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B. PHARMACY — 8th SEMESTER

SOCIAL AND PREVENTIVE PHARMACY

BP802ET

UNIT - 2

PREVENTIVE MEDICINE

Prevention and Control of Communicable and Non-Communicable Diseases

UNIT 2 — PREVENTIVE MEDICINE (Diseases Covered)

Communicable Diseases (Infectious)

Cholera • SARS • Ebola Virus Disease • Influenza • Acute Respiratory Infections • Malaria • Chikungunya • Dengue • Lymphatic Filariasis • Pneumonia

Non-Communicable Diseases (Chronic / Lifestyle)

Hypertension • Diabetes Mellitus • Cancer • Drug Addiction / Substance Abuse

UNIT 2 — PREVENTIVE MEDICINE

📌 General Principles of Prevention and Control of Disease

Prevention is better than cure. Preventive medicine involves measures taken to prevent disease rather than treating it after occurrence. It uses the concepts of epidemiology, immunology, nutrition, public health and social medicine to achieve this goal.

▸ General Preventive Measures Applicable to All Diseases

- **Immunization / vaccination** — active or passive protection against infectious diseases.
- **Health education** — informing communities about modes of transmission and risk reduction.
- **Epidemiological surveillance** — monitoring and reporting of disease occurrence.
- **Vector control** — elimination of mosquitoes, rodents and other disease vectors.
- **Environmental sanitation** — safe drinking water, sewage disposal, solid waste management.
- **Quarantine and isolation** — preventing spread from infected individuals.
- **Chemoprophylaxis** — prophylactic drugs for high-risk individuals (e.g., anti-malarials).
- **Screening programs** — early detection of NCD risk factors (BP, blood sugar, cancer markers).
- **Legislation** — tobacco control (COTPA), drug control (NDPS Act), food safety (FSSAI).

PART A — COMMUNICABLE DISEASES

1. CHOLERA

Communicable Disease — Bacterial | Intestinal Infection

At a Glance — Cholera

Parameter	Details
Causative Agent	Vibrio cholerae — Gram negative, comma-shaped bacillus; El Tor biotype most common now.

Parameter	Details
Reservoir	Human (only known reservoir); no animal reservoir.
Mode of Transmission	Faecal-oral route — contaminated water, food, flies. 5 F's: Faeces, Flies, Fingers, Food, Fluids.
Incubation Period	Few hours to 5 days (usually 2–3 days).
Clinical Features	Profuse, painless, watery 'rice-water' diarrhoea; projectile vomiting; severe dehydration, muscle cramps; cholera gravis (severe) → hypovolaemic shock.
Diagnosis	Stool microscopy, culture on TCBS agar, agglutination test with O1 antiserum.
Treatment	Oral Rehydration Therapy (ORT) is cornerstone; IV fluids (Ringer's Lactate) for severe cases; antibiotics: Doxycycline or Tetracycline.

▸ Prevention and Control of Cholera

1. **Safe water supply:** chlorination, boiling; avoid untreated water.
2. **Food hygiene:** cook food thoroughly, avoid raw vegetables and street food.
3. **Sanitation:** safe disposal of human excreta; fly control.
4. **Personal hygiene:** hand washing with soap after defecation and before eating.
5. **Vaccination:** Oral Cholera Vaccine (OCV) — Shanchol/mORC-VAX; 2 doses; used in outbreak control.
6. **Surveillance:** early detection and notification; case isolation.
7. **Health education:** ORS preparation, signs of dehydration.

ORS Formula (WHO)
1 litre clean water + 3.5 g NaCl + 2.5 g $NaHCO_3$ + 1.5 g KCl + 20 g glucose (or standard ORS sachet). Give sip by sip. Do not stop breastfeeding.

2. SARS — SEVERE ACUTE RESPIRATORY SYNDROME

Communicable Disease — Viral | Respiratory

At a Glance — SARS

Parameter	Details
Causative Agent	SARS-CoV (SARS-Coronavirus); a betacoronavirus; