azar elimination	Indoor residual spray; no chemoprophylaxis	—	—

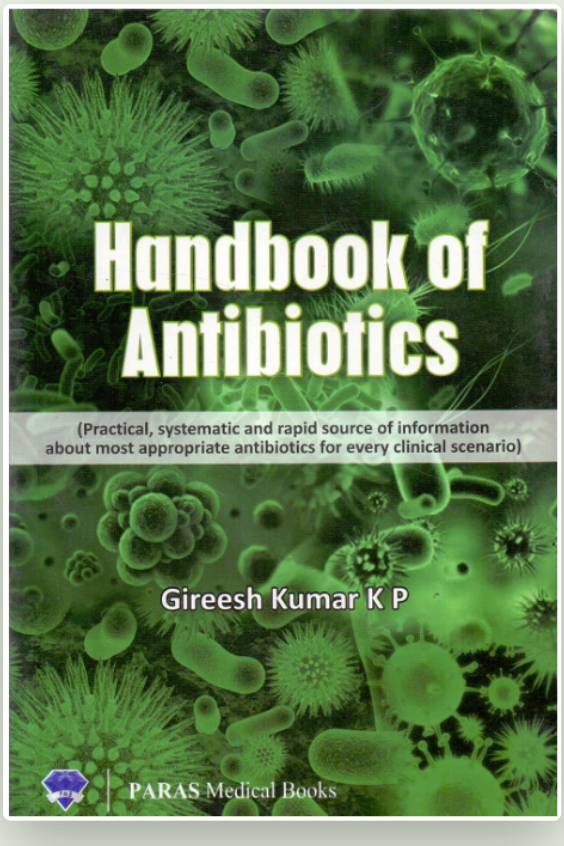
KEY POINT Adverse events after DEC/ivermectin (fever, headache, myalgia, scrotal swelling) usually reflect killing of microfilariae and settle within 1–2 days with paracetamol — reassure the community to maintain coverage.

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CHAPTER 12

Cardiology

Infective endocarditis, rheumatic fever, aspirin, statins, antithrombotics and vaccines in heart disease

Infective endocarditis (IE) prophylaxis — who needs it (AHA 2021, ESC 2023)

High-risk cardiac condition (prophylaxis recommended)	Not recommended (no prophylaxis)
Prosthetic heart valve (surgical or transcatheter, including TAVI) or prosthetic material used for valve repair (annuloplasty rings, chords)	Mitral valve prolapse, bicuspid aortic valve, rheumatic valve disease without prior IE (ESC: consider in India where RHD is common, per cardiologist)
Previous infective endocarditis	Hypertrophic cardiomyopathy
Unrepaired cyanotic congenital heart disease, including palliative shunts and conduits	Atrial septal defect, repaired VSD/PDA beyond 6 months without residual defect
Completely repaired congenital heart defect with prosthetic material — for 6 months after the procedure	Pacemaker/ICD (ESC: prophylaxis for device implantation surgery itself only)
Repaired congenital heart disease with residual shunt or valvular regurgitation at or adjacent to prosthetic material	Coronary stents, CABG
Cardiac transplant recipients with valvulopathy (AHA); ventricular assist devices (ESC 2023)	—

Procedures that need prophylaxis (in high-risk patients only)

- **Dental procedures** involving manipulation of gingival tissue or the periapical region, or perforation of the oral mucosa (extraction, scaling, root canal).
- NOT needed for: local anaesthetic injection through non-infected tissue, dental X-rays, placing orthodontic brackets, shedding of deciduous teeth, lip/oral mucosa trauma.
- Respiratory, GI, genitourinary, skin procedures: **no routine prophylaxis**; treat established infection with antibiotics covering the likely organism (ESC 2023 may consider for TAVI/high-risk in specific settings).

IE prophylaxis regimens — single dose 30–60 minutes before the procedure

Situation	Adult	Child
Oral	Amoxicillin 2 g	50 mg/kg (max 2 g)
Unable to take oral	Ampicillin 2 g IM/IV, or cefazolin/ceftriaxone 1 g IM/IV	Ampicillin 50 mg/kg; cefazolin/ceftriaxone 50 mg/kg
Penicillin allergy — oral	Azithromycin or clarithromycin 500 mg; or doxycycline 100 mg; or cephalexin 2 g (if no anaphylaxis/angioedema/urticaria)	Azithromycin 15 mg/kg; doxycycline 2.2 mg/kg (<45 kg); cephalexin 50 mg/kg
Penicillin allergy — unable to take oral	Cefazolin or ceftriaxone 1 g IM/IV (if no anaphylaxis)	50 mg/kg

KEY POINT **Clindamycin is no longer recommended** (AHA 2021) because of C. difficile risk. If the dose is inadvertently missed, it may be given up to 2 hours after the procedure. Good oral hygiene and 6-monthly dental review are more important than antibiotics.

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Rheumatic fever (RF) and rheumatic heart disease (RHD)

Level	Measure	Regimen
Primary prevention (treat group A streptococcal pharyngitis)	Within 9 days of sore throat onset	Benzathine penicillin G (BPG) single IM: 1.2 MU (≥27 kg / ≥30 kg), 0.6 MU (<27 kg); or oral penicillin V 250 mg 2–3 times daily (child) / 500 mg twice daily (adult) × 10 days; or amoxicillin 50 mg/kg once daily (max 1 g) × 10 days; penicillin allergy: azithromycin 12 mg/kg (max 500 mg) × 5 days, or cephalexin × 10 days
Secondary prevention (after an episode of RF)	Long-term prophylaxis	BPG 1.2 MU IM **every 3 weeks** in India (high-incidence areas; every 4 weeks elsewhere); 0.6 MU if <27 kg
Oral alternatives (secondary)	If injections refused	Penicillin V 250 mg twice daily; or erythromycin 250 mg twice daily (penicillin allergy); or azithromycin per national RHD guidance
Penicillin test-dose	Not mandatory	Ask about allergy; keep adrenaline ready; give in a facility with resuscitation equipment

Duration of secondary prophylaxis (ICMR/WHO)

Category	Duration (whichever is longer)
RF without carditis	5 years after last attack or until age 18 years (ICMR: until 18; some advise 21)
RF with mild carditis / healed carditis (mild mitral regurgitation)	10 years after last attack or until age 25 years
Moderate–severe RHD or after valve surgery	Until age 40 years, often lifelong

KEY POINT BPG is painful — warm the vial, use 2 ml lignocaine 1–2% as diluent if permitted by the manufacturer; maintain an RHD register and reminder card. Persistent shortages of BPG in India should be reported to the district.

Aspirin and antiplatelet prophylaxis

Indication	Drug and dose	Duration / comment
Secondary prevention after MI, ACS, PCI, ischaemic stroke/TIA, peripheral artery disease	Aspirin 75–150 mg daily	Lifelong unless contraindicated
After ACS or PCI (dual antiplatelet therapy)	Aspirin 75–100 mg + clopidogrel 75 mg (or ticagrelor 90 mg twice daily / prasugrel 10 mg)	12 months after ACS (6 months for stable CAD PCI; 1–3 months in high bleeding risk), then single antiplatelet
Primary prevention (no known ASCVD)	Aspirin 75 mg daily	**Not routine**; consider only in selected adults 40–70 years with high ASCVD risk and low bleeding risk (USPSTF 2022, ESC 2021); avoid >70 years
Clopidogrel monotherapy	Aspirin intolerance or after DAPT	75 mg daily lifelong
Low-dose rivaroxaban + aspirin	Stable CAD/PAD at high ischaemic risk	Rivaroxaban 2.5 mg twice daily + aspirin 75–100 mg (COMPASS)
Pre-eclampsia prevention	Aspirin 75–150 mg	12–16 weeks to 36 weeks (Chapter 6)
Colorectal cancer prevention (Lynch syndrome)	Aspirin (specialist)	See Chapter 15

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Lipid-lowering therapy (Lipid Association of India / ESC)

Risk category	LDL-C target	Drug
Very high / extreme risk (ASCVD, diabetes with target organ damage, familial hypercholesterolaemia with ASCVD)	<55 mg/dl (LAI extreme risk: ≤30 mg/dl in category A) and ≥50% reduction	High-intensity statin: atorvastatin 40–80 mg or rosuvastatin 20–40 mg; add ezetimibe 10 mg; then PCSK9 inhibitor/inclisiran or bempedoic acid
High risk (diabetes, CKD, LDL ≥190 mg/dl, multiple risk factors)	<70 mg/dl	Atorvastatin 20–40 mg or rosuvastatin 10–20 mg
Moderate risk	<100 mg/dl	Atorvastatin 10–20 mg or rosuvastatin 5–10 mg
Elevated lipoprotein(a)	Common in Indians — measure once	Intensify LDL lowering
Hypertriglyceridaemia after statin (TG 150–499)	—	Icosapent ethyl 2 g twice daily (REDUCE-IT) where available; lifestyle, glycaemic control

Anticoagulation to prevent stroke and thromboembolism

Condition	When to anticoagulate	Drug and dose
Non-valvular atrial fibrillation	CHA_2DS_2-VA ≥2 (ESC 2024): recommend; =1: consider	Apixaban 5 mg twice daily (2.5 mg if 2 of: age ≥80, weight ≤60 kg, creatinine ≥1.5); rivaroxaban 20 mg daily with food (15 mg if CrCl 15–49); dabigatran 150 mg twice daily (110 mg if ≥80 y or bleeding risk); edoxaban 60 mg daily (30 mg if CrCl 15–50/weight ≤60 kg)
AF with mechanical valve or moderate–severe mitral stenosis	All	Warfarin (INR 2–3; 2.5–3.5 for mitral mechanical valve) — **DOACs contraindicated**
Mechanical heart valve	Lifelong	Warfarin/acenocoumarol to target INR; add aspirin 75–100 mg only if specific indication
Bioprosthetic valve	First 3 months	Aspirin 75–100 mg (or warfarin) for 3–6 months
LV thrombus after MI	—	Warfarin or DOAC × 3–6 months
Cardioversion of AF >48 h	—	Anticoagulate 3 weeks before and ≥4 weeks after

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KEY POINT Use CHA_2DS_2-VA (C – heart failure, H – hypertension, A_2 – age ≥75 = 2, D – diabetes, S_2 – stroke/TIA = 2, V – vascular disease, A – age 65–74) and assess bleeding risk (HAS-BLED); correct modifiable bleeding risks rather than withholding anticoagulation.

Other cardiovascular prevention

Measure	Indication	Dose
ACE inhibitor / ARB	After MI with LV dysfunction, diabetes with albuminuria, heart failure	Ramipril 2.5 → 10 mg daily; telmisartan 40–80 mg
Beta-blocker	After MI (especially reduced EF), heart failure	Metoprolol succinate 25 → 200 mg; bisoprolol 1.25 → 10 mg; carvedilol 3.125 → 25 mg twice daily
SGLT2 inhibitor	Heart failure (any EF), CKD, diabetes with ASCVD	Dapagliflozin 10 mg or empagliflozin 10 mg daily
Colchicine (low dose)	Stable CAD / after MI (secondary prevention)	0.5 mg daily (avoid in severe renal disease)

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Measure	Indication	Dose
Postoperative AF prevention	Cardiac surgery	Beta-blocker continued; amiodarone in high-risk patients
Polypill	Primary/secondary prevention in resource-limited settings	Aspirin + statin + antihypertensives (e.g. PolyIran/TIPS)

Vaccines in heart disease

Vaccine	Schedule	Reason
Influenza	Annually (0.5 ml IM)	Reduces MACE and death after MI and in heart failure (IAMI, NUDGE trials)
Pneumococcal	PCV20 single dose, or PCV13 then PPSV23 ≥8 weeks later (1 year if ≥65)	Heart failure, cardiomyopathy, cyanotic CHD
Hepatitis B	0, 1, 6 months	Before cardiac surgery/transfusion when non-immune
COVID-19, RSV (≥60 years where available), zoster	Per adult schedule	Cardiovascular events follow these infections
Children with congenital heart disease	Routine schedule; RSV monoclonal (nirsevimab/palivizumab) for haemodynamically significant CHD <2 years	Chapter 3–4

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CHAPTER 13

Neurology

Stroke prevention, migraine and seizure prophylaxis, SAH, encephalitis vaccines

Secondary prevention after ischaemic stroke or TIA

Measure	Regimen	Comment
Minor stroke (NIHSS ≤3) or high-risk TIA (ABCD² ≥4)	Aspirin 150–325 mg loading + clopidogrel 300 mg loading, then aspirin 75 mg + clopidogrel 75 mg daily × 21 days (CHANCE/POINT), then single antiplatelet	Start within 24 hours
Long-term antiplatelet	Aspirin 75–150 mg, or clopidogrel 75 mg, or aspirin + extended-release dipyridamole	Lifelong
Cardioembolic stroke (AF)	DOAC: start day 1–2 (TIA/minor), day 3–4 (moderate), day 6–7 (severe) — ELAN timing	Lifelong
Statin	Atorvastatin 40–80 mg; LDL <70 mg/dl (TST trial)	Lifelong
Blood pressure	Target <130/80 mmHg, start after the acute phase	ACE inhibitor/ARB + thiazide-like diuretic
Carotid stenosis 70–99% (symptomatic)	Carotid endarterectomy/stenting within 2 weeks	Specialist
PFO-related stroke (age <60, high-risk PFO)	PFO closure + antiplatelet	Specialist
Diabetes, smoking, alcohol, obesity	Lifestyle and pharmacotherapy (SGLT2i/GLP-1RA in diabetes with ASCVD)	—

Primary stroke prevention

- Treat hypertension (single biggest modifiable risk in India), diabetes, dyslipidaemia; stop smoking; anticoagulate AF (Chapter 12).
- Sickle cell disease children with abnormal transcranial Doppler: chronic transfusion/hydroxyurea (Chapter 14).

Migraine prophylaxis (indicated if ≥4 headache days/month or disabling attacks)

Drug	Dose	Caution
Propranolol	20–40 mg twice or thrice daily (long-acting 40–160 mg)	Asthma, bradycardia
Flunarizine	5–10 mg at night	Weight gain, depression, parkinsonism in elderly
Amitriptyline	10–25 mg at night (up to 75 mg)	Anticholinergic, sedation
Topiramate	25 mg at night → 50 mg twice daily	Paraesthesia, kidney stones, teratogenic
Sodium valproate	250–500 mg twice daily	Avoid in women of child-bearing age
Candesartan	8–16 mg daily	Hypotension

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Drug	Dose	Caution
CGRP monoclonal antibodies (erenumab, fremanezumab, galcanezumab)	Monthly SC injection	Refractory migraine; expensive
OnabotulinumtoxinA	155 units every 12 weeks	Chronic migraine
Menstrual migraine	Naproxen 550 mg twice daily or frovatriptan 2.5 mg twice daily from 2 days before for 5–7 days	Mini-prophylaxis

KEY POINT Continue prophylaxis for 6–12 months, then taper. Avoid medication-overuse headache (simple analgesics ≥15 days/month, triptans ≥10 days/month).

Seizure prophylaxis

Setting	Drug	Duration
Severe traumatic brain injury (GCS ≤8, contusion, depressed fracture, subdural/epidural haematoma, penetrating injury)	Levetiracetam 500–1000 mg twice daily IV/PO (or phenytoin 15–20 mg/kg load then 100 mg 8-hourly)	7 days (prevents early seizures only; does not prevent late epilepsy)
Supratentorial brain tumour surgery	Levetiracetam (only if seizures before surgery or per neurosurgeon)	Short course; taper after 1–2 weeks if seizure-free
Eclampsia prevention (severe pre-eclampsia)	Magnesium sulphate (Pritchard: 4 g IV + 10 g IM, then 5 g IM 4-hourly; or Zuspan: 4 g IV, then 1 g/hour)	24 hours after delivery or last seizure
Febrile seizures	No continuous prophylaxis; intermittent clobazam (0.75–1 mg/kg/day × 2–3 days during fever) only for frequent recurrences	During febrile illness
Alcohol withdrawal seizure prevention	Chlordiazepoxide 25–50 mg 6-hourly tapered, or lorazepam in liver disease; thiamine 100–500 mg before glucose	5–7 days
Neurocysticercosis	Antiepileptic until lesion resolves + 6–24 months seizure-free	Specialist; albendazole + steroid for viable cysts

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Subarachnoid haemorrhage

Drug	Dose	Purpose
Nimodipine	60 mg orally every 4 hours	For 21 days — reduces delayed cerebral ischaemia
Tranexamic acid	Short course before early aneurysm securing (selected)	Rebleeding prevention (not routine)

Prevention of other neurological problems

Problem	Preventive measure
Wernicke encephalopathy	Thiamine 100 mg IV/PO before glucose in alcoholics, malnourished, hyperemesis; high-risk: 200–500 mg IV 8-hourly
Post-herpetic neuralgia	Recombinant zoster vaccine ≥50 y (2 doses, 2–6 months apart); antivirals within 72 h of shingles

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Problem	Preventive measure
Isoniazid neuropathy	Pyridoxine 10–25 mg daily (50 mg in PLHIV/diabetes/alcohol)
Critical illness / immobility VTE	Chapter 14
Guillain–Barré after vaccines	Very rare; history of GBS within 6 weeks of previous influenza vaccine is a precaution
Tetanus	Td/TT (Chapter 7)

Vaccines against neurological infections

Vaccine	Schedule
Japanese encephalitis (UIP in endemic districts)	JE-1 at 9–12 months, JE-2 at 16–24 months; adult JE vaccination campaigns in endemic districts (15–65 y)
Meningococcal conjugate	High risk, travel, asplenia, complement deficiency, eculizumab therapy (Chapter 14)
Hib, pneumococcal	Pentavalent and PCV in UIP; CSF leak and cochlear implant: PCV + PPSV23
Polio (bOPV + fIPV)	UIP schedule (Chapter 2)
Rabies	PEP/PrEP (Chapter 7)
Measles (prevents SSPE)	MR at 9–12 and 16–24 months

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CHAPTER 14

Haematology

Asplenia, sickle cell disease, thalassaemia, haemophilia, venous thromboembolism and transplant revaccination

Asplenia and hyposplenism — who is at risk

- Splenectomy (trauma, ITP, hereditary spherocytosis, thalassaemia, lymphoma); functional asplenia — sickle cell disease, coeliac disease, SLE, congenital asplenia, splenic irradiation.
- Risk of **overwhelming post-splenectomy infection (OPSI)** with pneumococcus, Hib, meningococcus, Capnocytophaga (dog bites), malaria and babesiosis — lifelong, highest in the first 2 years and in children.

Post-splenectomy vaccination schedule

Vaccine	Schedule	Booster
Pneumococcal conjugate (PCV20, or PCV13/PCV15)	One dose	If PCV13/15 used: follow with PPSV23 ≥8 weeks later
Pneumococcal polysaccharide (PPSV23)	≥8 weeks after PCV13/15 (not needed after PCV20)	Repeat PPSV23 once after 5 years (and at 65 years)
Haemophilus influenzae type b	One dose if not previously vaccinated (≥5 years)	None
Meningococcal ACWY conjugate (MenACWY / MenFive in India)	2 doses, 8 weeks apart	Every 5 years
Meningococcal B (where available)	2 doses (Bexsero 1 month apart)	Per product
Influenza	Annually	Every year (prevents secondary bacterial infection)
COVID-19, hepatitis B, Td/Tdap, MMR, varicella, zoster	As per routine adult schedule	Live vaccines are safe in asplenia

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Timing in relation to surgery

Situation	When to vaccinate
Elective splenectomy	At least **2 weeks before** surgery (ideally 4–6 weeks)
Emergency splenectomy (trauma)	**2 weeks after** surgery (or before discharge if follow-up is doubtful)
Before chemotherapy/rituximab	≥2 weeks before; or 3 months after chemotherapy, 6 months after rituximab

Antibiotic prophylaxis after splenectomy

Group	Drug and dose	Duration
Children <5 years	Penicillin V 125 mg twice daily (<3 y), 250 mg twice daily (3–5 y); or amoxicillin 20 mg/kg/day	Until 5 years and at least 1–2 years after splenectomy
Adults and older children	Penicillin V 250–500 mg twice daily (or amoxicillin 250–500 mg daily)	At least 1–2 years after splenectomy; lifelong in high risk (previous OPSI, poor vaccine response, lymphoma)

Group	Drug and dose	Duration
Penicillin allergy	Erythromycin 250–500 mg twice daily, or azithromycin per local policy	Same
Standby ("rescue") antibiotic	Amoxicillin 3 g or co-amoxiclav 625 mg; levofloxacin 750 mg if allergic	Take at first fever and report to hospital immediately

KEY POINT Give an **asplenia alert card**, advise malaria chemoprophylaxis for travel, and prompt treatment of dog bites with co-amoxiclav.

Sickle cell disease (National Sickle Cell Anaemia Elimination Mission 2047)

Measure	Regimen	Duration
Penicillin prophylaxis	Penicillin V 125 mg twice daily (<3 y), 250 mg twice daily (3–5 y); or BPG 0.6 MU IM every 4 weeks	From 2–3 months to 5 years (longer if previous IPD or splenectomy)
Folic acid	1–5 mg daily (national programme: 5 mg daily)	Lifelong
Hydroxyurea	Start 10–15 mg/kg/day (from 9 months), titrate to 20–35 mg/kg/day	Lifelong; reduces crises, ACS, transfusions, stroke; monitor CBC
Vaccines	Routine UIP + PCV + PPSV23 at ≥2 years (≥8 weeks after PCV), MenACWY, Hib, typhoid, hepatitis A, influenza annually	As per asplenia schedule
Stroke prevention	Transcranial Doppler yearly 2–16 years; chronic transfusion/hydroxyurea if abnormal	—
Malaria prevention	Bed nets; chemoprophylaxis when travelling	—
Pregnancy	Folic acid 5 mg, low-dose aspirin from 12 weeks, LMWH as per risk	—

Thalassaemia major

Measure	Regimen
Transfusion	Keep pre-transfusion Hb 9.5–10.5 g/dl (prevents marrow expansion)
Iron chelation	Deferasirox 20–40 mg/kg/day (film-coated 14–28 mg/kg); deferiprone 75–100 mg/kg/day in 3 doses; desferrioxamine 20–60 mg/kg SC 8–12 hours 5–7 nights/week — start after ~10–20 transfusions or ferritin >1000 ng/ml
Hepatitis B vaccine	Before first transfusion; check anti-HBs; booster if <10 mIU/ml
Hepatitis A, pneumococcal, influenza, meningococcal (after splenectomy)	As per risk
Splenectomy	Asplenia protocol above; aspirin if platelets >500,000 after splenectomy
Prevention of thalassaemia births	Carrier screening (HbA2), premarital/antenatal counselling, prenatal diagnosis

Haemophilia and bleeding disorders

Measure	Regimen
Prophylactic factor replacement (prevents arthropathy)	Haemophilia A: factor VIII 25–40 IU/kg 3 times weekly (low-dose 10–15 IU/kg in resource-limited settings); haemophilia B: factor IX 25–40 IU/kg twice weekly

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Measure	Regimen
Non-factor prophylaxis	Emicizumab SC 3 mg/kg weekly × 4 (loading), then 1.5 mg/kg weekly, 3 mg/kg every 2 weeks or 6 mg/kg every 4 weeks (haemophilia A with or without inhibitors)
Before dental extraction / minor surgery	Factor to 50%; tranexamic acid 15–25 mg/kg 8-hourly (or 1 g 8-hourly) × 5–7 days; desmopressin 0.3 µg/kg for mild haemophilia A and type 1 vWD
Vaccines	Give all vaccines **subcutaneously** or IM with the finest needle (23–25 G) after factor cover, with firm pressure for 5–10 minutes; hepatitis A and B vaccines are essential

Venous thromboembolism (VTE) prophylaxis in hospitalised patients

Group	Risk assessment	Pharmacological prophylaxis	Duration
Medical inpatients (Padua score ≥4)	Immobile, cancer, sepsis, heart failure, previous VTE	Enoxaparin 40 mg SC once daily (20 mg if CrCl <30); or UFH 5000 IU SC 8–12-hourly; or fondaparinux 2.5 mg SC daily	While in hospital / until mobile (6–14 days)
General surgery (Caprini ≥3–5)	Major abdominal/pelvic surgery	Enoxaparin 40 mg SC daily (start 12 h before or 6–12 h after surgery) + mechanical	7–10 days; 28 days after major cancer surgery
Hip or knee replacement	All	Enoxaparin 40 mg daily; rivaroxaban 10 mg daily; apixaban 2.5 mg twice daily; dabigatran 220 mg daily; or aspirin 75–150 mg after initial LMWH (low risk)	Hip: 28–35 days; knee: 10–14 days
Hip fracture surgery	All	LMWH or fondaparinux	Up to 35 days
Ambulatory cancer patients (Khorana ≥2)	Starting chemotherapy	Apixaban 2.5 mg twice daily or rivaroxaban 10 mg daily	6 months
Multiple myeloma on lenalidomide/thalidomide	All	Aspirin 75–150 mg (low risk) or LMWH/DOAC (high risk)	During treatment
Pregnancy and postpartum	RCOG risk score	Enoxaparin weight-based (40 mg for 50–90 kg)	Antenatal and/or 10 days–6 weeks postpartum
Bleeding risk high	Active bleeding, platelets <50,000	Mechanical only: graduated compression stockings, intermittent pneumatic compression	Until pharmacological possible
Long-haul travel (>4 h) with high risk	Mobilise, hydrate, stockings	Single-dose LMWH only for very high risk	—

Secondary prevention after VTE

Situation	Duration of anticoagulation
Provoked by major transient factor (surgery, trauma)	3 months
Unprovoked, or persistent risk factor, recurrent VTE	Extended/indefinite — consider reduced dose apixaban 2.5 mg twice daily or rivaroxaban 10 mg daily after 6 months
Cancer-associated VTE	LMWH/DOAC ≥6 months and while cancer active
Antiphospholipid syndrome (triple-positive/arterial)	Warfarin long-term (DOACs not recommended)

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Anti-D and transfusion-related prevention

Situation	Measure
Rh-negative woman — pregnancy events	Anti-D (Chapter 6)
Rh-negative girl/woman of childbearing potential given Rh-positive platelets	Anti-D 250 IU covers up to 5 platelet doses (within 72 h)
Transfusion-associated GVHD prevention	Irradiated blood for HSCT, Hodgkin lymphoma, purine analogue therapy, intrauterine/neonatal exchange transfusion, related-donor blood
CMV prevention	Leucodepleted blood for at-risk patients
Febrile reactions	Leucodepletion (premedication not routinely recommended)

Revaccination after haematopoietic stem cell transplant (HSCT)

Time after HSCT	Vaccines
3–6 months	Influenza (from 6 months, or 3 months in outbreak; 2nd dose 4 weeks later); PCV13/PCV20 — 3 doses 1 month apart; COVID-19
6–12 months	DTaP/Tdap 3 doses, Hib 3 doses, hepatitis B 3 doses (high dose), IPV 3 doses, MenACWY 2 doses, PPSV23 at 12 months (or 4th PCV in chronic GVHD), HPV 3 doses, recombinant zoster 2 doses
24 months (if no GVHD, off immunosuppression ≥1 year, no IVIG for 8 months — "2-1-8 rule")	MMR and varicella (live)

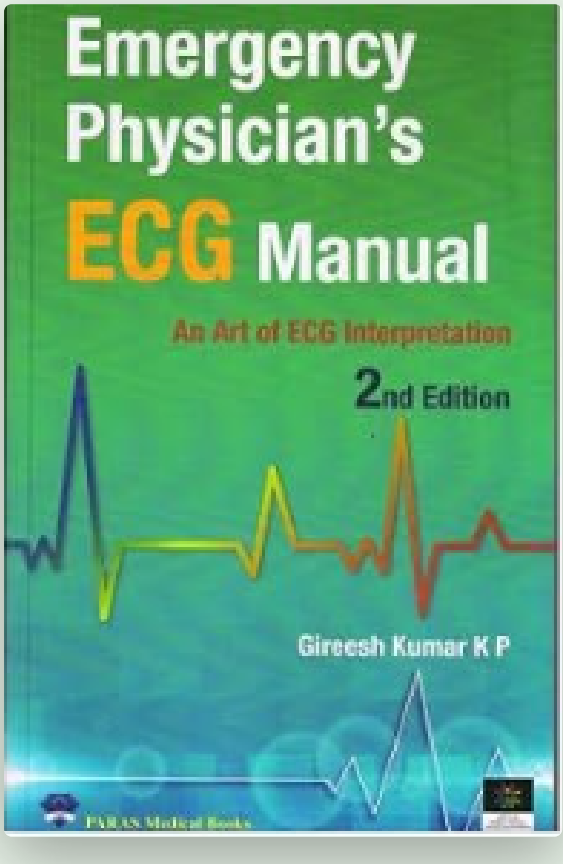
KEY POINT Never give live vaccines to HSCT recipients before 24 months or with active GVHD. Family members should be fully vaccinated (inactivated influenza; MMR, varicella and rotavirus are acceptable for contacts).

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CHAPTER 15

Oncology

Vaccines in cancer, infection prophylaxis during chemotherapy, supportive prevention and chemoprevention

Vaccination in patients with cancer

Vaccine	Timing	Comment
Influenza (inactivated)	Annually; ideally ≥2 weeks before chemotherapy, can be given during chemotherapy (between cycles)	Avoid within 6 months after rituximab (poor response; still give in season)
Pneumococcal (PCV20, or PCV13 then PPSV23 ≥8 weeks)	At diagnosis, before treatment	All patients with haematological malignancy and solid tumours on chemotherapy
Hepatitis B	If non-immune, 0, 1, 6 months (or rapid 0, 1, 2, 12)	Screen HBsAg and anti-HBc before treatment
Td/Tdap, HPV, hepatitis A, meningococcal, Hib	As per indication	Inactivated — safe
Recombinant zoster vaccine (Shingrix)	2 doses, 1–2 months apart, ≥18 years	Preferred over live zoster vaccine
COVID-19	Per national guidance	—
Live vaccines (MMR, varicella, yellow fever, BCG, oral typhoid)	**Contraindicated** during chemotherapy; give ≥4 weeks before, or ≥3 months after chemotherapy (≥6 months after anti-CD20)	Household contacts may receive MMR, varicella, rotavirus
After treatment	Childhood ALL survivors: booster of all routine vaccines 3–6 months after chemotherapy	Per IAP/oncology protocol

Hepatitis B reactivation prophylaxis

Serology	Therapy risk	Action
HBsAg positive	Any chemotherapy or immunosuppression	Entecavir 0.5 mg daily or tenofovir (TDF 300 mg / TAF 25 mg) daily — start before therapy; continue 12 months after (18 months after anti-CD20)
HBsAg negative, anti-HBc positive	High risk: rituximab/obinutuzumab, HSCT, high-dose steroids	Prophylaxis as above
HBsAg negative, anti-HBc positive	Moderate/low risk (standard chemotherapy, TNF inhibitors)	Monitor HBV DNA/ALT every 1–3 months, treat on rise (or prophylaxis if monitoring unreliable)
Hepatitis C positive	—	Treat with DAAs before/alongside cancer therapy when possible

Antimicrobial prophylaxis during cancer therapy (NCCN/IDSA, adapted)

Prophylaxis	Who	Drug and dose
Pneumocystis jirovecii pneumonia (PJP)	ALL, allogeneic HSCT, fludarabine/alemtuzumab, temozolomide + RT, prednisolone ≥20 mg/day for ≥4 weeks, idelalisib	Cotrimoxazole DS 1 tablet daily or thrice weekly; alternatives: dapsone 100 mg daily, atovaquone 1500 mg daily

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Prophylaxis	Who	Drug and dose
Herpes simplex / varicella-zoster	AML/ALL induction, HSCT, bortezomib, alemtuzumab, purine analogues, seropositive patients	Acyclovir 400–800 mg twice daily or valacyclovir 500 mg twice daily — during therapy and up to 1 year (VZV) after HSCT
Cytomegalovirus	Allogeneic HSCT (CMV-seropositive recipient)	Letermovir 480 mg daily (240 mg with ciclosporin) to day 100 (200 in high risk); or pre-emptive PCR monitoring
Invasive fungal (mould)	AML/MDS induction, allogeneic HSCT with GVHD	Posaconazole delayed-release 300 mg twice daily day 1, then 300 mg daily
Candida (yeast)	Allogeneic HSCT, ALL induction (where mould risk low)	Fluconazole 400 mg daily (beware vincristine interaction with azoles)
Bacterial (neutropenia)	Expected profound neutropenia (ANC <100 for >7 days): AML, HSCT	Levofloxacin 500–750 mg daily during neutropenia (consider local resistance in India; many centres avoid)
Tuberculosis	Positive IGRA/TST before HSCT or prolonged high-dose steroids	TPT (Chapter 10)
Strongyloides	From endemic areas before steroids/HSCT	Ivermectin 200 µg/kg × 2 days (empirical or after serology)
Hepatitis B	See above	—

Prevention of chemotherapy complications

Complication	Preventive measure	Dose
Febrile neutropenia	G-CSF primary prophylaxis if risk ≥20% (or 10–20% with patient risk factors)	Filgrastim 5 µg/kg/day SC from 24–72 h after chemotherapy until ANC recovery; or pegfilgrastim 6 mg SC once per cycle
Chemotherapy-induced nausea and vomiting — highly emetogenic (cisplatin, AC)	4-drug regimen	NK1 antagonist (aprepitant 125 mg day 1, 80 mg days 2–3; or fosaprepitant 150 mg IV) + palonosetron 0.25 mg IV/ondansetron 16–24 mg + dexamethasone 12 mg day 1 (8 mg days 2–4) + olanzapine 5–10 mg days 1–4
Moderately emetogenic	2–3 drugs	5-HT3 antagonist + dexamethasone 8 mg (± NK1 antagonist for carboplatin AUC ≥4)
Low emetogenic	Single agent	Dexamethasone 8 mg or metoclopramide/ondansetron
Tumour lysis syndrome — intermediate risk	Hydration 2.5–3 L/m²/day + allopurinol	Allopurinol 100–300 mg 8-hourly (max 800 mg/day) starting 24–48 h before chemotherapy
Tumour lysis syndrome — high risk (Burkitt, ALL with high WBC, bulky disease, AKI)	Hydration + rasburicase	Rasburicase 0.2 mg/kg IV daily (single 3–6 mg dose often enough); contraindicated in G6PD deficiency
Hand–foot syndrome / mucositis	Oral care, cryotherapy with ice chips (5-FU bolus, melphalan)	Benzydamine mouthwash (head-neck RT); photobiomodulation
Cardiotoxicity of anthracyclines	Dexrazoxane (high cumulative dose), ACEi/beta-blocker in high risk	Specialist
Ifosfamide/cyclophosphamide haemorrhagic cystitis	Mesna 20% of ifosfamide dose at 0, 4 and 8 hours + hydration	—

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Complication	Preventive measure	Dose
Methotrexate (high dose) toxicity	Leucovorin rescue 15 mg/m² 6-hourly from 24–36 h; urinary alkalinisation	Until MTX level safe
Cisplatin nephrotoxicity	Saline hydration + magnesium/potassium supplementation; mannitol	—
Bone metastasis — skeletal events	Zoledronic acid 4 mg IV every 12 weeks (adjust for renal function) or denosumab 120 mg SC every 4 weeks + calcium and vitamin D; dental check before starting	Prevents fractures; watch osteonecrosis of jaw
Aromatase inhibitor bone loss	Calcium, vitamin D; zoledronic acid 4 mg 6-monthly or denosumab 60 mg 6-monthly if osteoporosis	During therapy
VTE in cancer	Chapter 14	—
Fertility preservation	Sperm banking, oocyte/embryo cryopreservation; GnRH agonist during chemotherapy for ovarian protection	Before therapy

Cancer prevention by vaccines and drugs

Cancer	Preventive measure	Details
Cervical, anal, oropharyngeal cancer	HPV vaccine	9–14 y single dose (UIP girls, 14 y); up to 26 y; 27–45 y counselling (Chapter 3); cervical screening (VIA/HPV DNA from 30 y)
Hepatocellular carcinoma	Hepatitis B vaccine (birth dose); antiviral therapy for chronic HBV; HCV cure with DAAs	Ultrasound ± AFP 6-monthly in cirrhosis
Gastric cancer	Helicobacter pylori eradication in first-degree relatives and high-risk patients	Standard triple/quadruple therapy 14 days
Breast cancer (high risk: BRCA, Gail ≥1.7% 5-year, atypical hyperplasia, LCIS)	Tamoxifen 20 mg daily × 5 years (premenopausal); raloxifene 60 mg or anastrozole 1 mg daily × 5 years (postmenopausal)	Risk-reducing surgery in BRCA carriers
Ovarian cancer (BRCA)	Risk-reducing salpingo-oophorectomy (35–45 y); combined oral contraceptive pill reduces risk	—
Colorectal cancer — Lynch syndrome	Aspirin 600 mg daily (CAPP2) or lower dose (75–100 mg; CAPP3 dose-finding) for ≥2 years	Plus colonoscopy every 1–2 years
Colorectal adenomas / FAP	Colonoscopic surveillance; prophylactic colectomy in FAP	—
Oral cancer	Tobacco and areca-nut cessation (single most important preventive measure in India)	Varenicline 0.5 mg → 1 mg twice daily × 12 weeks; nicotine replacement; bupropion
Skin cancer (xeroderma pigmentosum, transplant recipients)	Sun protection; nicotinamide 500 mg twice daily (selected)	—

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Cancer	Preventive measure	Details
Prostate cancer	5-alpha-reductase inhibitors reduce incidence (not routinely recommended)	Shared decision
Kaposi sarcoma, lymphoma in HIV	Early ART	—

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CHAPTER 16

Rheumatology, Immunosuppression and Transplantation

Vaccination and chemoprophylaxis before and during steroids, DMARDs, biologics and organ transplant

Levels of immunosuppression

Level	Examples
High-level	Prednisolone ≥20 mg/day (≥2 mg/kg in children <10 kg) for ≥14 days; cyclophosphamide; rituximab and other anti-CD20; TNF inhibitors; JAK inhibitors; mycophenolate ≥2 g/day; azathioprine >3 mg/kg/day; methotrexate >0.4 mg/kg/week (>25 mg/week); calcineurin inhibitors; within 2 months of solid organ transplant; HSCT within 2 years
Low-level	Prednisolone <20 mg/day; methotrexate ≤0.4 mg/kg/week; azathioprine ≤3 mg/kg/day; hydroxychloroquine, sulfasalazine and leflunomide (not considered immunosuppressive for vaccination purposes)

Vaccine timing with immunosuppressive therapy (ACR 2022 / EULAR 2019, adapted)

Vaccine type	Before starting therapy	During therapy
Inactivated (influenza, pneumococcal, HBV, HAV, HPV, Td/Tdap, MenACWY, recombinant zoster, COVID-19)	Ideally ≥2 weeks before	Can be given; response reduced. Methotrexate: hold 1–2 weeks after influenza vaccine (ACR). Rituximab: vaccinate ≥2 weeks before, or ≥6 months after the last dose and 4 weeks before the next
Live attenuated (MMR, varicella, yellow fever, live zoster, BCG, oral typhoid, live JE, LAIV)	≥4 weeks before starting	**Avoid** during high-level immunosuppression; can be considered with low-level therapy (specialist); wait 1–3 months after stopping (12 months after rituximab)
Infants exposed to biologics in utero (e.g. infliximab, adalimumab in 3rd trimester)	—	**No rotavirus or BCG until 6–12 months** (or until drug undetectable); inactivated vaccines as per schedule

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Recommended vaccines for patients on immunosuppression

Vaccine	Schedule
Influenza	Annually (high-dose or adjuvanted where available for ≥65 y or transplant)
Pneumococcal	PCV20 one dose; or PCV13/15 then PPSV23 ≥8 weeks later, PPSV23 repeat after 5 years
Recombinant zoster (Shingrix)	2 doses (0, 1–2 months) for all ≥18 years on immunosuppression, especially JAK inhibitors
Hepatitis B	0, 1, 6 months (double dose 40 µg in dialysis/transplant); check anti-HBs
HPV	Up to 45 years (3 doses), especially SLE and transplant
Hepatitis A, MenACWY, MenB, Hib	According to risk (asplenia, complement inhibitor therapy)
COVID-19	Per national advice; additional doses in severely immunocompromised
Household contacts	All routine and influenza vaccines; live vaccines (MMR, varicella, rotavirus) permitted

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Screening and chemoprophylaxis before biologics/immunosuppressants

Screen	Before	If positive
Latent TB (IGRA or TST + chest X-ray)	TNF inhibitors, JAK inhibitors, IL-6/IL-17/IL-12-23 blockers, high-dose steroids, transplant	TPT (6H, 3HP, 4R) — start ≥1 month before biologic (complete if possible); rule out active TB
HBsAg, anti-HBc, anti-HBs	All biologics/DMARDs, rituximab	Antiviral prophylaxis (Chapter 15)
Anti-HCV, HIV	All	Treat
Strongyloides (endemic areas)	High-dose steroids	Ivermectin 200 µg/kg × 1–2 days
Varicella immunity (history/serology)	Before immunosuppression	Varicella vaccine 2 doses ≥4 weeks before therapy if non-immune
Dental, cervical screening (HPV)	Before long-term therapy	—

Pneumocystis (PJP) prophylaxis in rheumatology

Indication	Regimen
Prednisolone ≥20 mg/day for ≥4 weeks plus another immunosuppressant (cyclophosphamide, rituximab), granulomatosis with polyangiitis induction, high-dose steroids in myositis/SLE	Cotrimoxazole 480 mg daily or 960 mg thrice weekly (alternatives: dapsone 100 mg daily, atovaquone 1500 mg daily)
Stop	When prednisolone <15–20 mg/day and other risk factors resolved

Glucocorticoid-related prevention

Problem	Preventive measure
Osteoporosis (prednisolone ≥2.5 mg/day for ≥3 months)	Calcium 1000–1200 mg/day + vitamin D 800–1000 IU/day; bisphosphonate (alendronate 70 mg weekly, risedronate 35 mg weekly, zoledronic acid 5 mg IV yearly) if moderate/high FRAX risk or age ≥50; teriparatide/denosumab for very high risk
Peptic ulcer	PPI only if combined with NSAID, anticoagulant, or previous ulcer
Adrenal crisis	Sick-day rules: double the dose for fever/illness; hydrocortisone 100 mg IM/IV in vomiting/surgery; steroid card
Hyperglycaemia	Monitor blood glucose (afternoon/evening peak with morning prednisolone)
Infections	Vaccines + PJP and TB screening above

Other drug-specific prevention in rheumatology

Drug	Preventive measure
Methotrexate	Folic acid 5 mg once weekly (on a different day) or 1 mg daily — prevents mucositis, cytopenias, liver toxicity; avoid trimethoprim
Cyclophosphamide	Mesna (IV high dose), hydration, antiemetics, PJP prophylaxis, fertility protection (GnRH agonist)
Hydroxychloroquine	Baseline and annual eye screening after 5 years (≤5 mg/kg real weight)

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Drug	Preventive measure
Gout (urate-lowering start)	Colchicine 0.5 mg once or twice daily (or low-dose NSAID) for 3–6 months to prevent flares while starting allopurinol (100 mg, increase to target urate <6 mg/dl); HLA-B*5801 testing where available
Antiphospholipid antibodies	Low-dose aspirin for high-risk profile without thrombosis; anticoagulation after thrombosis (Chapter 14)
SLE in pregnancy	Hydroxychloroquine continued; aspirin from 12 weeks (pre-eclampsia prevention)
Kawasaki disease	IVIG 2 g/kg + aspirin to prevent coronary aneurysms (treatment-prevention)
Acute rheumatic fever	Chapter 12

Solid organ transplant recipients

Timing	Measure
Before transplant (ideally)	Complete all vaccines; live vaccines (MMR, varicella) ≥4 weeks before transplant; hepatitis B (high dose), hepatitis A, pneumococcal, HPV, zoster (recombinant), Tdap, influenza, COVID-19
After transplant	Inactivated vaccines from 3–6 months (influenza from 1 month); **no live vaccines**
PJP prophylaxis	Cotrimoxazole 480 mg daily for 6–12 months (lifelong in lung transplant)
CMV prophylaxis (donor +/recipient −, or recipient +)	Valganciclovir 900 mg daily (adjust for renal function) for 3–6 months, or pre-emptive monitoring; letermovir in kidney transplant (D+/R−)
Fungal	Fluconazole (liver transplant high risk); inhaled amphotericin/voriconazole/posaconazole (lung)
HSV	Acyclovir/valacyclovir for 1 month if not on valganciclovir
Tuberculosis	TPT for latent TB (isoniazid preferred; rifampicin interacts with calcineurin inhibitors)
Hepatitis B (HBsAg+ donor or recipient)	Entecavir/tenofovir ± HBIG (liver transplant)
Skin cancer	Annual skin examination; sun protection

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CHAPTER 17

Gastroenterology and Hepatology

Cirrhosis complications, GI bleeding, stress ulcer, NSAID gastroprotection and vaccines in liver disease

Cirrhosis — prophylaxis of complications

Complication	Indication	Drug and dose	Duration
Spontaneous bacterial peritonitis (SBP) — secondary	After one episode of SBP	Norfloxacin 400 mg daily, or ciprofloxacin 500 mg daily, or cotrimoxazole DS daily	Long-term (until transplant or ascites resolves)
SBP — primary	Ascitic protein <1.5 g/dl with Child–Pugh ≥9 + bilirubin ≥3, or creatinine ≥1.2/Na ≤130	Norfloxacin 400 mg daily (or ciprofloxacin)	Long-term
Variceal bleeding — antibiotics	Cirrhosis with GI bleeding	Ceftriaxone 1 g IV daily (or norfloxacin 400 mg twice daily)	5–7 days
Variceal bleeding — primary prevention (large varices or small with red signs/Child C; or CSPH)	Non-selective beta-blocker	Carvedilol 6.25 mg once daily → 12.5 mg (preferred, Baveno VII); or propranolol 20–40 mg twice daily titrated to HR 55–60	Lifelong; or endoscopic variceal ligation if NSBB not tolerated
Variceal bleeding — secondary prevention	After first bleed	NSBB + endoscopic variceal ligation every 2–4 weeks until obliteration	Lifelong; TIPS in selected
Hepatic encephalopathy — secondary	After first episode	Lactulose 15–30 ml 2–3 times daily (2–3 soft stools/day)	Long-term
Hepatic encephalopathy — recurrence	After second episode	Add rifaximin 550 mg twice daily (or 400 mg thrice daily)	Long-term
Hepatorenal syndrome	Large-volume paracentesis	Albumin 6–8 g per litre removed (>5 L)	With each tap
Hepatocellular carcinoma	All cirrhosis and high-risk chronic HBV	Ultrasound ± AFP every 6 months	Lifelong
Osteoporosis, malnutrition	Cirrhosis	Calcium, vitamin D, late-evening snack, protein 1.2–1.5 g/kg/day	—

Vaccines in chronic liver disease

Vaccine	Schedule	Comment
Hepatitis A	2 doses 6 months apart (inactivated); or live single dose	Check anti-HAV IgG in adults (many Indians immune)
Hepatitis B	0, 1, 6 months (double dose 40 µg in cirrhosis; 0, 1, 2, 6)	Check anti-HBs; revaccinate if <10
Pneumococcal	PCV20, or PCV13 then PPSV23	All with cirrhosis/alcohol use disorder
Influenza	Annually	—
Zoster (recombinant), Tdap, COVID-19	Per adult schedule	Before liver transplant: all vaccines including live ones ≥4 weeks before

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Chronic viral hepatitis — prevention of progression and transmission

Situation	Measure
Chronic hepatitis B — household and sexual contacts	Test HBsAg/anti-HBs; vaccinate non-immune
HBV-infected healthcare worker	Antiviral therapy if HBV DNA high; follow institutional policy
HBV reactivation with immunosuppression	Chapters 15 and 16
Hepatitis C	No vaccine; test-and-treat (National Viral Hepatitis Control Programme): sofosbuvir + velpatasvir/daclatasvir; safe injection practices
Hepatitis E in pregnancy	Safe water; no vaccine available in India

Stress ulcer prophylaxis (ICU)

Indication	Drug	Stop when
Mechanical ventilation >48 h, coagulopathy (platelets <50,000, INR >1.5), shock, severe burns, traumatic brain/spinal injury, history of GI bleed in past year	Pantoprazole 40 mg IV/PO daily, or famotidine 20 mg twice daily	Risk factors resolve or enteral feeding established (avoid indiscriminate use — C. difficile, pneumonia)

Gastroprotection with NSAIDs, antiplatelets and anticoagulants

Patient risk	Measure
Age >65, previous ulcer/bleed, concomitant aspirin, anticoagulant, steroid or SSRI, high-dose NSAID	PPI: omeprazole 20 mg or pantoprazole 40 mg daily; prefer celecoxib + PPI in very high GI risk (avoid if CV risk)
Dual antiplatelet therapy	PPI (pantoprazole preferred with clopidogrel)
H. pylori before long-term NSAID/aspirin in ulcer history	Test and eradicate
Low GI risk	No PPI needed

Other GI preventive therapies

Condition	Measure	Dose
Post-ERCP pancreatitis	Rectal indomethacin or diclofenac 100 mg immediately before/after ERCP + aggressive Ringer's lactate; pancreatic stent in high risk	Single dose
Recurrent C. difficile	Fidaxomicin, bezlotoxumab or faecal microbiota transplant	Specialist
Hepatic veno-occlusive disease (HSCT)	Ursodeoxycholic acid 12 mg/kg/day	Pre-transplant to day 90
Gallstones after bariatric surgery / rapid weight loss	Ursodeoxycholic acid 500–600 mg daily	6 months
Colorectal cancer screening	Colonoscopy from 45–50 years (earlier with family history); stool FIT where available	—
Barrett's oesophagus	PPI + endoscopic surveillance	—
Inflammatory bowel disease	Vaccines before immunosuppression (Chapter 16); colonoscopic surveillance 8 years after onset	—
Wilson disease siblings	Screen; zinc acetate 50 mg thrice daily in presymptomatic	Lifelong

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Condition	Measure	Dose
Alcohol-related liver disease	Abstinence; baclofen 10 mg thrice daily or acamprosate for craving; thiamine	—
Typhoid, cholera, hepatitis A, rotavirus	Vaccines (Chapters 2–3, 11)	—

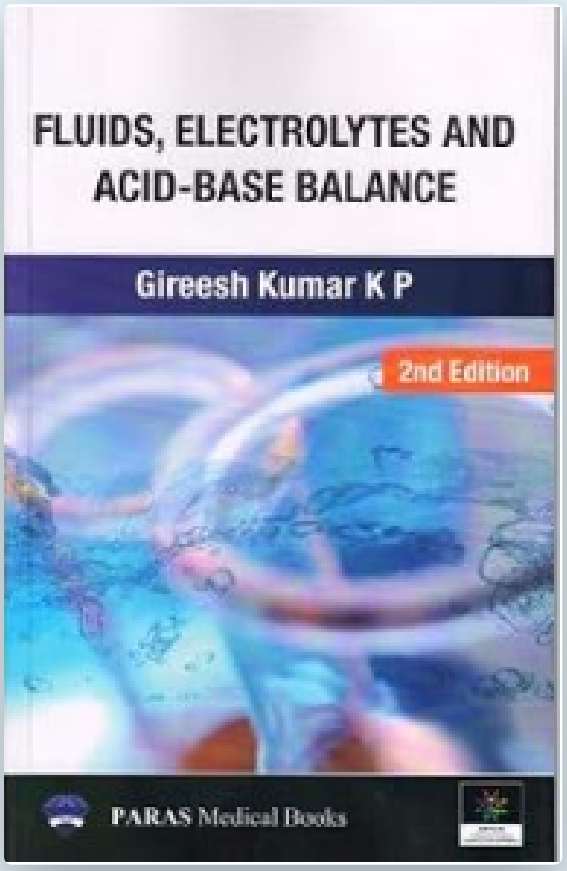
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CHAPTER 18

Nephrology and Urology

Vaccines in CKD and dialysis, recurrent UTI, stones, contrast and drug nephrotoxicity

Vaccination in chronic kidney disease (CKD) and dialysis

Vaccine	Schedule	Monitoring / booster
Hepatitis B (essential before dialysis)	**Double dose 40 µg IM at 0, 1, 2 and 6 months** (Engerix-B 2 × 20 µg); start early in CKD stage 3–4 for better response	Check anti-HBs 1–2 months after series; annual anti-HBs in dialysis; booster when <10 mIU/ml; non-responders: repeat series once
Pneumococcal	PCV20, or PCV13 then PPSV23 ≥8 weeks; PPSV23 repeat at 5 years	CKD stage 4–5, nephrotic syndrome, transplant candidates
Influenza	Annually	—
Hepatitis A, Tdap, recombinant zoster, HPV, COVID-19	Per adult schedule	—
Live vaccines (MMR, varicella)	Before transplant (≥4 weeks)	Not after transplant
Nephrotic syndrome in children	PCV + PPSV23, varicella when off high-dose steroids (<2 mg/kg or <20 mg/day), influenza annually	Live vaccines deferred until prednisolone <20 mg/day for 4 weeks

Infection prevention in dialysis

- Separate dialysis machines and area for HBsAg-positive patients; anti-HCV and HBsAg screening every 3–6 months.
- Catheter lock solutions (taurolidine/citrate, gentamicin–heparin) and mupirocin/gentamicin cream to exit sites in peritoneal dialysis reduce infections.
- Peritoneal dialysis catheter insertion: single-dose cefazolin 1–2 g IV.

Recurrent urinary tract infection (≥2 in 6 months or ≥3 in 1 year) — women

Strategy	Regimen	Duration
Behavioural	Fluids ≥1.5–2 L/day, post-coital voiding, avoid spermicides	—
Vaginal oestrogen (postmenopausal)	Estriol cream 0.5 mg nightly × 2 weeks then twice weekly	Long-term
Methenamine hippurate	1 g twice daily	6–12 months (non-antibiotic alternative)
Continuous antibiotic prophylaxis	Nitrofurantoin 50–100 mg at night; or cotrimoxazole 240–480 mg at night (trimethoprim 100 mg); or cephalexin 250 mg at night; fosfomycin 3 g every 10 days	6–12 months; reassess
Post-coital prophylaxis	Single dose of nitrofurantoin 50–100 mg, or cotrimoxazole 480 mg, or cephalexin 250 mg within 2 hours after intercourse	As needed
Cranberry products, D-mannose	May reduce recurrence modestly	—

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Strategy	Regimen	Duration
Pregnancy (recurrent UTI/asymptomatic bacteriuria treated)	Nitrofurantoin 50–100 mg or cephalexin 250 mg at night	Until delivery

KEY POINT Avoid nitrofurantoin if eGFR <30 and for long-term use in the elderly (pulmonary/hepatic toxicity); screen and treat asymptomatic bacteriuria **only** in pregnancy and before urological procedures.

UTI prophylaxis in children

Group	Measure
Vesicoureteric reflux grade III–V (especially <1 year), recurrent febrile UTI	Cotrimoxazole 2 mg/kg trimethoprim at night or nitrofurantoin 1–2 mg/kg at night (cephalexin 10 mg/kg in neonates)
Antenatally diagnosed hydronephrosis (high-grade)	Prophylaxis until evaluation (cephalexin/amoxicillin in first 2 months)
Bladder–bowel dysfunction, phimosis	Treat constipation, timed voiding; topical steroid for phimosis

Urological procedures

Procedure	Prophylaxis
Transrectal prostate biopsy	Fluoroquinolone or targeted (rectal swab culture) / fosfomycin 3 g; prefer transperineal route (no antibiotics in many guidelines)
TURP, TURBT, ureteroscopy, PCNL	Single dose based on urine culture (cefazolin/ceftriaxone/aminoglycoside); treat bacteriuria before
Urinary catheter removal, cystoscopy (simple)	Not routinely recommended

Kidney stone prevention

Stone type	Measure	Drug
All	Fluids to pass ≥2–2.5 L urine/day; salt <5 g/day; normal calcium diet (1000–1200 mg); reduce animal protein	—
Calcium oxalate with hypercalciuria	—	Hydrochlorothiazide 25–50 mg daily or chlorthalidone 12.5–25 mg daily
Hypocitraturia / calcium stones / uric acid stones	Urinary alkalinisation	Potassium citrate 30–60 mEq/day in divided doses (urine pH 6.5–7)
Uric acid stones / hyperuricosuria	—	Allopurinol 100–300 mg daily + potassium citrate
Cystine stones	Fluids >3 L/day, alkalinisation	Tiopronin / penicillamine (specialist)
Struvite (infection) stones	Complete stone removal + treat infection	Acetohydroxamic acid (rare)

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Contrast-associated acute kidney injury prevention

Risk	Measure
eGFR <30 (or <45 with IV contrast in high-risk, ICU)	IV isotonic saline 1 ml/kg/hour for 3–12 h before and 6–12 h after (0.5 ml/kg/h if heart failure); lowest dose of iso-/low-osmolar contrast
Not recommended	N-acetylcysteine, sodium bicarbonate (no benefit, PRESERVE trial); routine stopping of ACEi
Metformin	Hold at the time of contrast if eGFR <30 or AKI; restart after 48 h if renal function stable

Prevention of drug and disease-related kidney damage

Situation	Measure
Aminoglycosides, vancomycin	Once-daily dosing, level monitoring; avoid concurrent nephrotoxins
Rhabdomyolysis	Aggressive IV fluids to urine output 200–300 ml/h
Tumour lysis	Chapter 15
CKD progression	ACEi/ARB in proteinuria; SGLT2 inhibitor (dapagliflozin 10 mg) if eGFR ≥20–25; finerenone in diabetic CKD; BP <130/80; avoid NSAIDs
Hyperkalaemia prevention (on RAAS blockers)	Low-potassium diet; patiromer/sodium zirconium cyclosilicate where available
CKD–mineral bone disease	Phosphate binders, vitamin D analogues per stage
Anaemia of CKD	Iron (IV in dialysis), erythropoiesis-stimulating agents to Hb 10–11.5 g/dl

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CHAPTER 19

Endocrinology and Metabolism

Diabetes, prediabetes, osteoporosis, adrenal insufficiency, thyroid and nuclear emergencies

Vaccines in diabetes mellitus

Vaccine	Schedule	Reason
Influenza	Annually (0.5 ml IM)	Reduces hospitalisation, DKA and cardiovascular events
Pneumococcal	PCV20 single dose; or PCV13 → PPSV23 after ≥1 year (≥8 weeks if high risk); PPSV23 at 65 y	All adults with diabetes (API 2026)
Hepatitis B	0, 1, 6 months for adults with diabetes <60 y (≥60 after counselling)	Shared glucometers, assisted monitoring
Recombinant zoster	2 doses ≥50 y (≥18 y if immunocompromised)	Higher zoster risk in diabetes
Tdap/Td	Td every 10 years; Tdap once	Foot wounds
RSV (≥60 y, where available), COVID-19	Per national advice	—

Prevention of diabetes and its complications

Measure	Who	Regimen
Lifestyle (Indian Diabetes Prevention Programme)	Prediabetes (FPG 100–125, HbA1c 5.7–6.4%)	150 min/week activity, 5–7% weight loss, reduce refined carbohydrates
Metformin	Prediabetes with BMI ≥23 (Asian Indian), age <60, women with prior GDM, or progressive hyperglycaemia	500 mg twice daily → 850 mg twice daily (IDPP, DPP)
GLP-1 receptor agonist / tirzepatide	Obesity with prediabetes (specialist)	Semaglutide 2.4 mg weekly; tirzepatide up to 15 mg weekly
Statin	Diabetes 40–75 y (and younger with risk factors)	Moderate–high intensity (Chapter 12)
Aspirin	Diabetes with ASCVD (secondary prevention)	75 mg daily; primary prevention only in selected high-risk, low bleeding risk
ACEi/ARB	Diabetes with albuminuria or hypertension	Ramipril/telmisartan
SGLT2 inhibitor / GLP-1RA	Type 2 diabetes with ASCVD, heart failure or CKD	Dapagliflozin/empagliflozin; semaglutide/liraglutide/dulaglutide
Diabetic foot	All diabetics	Daily foot inspection, footwear, annual monofilament test
Retinopathy	All	Annual fundus examination
Hypoglycaemia	Insulin/sulfonylurea users	Education, glucagon kit, avoid glibenclamide in elderly
Type 1 diabetes in children	Teplizumab (delays onset in stage 2; not available in India)	—

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Sick-day rules

Drug	Action during vomiting, diarrhoea, fever with poor intake
SGLT2 inhibitors	Stop (euglycaemic DKA risk); also stop 3 days before major surgery
Metformin, ACEi/ARB, diuretics, NSAIDs ("SADMANS")	Withhold until eating/drinking normally
Insulin	**Never stop basal insulin**; check glucose 4-hourly and ketones; extra rapid-acting insulin per protocol
Glucocorticoid replacement	Double/triple oral dose; hydrocortisone 100 mg IM if vomiting

Adrenal insufficiency — prevention of adrenal crisis

Situation	Hydrocortisone
Minor illness with fever	Double daily dose for 3 days
Vomiting / unable to take oral	100 mg IM/IV, then 50 mg 6-hourly (or 200 mg/24 h infusion)
Minor procedure (endoscopy, dental)	Double the dose on the day / 25–50 mg before
Major surgery / labour	100 mg IV at induction, then 200 mg/24 h until eating, taper over 2–3 days
All	Steroid emergency card, medic alert bracelet, injection kit

Osteoporosis prevention and fracture prevention

Group	Measure	Dose
Everyone at risk (postmenopausal women, men ≥70, steroid users)	Calcium (diet + supplement) + vitamin D	Calcium 1000–1200 mg/day; vitamin D3 800–2000 IU daily (or 60,000 IU monthly) to 25(OH)D >30 ng/ml
Osteoporosis / high FRAX	Bisphosphonate	Alendronate 70 mg weekly (empty stomach, upright 30 min) or risedronate 35 mg weekly or zoledronic acid 5 mg IV yearly; drug holiday after 3–5 years if risk lowered
Very high risk (multiple fractures, T ≤ −3.0)	Anabolic first	Teriparatide 20 µg SC daily × 2 years, then antiresorptive; or romosozumab 210 mg monthly × 12
Denosumab	Renal impairment / bisphosphonate intolerance	60 mg SC every 6 months — never stop abruptly (rebound fractures); follow with bisphosphonate
Falls prevention	Elderly	Exercise, vision, home safety, medication review
Glucocorticoid-induced osteoporosis	Chapter 16	—

Thyroid, pituitary and nuclear emergencies

Situation	Preventive measure	Dose
Iodine deficiency	Universal salt iodisation	Iodised salt (pregnancy: ensure adequate intake; no routine tablets)
Radiation emergency (radioactive iodine release)	Potassium iodide (on instruction of authorities, within hours of exposure)	Adults 130 mg; 3–18 y 65 mg; 1 month–3 y 32 mg; neonates 16 mg — single dose (repeat only if advised)

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Situation	Preventive measure	Dose
Amiodarone/iodinated contrast in thyroid nodular disease	Monitor TFTs; consider methimazole/perchlorate pre-treatment in high-risk	Specialist
Thyroid storm before surgery	Make euthyroid with antithyroid drugs; Lugol's iodine 5–7 drops 8-hourly × 7–10 days before thyroidectomy (Graves)	—
Hypothyroidism in pregnancy	Increase levothyroxine by 25–30% (2 extra tablets/week) as soon as pregnancy confirmed	—
Pheochromocytoma surgery	Alpha-blockade (phenoxybenzamine or prazosin/doxazosin) 10–14 days before, then beta-blocker	—
Refeeding syndrome	Thiamine 200–300 mg daily + B complex before feeding; start 10 kcal/kg/day in high-risk; replace phosphate, potassium, magnesium	First 10 days

Obesity, metabolic and other

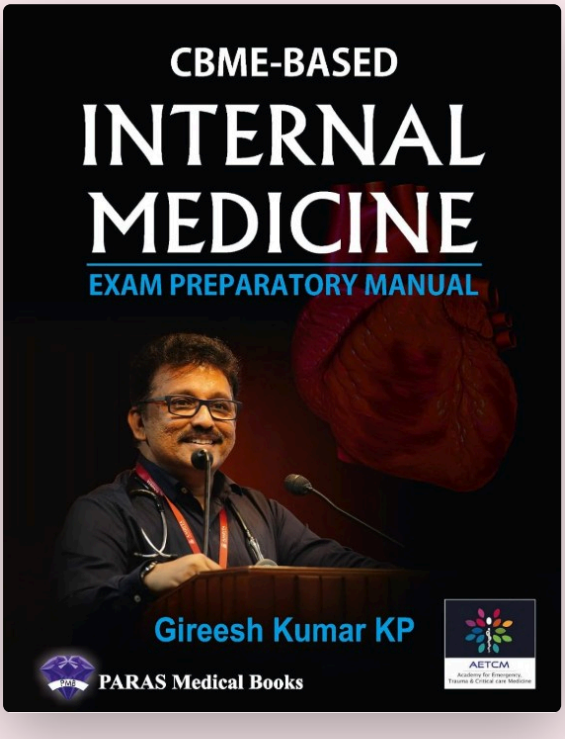
Condition	Prevention
Gestational diabetes (previous GDM)	Lifestyle; early OGTT; postpartum OGTT at 6–12 weeks then yearly; metformin if prediabetes
Hypoglycaemia in neonates of diabetic mothers	Early feeding, glucose monitoring (Chapter 4)
Gout	Chapter 16
Familial hypercholesterolaemia	Cascade screening; statins from 8–10 years in children
Vitamin B12 deficiency on metformin	Check B12 periodically; supplement 1000 µg daily or monthly IM if low

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CHAPTER 20

Respiratory Medicine

COPD, asthma, bronchiectasis, interstitial lung disease, occupational lung disease and respiratory infections

Vaccines in chronic respiratory disease (COPD, asthma, bronchiectasis, ILD, post-TB lung disease)

Vaccine	Schedule	Evidence / comment
Influenza	Annually, before the season (April–May for most of India; September–October for northern India)	Reduces COPD exacerbations and deaths (GOLD 2025)
Pneumococcal	PCV20 one dose; or PCV13/15 then PPSV23 ≥8 weeks (≥1 year if not high risk)	All COPD, asthma on high-dose ICS/OCS, bronchiectasis, ILD
Tdap	Once in adulthood (if not vaccinated in adolescence), then Td/Tdap every 10 years	Pertussis triggers COPD/asthma exacerbations (GOLD)
RSV (RSVPreF3/RSVpreF)	Single dose, ≥60 years with chronic lung disease (≥50 y high risk)	Recently available in India in the private sector; check availability
Recombinant zoster	2 doses ≥50 years	COPD increases zoster risk
COVID-19	Per national advice	—
BCG (adult)	State adult BCG programmes for previous TB, contacts, elderly	Chapter 10

Drugs that prevent exacerbations of COPD (GOLD 2025)

Drug	Who	Dose
LAMA ± LABA	All symptomatic COPD; exacerbators	Tiotropium 18 µg daily; glycopyrronium + formoterol; LABA+LAMA combination inhalers
Triple therapy (LABA + LAMA + ICS)	Exacerbations with blood eosinophils ≥100–300/µl	Single-inhaler triple therapy (fluticasone furoate/umeclidinium/vilanterol; budesonide/glycopyrronium/formoterol)
Azithromycin (macrolide)	Frequent exacerbations despite inhalers, preferably ex-smokers	250 mg daily or 500 mg three times a week × 1 year (check ECG for QTc, hearing; exclude NTM/TB)
Roflumilast	FEV_1 <50%, chronic bronchitis, exacerbations	250 µg daily × 4 weeks then 500 µg daily
N-acetylcysteine / carbocisteine	Chronic bronchitis, not on ICS	NAC 600 mg twice daily; carbocisteine 375–750 mg twice daily
Dupilumab	COPD with type 2 inflammation (eosinophils ≥300)	300 mg SC every 2 weeks (specialist)
Smoking cessation	All smokers	Varenicline 0.5 mg daily × 3 days, 0.5 mg twice daily × 4 days, then 1 mg twice daily × 12 weeks; nicotine patch 21 mg + gum/lozenge; bupropion SR 150 mg daily × 3 days then twice daily
Pulmonary rehabilitation	After exacerbation (within 4 weeks)	6–12 weeks

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Drug	Who	Dose
Long-term oxygen	PaO_2 ≤55 mmHg or SpO_2 ≤88%	≥15 hours/day
Biomass smoke	Women exposed to chulha smoke	LPG (Pradhan Mantri Ujjwala Yojana), improved cookstoves, ventilation

Asthma — prevention of attacks

Step	Preventer	Comment
All adults/adolescents (GINA 2024 Track 1)	As-needed low-dose budesonide–formoterol (mild); maintenance and reliever therapy (MART) with budesonide–formoterol 200/6 µg (steps 3–5)	Avoid SABA-only treatment
Children 6–11 years	Daily low-dose ICS (budesonide 100–200 µg, fluticasone 50–100 µg) ± LABA; montelukast as alternative	Check inhaler technique and spacer
Children <5 years	Daily ICS or intermittent ICS for viral-induced wheeze; montelukast 4 mg	—
Severe asthma	Add LAMA; biologics: omalizumab, mepolizumab, benralizumab, dupilumab, tezepelumab	Specialist
Exercise-induced bronchoconstriction	Budesonide–formoterol or SABA 15 minutes before exercise; warm-up	—
Allergen avoidance / immunotherapy	House dust mite: subcutaneous/sublingual immunotherapy in selected	Specialist
Aspirin-exacerbated respiratory disease	Avoid NSAIDs; COX-2 inhibitors usually tolerated	—

Bronchiectasis and cystic fibrosis

Measure	Indication	Regimen
Long-term macrolide	≥3 exacerbations/year	Azithromycin 250 mg daily or 500 mg thrice weekly; erythromycin 250 mg twice daily
Inhaled antibiotics	Chronic Pseudomonas	Tobramycin/colistin nebulised
Airway clearance	All	Daily physiotherapy; hypertonic saline nebulisation
Eradication	New Pseudomonas isolation	Ciprofloxacin 750 mg twice daily × 2 weeks ± inhaled colistin

Interstitial lung disease and pulmonary vascular disease

Condition	Prevention
Idiopathic pulmonary fibrosis / progressive fibrosing ILD	Antifibrotics (nintedanib 150 mg twice daily, pirfenidone 801 mg thrice daily) slow decline; vaccines; avoid smoking
Systemic sclerosis-ILD	Mycophenolate; PJP prophylaxis if on cyclophosphamide
Methotrexate/amiodarone/nitrofurantoin lung	Baseline chest X-ray and spirometry, monitor
Chronic thromboembolic pulmonary hypertension	Lifelong anticoagulation

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Occupational and environmental lung disease (India)

Exposure	Preventive measure
Silica (stone crushing, mining, sandblasting)	Wet drilling, N95 respirators, periodic chest X-ray; annual TB screening and TPT (silicosis increases TB risk)
Coal, asbestos, cotton dust (byssinosis)	Exposure control, PPE, statutory medical examinations (Factories Act)
Healthcare workers (TB)	N95 masks, airborne infection control, annual screening
Air pollution	Masks (N95) on high AQI days, avoid outdoor exercise, air purifiers for vulnerable

Respiratory infection — chemoprophylaxis

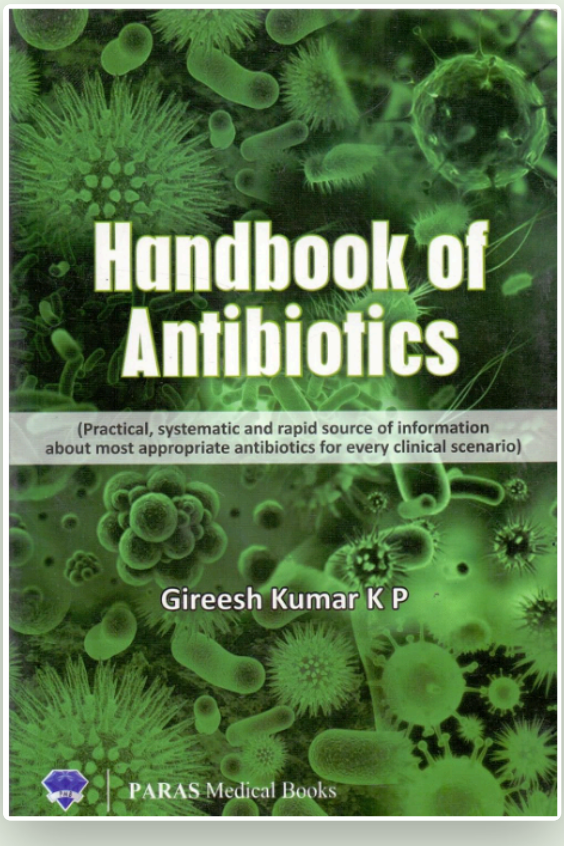
Infection	Measure
Influenza	Oseltamivir prophylaxis (Chapter 9)
Pertussis	Azithromycin to household contacts (Chapter 9)
Tuberculosis contacts	TPT (Chapter 10)
RSV in infants	Nirsevimab single dose (Chapter 3); palivizumab 15 mg/kg monthly for 5 months in high-risk where nirsevimab unavailable
Aspiration pneumonia	Head-end elevation 30–45°, oral care with chlorhexidine in ventilated, swallow assessment after stroke; **no** prophylactic antibiotics
Ventilator-associated pneumonia	VAP bundle: head elevation, daily sedation interruption, subglottic suction, oral care
Post-operative pulmonary complications	Incentive spirometry, early mobilisation, stop smoking ≥4–8 weeks before surgery

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CHAPTER 21

Surgery, Trauma, Burns and Procedures

Surgical antibiotic prophylaxis, open fractures, burns, bites and perioperative prevention

Principles of surgical antibiotic prophylaxis (ICMR AMSP / ASHP / WHO)

- Give within **60 minutes before skin incision** (vancomycin and fluoroquinolones: start 60–120 minutes before).
- Use a **single dose**; prolonging beyond 24 hours (48 h in cardiac surgery) does not reduce infection and increases resistance.
- **Redose** if surgery lasts longer than two half-lives of the drug (cefazolin every 4 hours) or blood loss >1500 ml.
- Weight-based dose: cefazolin 2 g (3 g if ≥120 kg); children 30 mg/kg.
- Prophylaxis is not a substitute for asepsis, hair clipping (not shaving), chlorhexidine–alcohol skin preparation and normothermia.

Surgical prophylaxis by procedure

Procedure	Recommended agent	Penicillin/β-lactam allergy
Clean surgery without implant (hernia without mesh, thyroid, breast lump, varicose veins)	Usually none (single cefazolin if risk factors)	—
Hernia repair with mesh, breast surgery	Cefazolin 2 g IV	Clindamycin 900 mg or vancomycin 15 mg/kg
Cardiac, vascular, thoracic	Cefazolin 2 g (cefuroxime 1.5 g) ± vancomycin if MRSA carriage	Vancomycin 15 mg/kg ± gentamicin
Orthopaedic with implant, joint replacement	Cefazolin 2 g (± vancomycin for MRSA)	Vancomycin or clindamycin
Gastroduodenal, biliary (open/high-risk laparoscopic cholecystectomy)	Cefazolin 2 g	Clindamycin + gentamicin
Appendicectomy (uncomplicated)	Cefazolin 2 g + metronidazole 500 mg, or cefoxitin 2 g	Clindamycin/metronidazole + gentamicin
Colorectal surgery	Cefazolin 2 g + metronidazole 500 mg IV; plus oral neomycin + metronidazole with mechanical bowel prep the day before (elective)	Gentamicin + metronidazole
Caesarean section	Cefazolin 2 g before incision (add azithromycin 500 mg in labour/ruptured membranes)	Clindamycin 900 mg + gentamicin 5 mg/kg
Hysterectomy	Cefazolin 2 g (or cefuroxime) ± metronidazole	Clindamycin + gentamicin
Head and neck (clean-contaminated)	Cefazolin 2 g + metronidazole 500 mg (or co-amoxiclav 1.2 g)	Clindamycin 900 mg
Neurosurgery (craniotomy, shunt)	Cefazolin 2 g	Vancomycin
Urology	Chapter 18	—
Manual removal of placenta, perineal tear (3rd/4th degree)	Single dose cefazolin/co-amoxiclav (+ metronidazole for 3rd–4th degree)	—
Surgical termination / evacuation	Doxycycline 100 mg before and 200 mg after, or azithromycin 1 g; metronidazole 500 mg	—

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Procedure	Recommended agent	Penicillin/β-lactam allergy
IUCD insertion, diagnostic endoscopy	Not recommended	—
PEG tube placement	Cefazolin 1 g (or co-amoxiclav)	—

Open fractures

Gustilo grade	Antibiotic	Duration
Grade I–II	Cefazolin 2 g IV 8-hourly (within 1 hour of injury, ideally)	Until 24 hours after wound closure (max 72 h)
Grade III	Cefazolin + gentamicin 5 mg/kg daily (or ceftriaxone 2 g); add penicillin/metronidazole for farmyard/soil contamination	Until 24–72 h after definitive closure
All	Tetanus prophylaxis (Chapter 7); early debridement; wound irrigation with saline	—

Burns — preventive care

Issue	Measure
Tetanus	Td + TIG per wound table (all burns are tetanus-prone)
Infection	No routine systemic antibiotic prophylaxis; topical silver sulfadiazine 1% (not on face/children <2 months), mupirocin, or silver dressings; perioperative prophylaxis at excision/grafting
Stress ulcer	PPI/H2 blocker in burns >20–30% TBSA
VTE	LMWH in major burns once haemostasis secured
Nutrition	Early enteral feeding within 24 h; vitamin C, zinc, trace elements
Contractures	Splinting, early physiotherapy, pressure garments
Electrical burns	ECG monitoring; myoglobinuria prevention with fluids

Trauma — other preventive measures

Situation	Measure	Dose
Major bleeding within 3 hours of injury	Tranexamic acid (CRASH-2)	1 g IV over 10 minutes, then 1 g over 8 hours
Traumatic brain injury	Seizure prophylaxis (Chapter 13); TXA within 3 hours in mild–moderate TBI (CRASH-3)	—
Splenic injury/splenectomy	Asplenia vaccines 14 days after surgery (Chapter 14)	—
Penetrating abdominal trauma	Single preoperative dose (cefoxitin or cefazolin + metronidazole); continue ≤24 h if hollow viscus injury repaired within 12 h	—
Chest drain for trauma	Cefazolin 1–2 g prophylaxis (reduces empyema)	Until 24 h
Basilar skull fracture / CSF leak	No antibiotic prophylaxis; pneumococcal vaccination	—
Facial lacerations, hand wounds, bites	Co-amoxiclav 625 mg 8-hourly × 3–5 days for bites and contaminated wounds	—

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Situation	Measure	Dose
Spinal cord injury	VTE prophylaxis (LMWH within 72 h); pressure sore prevention; bladder care	—
Crush injury / compartment syndrome	IV fluids before extrication; monitor compartments	—

Perioperative medical prevention

Risk	Measure
Postoperative nausea and vomiting (Apfel ≥2)	Dexamethasone 4–8 mg IV at induction + ondansetron 4 mg at end of surgery
Aspiration at induction	Fasting (solids 6 h, clear fluids 2 h); ranitidine/famotidine + sodium citrate in caesarean section; rapid sequence induction
VTE	Chapter 14 (Caprini score)
Myocardial events	Continue beta-blockers and statins; do not start high-dose beta-blocker on day of surgery
Infective endocarditis	Chapter 12 (high-risk cardiac patients, dental procedures only)
Prosthetic joint and dental work	Routine antibiotic prophylaxis not recommended (ADA/AAOS)
Surgical site infection	Decolonise Staphylococcus aureus carriers before cardiac/orthopaedic implant surgery (mupirocin nasal twice daily × 5 days + chlorhexidine bath)
Steroid-dependent patients	Stress-dose hydrocortisone (Chapter 19)
Diabetes	Perioperative glucose 140–180 mg/dl; stop SGLT2 inhibitors 3 days before (ertugliflozin 4 days)
Anticoagulants	Warfarin stop 5 days before (bridge only in mechanical mitral valve/high-risk); DOACs stop 1–2 days (longer if renal impairment); aspirin usually continued
Delirium in elderly	Avoid benzodiazepines/anticholinergics, maintain sleep, glasses, hearing aids, early mobilisation
Malignant hyperthermia (family history)	Trigger-free anaesthesia; dantrolene available
Latex allergy	Latex-free theatre
Healthcare worker safety	Hepatitis B vaccination, double gloving, PEP (Chapters 8–9)

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CHAPTER 22

Leprosy, Skin, Allergy, Eye, ENT and Other Specialties

Contact prophylaxis in leprosy, recurrent skin infections, anaphylaxis prevention and miscellaneous preventive therapy

Leprosy — post-exposure prophylaxis (National Leprosy Eradication Programme)

Measure	Who	Dose
Single-dose rifampicin (SDR-PEP)	Household, neighbour and social contacts of a new leprosy case, aged ≥2 years, after excluding leprosy and TB	Adults (≥15 y): rifampicin 600 mg single dose; 10–14 y: 450 mg; 6–9 y: 300 mg; 2–5 y: 10–15 mg/kg — given once under supervision
Not eligible	Children <2 y, pregnant women, contacts with signs of leprosy or TB, elderly >70 y, hepatic/renal disease	—
Mycobacterium indicus pranii (MIP) vaccine	Contacts in selected districts (programme pilot)	As per programme
BCG	Partial protection against leprosy	UIP birth dose

KEY POINT Contact screening every year for 5 years after the index case is diagnosed; early MDT treatment interrupts transmission.

Recurrent skin and soft-tissue infection

Condition	Preventive regimen
Recurrent cellulitis (≥2 episodes/year, lymphoedema, filarial leg)	Penicillin V 250 mg twice daily or benzathine penicillin 1.2 MU IM every 2–4 weeks (erythromycin 250 mg twice daily if allergic) for 6–12 months; treat tinea pedis, foot hygiene, compression
Recurrent furunculosis (S. aureus carriage)	Mupirocin 2% nasal twice daily × 5 days each month + chlorhexidine body wash; treat household; check diabetes
Recurrent genital herpes (≥6/year)	Acyclovir 400 mg twice daily or valacyclovir 500 mg daily (suppression for 6–12 months, reassess)
Recurrent herpes labialis (sun-triggered)	Sunscreen lip balm; short-term acyclovir before exposure
Erythema multiforme (HSV-associated)	Continuous acyclovir 400 mg twice daily
Recurrent vulvovaginal candidiasis (≥4/year)	Fluconazole 150 mg every 72 h × 3 doses, then 150 mg weekly × 6 months
Recurrent tinea (dermatophytosis epidemic in India)	Treat family, wash clothes in hot water, avoid steroid creams; no proven long-term prophylaxis
Scabies contacts	Chapter 9

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Allergy and anaphylaxis prevention

Situation	Measure
Previous anaphylaxis (food, venom, idiopathic)	Adrenaline auto-injector (0.3 mg adult, 0.15 mg child 15–30 kg) — or prefilled 1 mg/ml ampoule with syringe in India; written action plan; medic alert
Hymenoptera venom allergy	Venom immunotherapy for 3–5 years (specialist)
Previous reaction to iodinated contrast	Use different agent; premedication: prednisolone 50 mg at 13, 7 and 1 hour before + cetirizine/chlorphenamine 1 hour before (reduces but does not abolish risk)
Hereditary angioedema	Short-term prophylaxis before dental/surgical procedures: C1-esterase inhibitor 1000–2000 U or fresh frozen plasma; long-term: danazol 100–200 mg daily (attenuated androgen), tranexamic acid, lanadelumab/berotralstat where available
Drug hypersensitivity (Stevens–Johnson risk)	HLA-B*1502 before carbamazepine (South/East Asian ancestry), HLA-B*5801 before allopurinol where available; avoid re-challenge
Infusion reactions (rituximab, amphotericin, ATG)	Paracetamol + antihistamine ± hydrocortisone premedication; slow initial infusion rate
Red-man syndrome	Infuse vancomycin over ≥60 minutes (≥2 h for doses >1 g)
Peanut/egg allergy in infants	Early introduction (4–6 months) of allergenic foods prevents allergy (LEAP)
Vaccination of egg-allergic persons	Influenza and MMR can be given routinely; yellow fever with caution (specialist)

Eye

Situation	Preventive measure
Ophthalmia neonatorum	Clean delivery, cleaning eyelids at birth; topical prophylaxis (povidone-iodine 2.5% or erythromycin/tetracycline ointment) where maternal STI prevalence is high
Vitamin A deficiency / xerophthalmia	Biannual vitamin A (Chapter 4)
Retinopathy of prematurity	Oxygen targeting (SpO_2 90–95%), screening of babies <34 weeks/<2000 g by day 20–30
Glaucoma (angle closure suspects)	Laser peripheral iridotomy; avoid anticholinergics/decongestants
Intraocular surgery	Intracameral cefuroxime/moxifloxacin at the end of cataract surgery; povidone-iodine 5% preparation
Hydroxychloroquine, ethambutol retinopathy/neuropathy	Screening examinations
Herpes zoster ophthalmicus	Zoster vaccine; prompt antivirals
Recurrent HSV keratitis	Acyclovir 400 mg twice daily × 12 months

ENT and dental

Situation	Preventive measure
Cochlear implant	Pneumococcal (PCV + PPSV23), Hib, influenza ≥2 weeks before surgery
CSF leak, skull base fracture	Pneumococcal vaccines; no antibiotic prophylaxis

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Situation	Preventive measure
Recurrent acute otitis media in children	Pneumococcal and influenza vaccines; avoid passive smoking; grommets; antibiotic prophylaxis not recommended
Aminoglycoside ototoxicity (mitochondrial m.1555A>G)	Avoid where possible; monitor
Cisplatin ototoxicity in children	Sodium thiosulfate 6 h after cisplatin (localised hepatoblastoma)
Dental caries	Fluoride toothpaste 1000–1450 ppm twice daily; fluoride varnish every 6 months in high-risk children; pit-and-fissure sealants
Medication-related osteonecrosis of jaw	Dental clearance before bisphosphonates/denosumab

Psychiatry and substance use — relapse prevention

Condition	Preventive drug	Comment
Bipolar disorder	Lithium (level 0.6–0.8 mmol/l), valproate, lamotrigine, quetiapine	Lithium reduces suicide; monitor renal/thyroid
Recurrent depression	Continue antidepressant ≥6–12 months after remission (≥2 years if recurrent)	—
Schizophrenia	Maintenance antipsychotics; long-acting injectables in poor adherence	—
Alcohol dependence	Naltrexone 50 mg daily, acamprosate 666 mg thrice daily, disulfiram 250 mg daily (supervised), baclofen	Plus thiamine
Opioid dependence	Buprenorphine or methadone (opioid substitution therapy); naloxone for overdose prevention	—
Tobacco	Varenicline, NRT, bupropion (Chapter 20); National Tobacco Quit Line 1800-112-356	—
Clozapine	Neutrophil count monitoring; constipation prevention	—
Neuroleptic-induced dystonia	Prophylactic anticholinergic only with high-potency antipsychotics in young males	—

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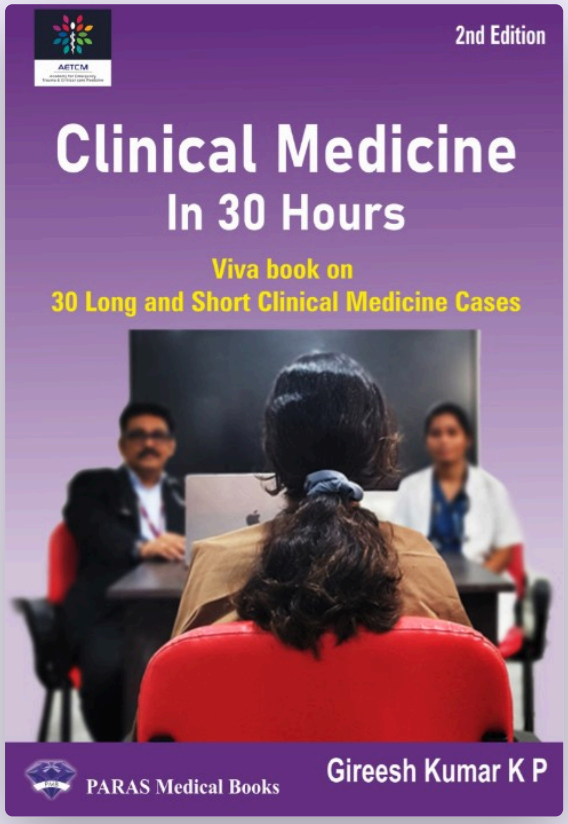
Poisoning and toxicology — preventive antidotes

Situation	Measure
Paracetamol overdose	N-acetylcysteine (21-hour regimen) based on nomogram — prevents hepatotoxicity
Isoniazid overdose	Pyridoxine gram-for-gram
Methanol / ethylene glycol	Fomepizole or ethanol to prevent toxic metabolites
Organophosphate occupational exposure	PPE, cholinesterase monitoring in sprayers
Cyanide risk (fire victims)	Hydroxocobalamin 5 g IV
Lead	Screening of high-risk children; chelation when indicated

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APPENDIX A

Vaccines Available in India

Quick reference of products, type, dose and route (brands are examples, not endorsements)

Childhood and adult vaccines

Vaccine	Type	Example products	Dose / route
BCG	Live bacterial	BCG (Serum Institute)	0.05–0.1 ml ID
Hepatitis B	Recombinant	Engerix-B, Genevac-B, Revac-B, Elovac-B	0.5 ml (<19 y) / 1 ml adult IM
bOPV / IPV / fIPV	Live / inactivated	bOPV; Poliorix, Imovax Polio	2 drops oral; 0.5 ml IM; 0.1 ml ID (fIPV)
Pentavalent (DTwP-HepB-Hib)	Combination	Pentavac, Easyfive, Shan5	0.5 ml IM thigh
Hexavalent (DTaP-IPV-HepB-Hib)	Combination	Hexaxim, Infanrix Hexa, Sii HEXASIIL	0.5 ml IM
DTwP / DTaP boosters; Tdap; Td	Toxoid ± pertussis	Tripvac; Boostrix, Adacel; Td vac	0.5 ml IM
Rotavirus	Live oral	Rotavac, Rotasiil, Rotarix, RotaTeq	Oral; 3 doses (Rotarix 2)
Pneumococcal conjugate	Conjugate	PCV10 (Pneumosil, Synflorix), PCV13 (Prevenar 13), PCV15 (Vaxneuvance), PCV20 (Prevenar 20), PCV14 (BE)	0.5 ml IM
Pneumococcal polysaccharide	Polysaccharide	Pneumovax 23	0.5 ml IM/SC
Measles–rubella / MMR	Live	MR-VAC; Tresivac, Priorix	0.5 ml SC
Varicella	Live	Varivax, Varilrix, Nexipox, Biopox	0.5 ml SC
Hepatitis A	Inactivated / live	Havrix, Avaxim; Biovac-A (live)	0.5–1 ml IM; live 0.5 ml SC single
Typhoid conjugate (TCV)	Vi-TT conjugate	Typbar-TCV, PedaTyph, ZyVac TCV, TyphiBEV	0.5 ml IM single
Influenza (trivalent/quadrivalent)	Inactivated	Vaxigrip, Fluarix, Influvac, Nasovac-S (live intranasal), Cadiflu	0.25–0.5 ml IM yearly
HPV	Recombinant VLP	Gardasil 4 (UIP), Gardasil 9, Cervavac (qHPV, Serum Institute)	0.5 ml IM
Japanese encephalitis	Live / inactivated	SA-14-14-2 (CD-JEVAX), JENVAC, Ixiaro	0.5 ml SC/IM
Meningococcal	Conjugate	Menactra, MenQuadfi, Nimenrix (ACWY); MenFive (ACYWX); Bexsero (MenB, limited)	0.5 ml IM
Cholera	Killed oral	Shanchol, Euvichol-Plus, Hillchol	1.5 ml oral × 2
Rabies (cell culture)	Inactivated	Rabipur (PCECV), Verorab, Abhayrab (PVRV), Vaxirab N (PDEV), Indirab	0.5–1 ml IM; 0.1 ml ID
Yellow fever	Live	Stamaril (designated centres only)	0.5 ml SC
Zoster	Recombinant adjuvanted	Shingrix	0.5 ml IM × 2

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Vaccine	Type	Example products	Dose / route
RSV (older adults / maternal)	Recombinant protein	Arexvy, Abrysvo (availability evolving)	0.5 ml IM single
Dengue	Live tetravalent	Qdenga (approved July 2026; launch details awaited)	0.5 ml SC × 2, 3 months apart
COVID-19	Various	Covishield, Covaxin, Corbevax, Covovax	Per current advice

Immunoglobulins and monoclonal antibodies

Product	Dose	Use
Human rabies immunoglobulin (HRIG)	20 IU/kg	Category III rabies exposure
Equine rabies immunoglobulin (ERIG)	40 IU/kg	Category III rabies exposure
Rabies monoclonal antibody (Rabishield) / cocktail (Twinrab)	3.33 IU/kg / 40 IU/kg	Category III, wound infiltration
Hepatitis B immunoglobulin (HBIG)	0.5 ml newborn; 0.06 ml/kg adult	Perinatal and post-exposure
Tetanus immunoglobulin (TIG)	250–500 IU IM (prophylaxis); 3000–6000 IU (treatment)	Tetanus-prone wounds
Varicella-zoster immunoglobulin (VZIG)	125 IU/10 kg (max 625 IU)	Post-exposure in high-risk
Normal human immunoglobulin (IM) / IVIG	0.25–0.5 ml/kg IM; IVIG 400 mg/kg	Measles, hepatitis A PEP; immunodeficiency
Anti-D immunoglobulin	50–300 µg	Rh isoimmunisation prevention
Nirsevimab	50 mg (<5 kg), 100 mg (≥5 kg), 200 mg second season	RSV prevention in infants
Palivizumab	15 mg/kg monthly × 5	RSV prevention (high-risk)
Anti-snake venom (polyvalent)	10 vials initial (treatment, not prophylaxis)	Envenomation
Diphtheria antitoxin	20,000–100,000 units (treatment)	Diphtheria

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APPENDIX B

Intervals Between Vaccines, Immunoglobulins and Blood Products

Spacing rules that every vaccinator must know

Spacing of vaccines

Combination	Minimum interval
Two or more inactivated vaccines	None — can be given on the same day or at any interval
Inactivated + live vaccine	None
Two live injectable vaccines (MMR, varicella, yellow fever, live JE)	Same day, or **at least 4 weeks apart**
Live oral vaccines (OPV, rotavirus, oral typhoid, cholera) and live injectable	No interval needed
Tuberculin skin test / IGRA and MMR	Same day, or test ≥4 weeks after MMR (measles vaccine suppresses TST)
Doses of the same vaccine	Minimum interval as per schedule; doses given ≤4 days before the minimum interval are valid ("4-day grace period"), not for rabies
Delayed doses	Never restart a series — continue where it stopped

Immunoglobulin or blood products and live vaccines (MMR, varicella)

Product and dose	Wait before giving MMR/varicella
Tetanus immunoglobulin (250 IU), hepatitis B immunoglobulin	3 months
Rabies immunoglobulin (20 IU/kg)	4 months
Varicella immunoglobulin (125 IU/10 kg)	5 months
Normal immunoglobulin for hepatitis A PEP (0.1 ml/kg)	6 months
Normal immunoglobulin for measles PEP (0.5 ml/kg)	6 months
Washed red cells	None
Packed red cells	5 months
Whole blood	6 months
Plasma / platelet products	7 months
IVIG 300–400 mg/kg (replacement)	8 months
IVIG 1 g/kg (ITP)	10 months
IVIG 2 g/kg (Kawasaki disease)	11 months
Monoclonal antibodies (palivizumab, nirsevimab)	No interval — do not interfere with vaccines
Anti-D immunoglobulin (postpartum)	No interval for postpartum MMR/varicella (check rubella serology later)

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KEY POINT If immunoglobulin is given **within 2 weeks after** MMR or varicella vaccine, repeat the vaccine after the interval above (or check serology). Inactivated vaccines, OPV, rotavirus and yellow fever are **not** affected by immunoglobulins.

Live vaccines and immunosuppression

Treatment	Wait after stopping before live vaccines
Prednisolone ≥20 mg/day (≥2 mg/kg) for ≥14 days	1 month
Cancer chemotherapy	3 months
Anti-CD20 (rituximab), alemtuzumab	6–12 months
Other biologics (TNF inhibitors, IL-blockers), JAK inhibitors	1–3 months (drug-dependent)
HSCT	24 months (if no GVHD and off immunosuppression)
Before starting immunosuppression	Give live vaccines ≥4 weeks before

Antimicrobials and live vaccines

Drug	Interaction
Antivirals (acyclovir, valacyclovir)	Stop 24 h before varicella/zoster live vaccine; do not restart for 14 days
Antibiotics	Inactivate oral typhoid (Ty21a) — separate by 72 h; no effect on other vaccines
Antimalarials (mefloquine, chloroquine)	Separate from oral typhoid Ty21a by 72 h; chloroquine may reduce ID rabies PrEP response (use IM)
Oseltamivir / influenza antivirals	Inactivate live intranasal influenza vaccine (48 h before to 2 weeks after)

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APPENDIX C

Abbreviations and Key Resources

Common abbreviations used in this book and where to check updates

Abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
ACVIP	Advisory Committee on Vaccines and Immunization Practices (IAP)	IPV / fIPV	Inactivated polio vaccine / fractional IPV
AEFI	Adverse event following immunisation	IVIG	Intravenous immunoglobulin
ART	Antiretroviral therapy	LMWH	Low-molecular-weight heparin
ASCVD	Atherosclerotic cardiovascular disease	MDA	Mass drug administration
BPG	Benzathine penicillin G	MenACWY	Meningococcal conjugate (A, C, W, Y)
bOPV	Bivalent oral polio vaccine	MR / MMR	Measles–rubella / measles–mumps–rubella
CPT	Cotrimoxazole preventive therapy	NACO	National AIDS Control Organisation
DAA	Direct-acting antiviral (HCV)	NIS	National Immunization Schedule
DOAC	Direct oral anticoagulant	NSBB	Non-selective beta-blocker
DTwP / DTaP	Diphtheria–tetanus–whole-cell / acellular pertussis	PCV / PPSV23	Pneumococcal conjugate / polysaccharide vaccine
ERIG / HRIG	Equine / human rabies immunoglobulin	PEP / PrEP	Post- / pre-exposure prophylaxis
GVHD	Graft-versus-host disease	PJP	Pneumocystis jirovecii pneumonia
HBIG	Hepatitis B immunoglobulin	PLHIV	People living with HIV
HPV	Human papillomavirus	PPTCT	Prevention of parent-to-child transmission
HSCT	Haematopoietic stem cell transplantation	RHD / RF	Rheumatic heart disease / rheumatic fever
IAP	Indian Academy of Pediatrics	RSV	Respiratory syncytial virus
ICS / LABA / LAMA	Inhaled corticosteroid / long-acting β-agonist / muscarinic antagonist	SBP	Spontaneous bacterial peritonitis
ID / IM / SC	Intradermal / intramuscular / subcutaneous	TCV	Typhoid conjugate vaccine
IE	Infective endocarditis	TIG	Tetanus immunoglobulin
IFA	Iron and folic acid	TLD	Tenofovir + lamivudine + dolutegravir
IGRA / TST	Interferon-gamma release assay / tuberculin skin test	TPT	TB preventive treatment
IPD	Invasive pneumococcal disease	UIP	Universal Immunization Programme
VTE	Venous thromboembolism	VZIG	Varicella-zoster immunoglobulin

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Key resources for updates

Topic	Source
National Immunization Schedule, UIP, U-WIN	Ministry of Health and Family Welfare — mohfw.gov.in; U-WIN portal
Paediatric optional vaccines	IAP ACVIP Recommended Immunization Schedule 2025 (Indian Pediatrics, 2026)
Adult vaccination	API / Indian adult immunization consensus 2026
Rabies	National Guidelines for Rabies Prophylaxis (NRCP, NCDC)
HIV PEP, PrEP, PPTCT, OI prophylaxis	NACO National Guidelines for HIV Care and Treatment
TB preventive treatment	Guidelines for Programmatic Management of TPT, Central TB Division (tbcindia.gov.in)
Malaria and filariasis	National Center for Vector Borne Diseases Control (NCVBDC)
Infective endocarditis, AF, lipids	AHA 2021, ESC 2023–2024 guidelines; Lipid Association of India
Antibiotic prophylaxis	ICMR Treatment Guidelines for Antimicrobial Use; NCDC National Treatment Guidelines

KEY POINT Vaccine schedules, product availability and programme policies change frequently. Always check the latest national guidance and the product insert before administration.

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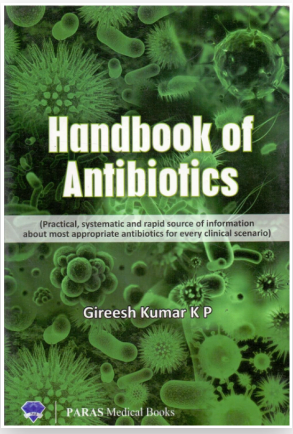
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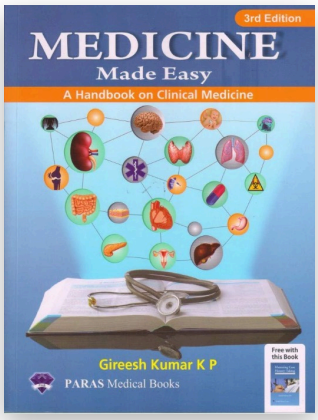
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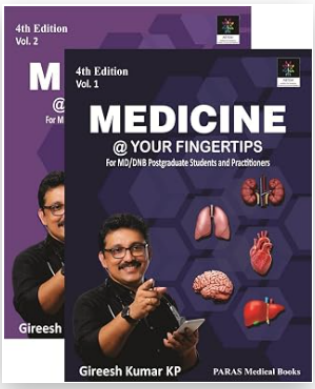
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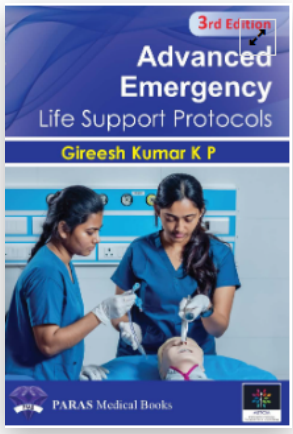
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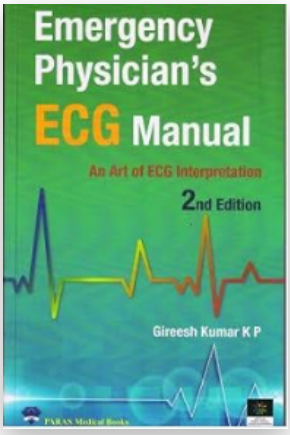
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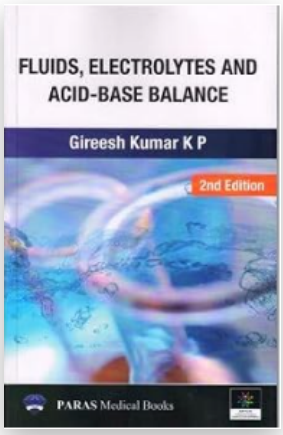
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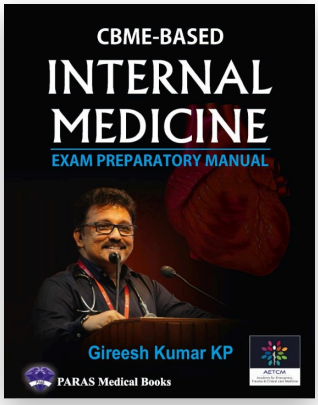
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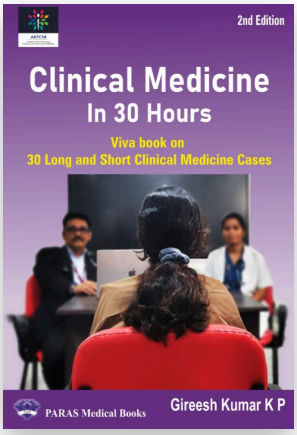
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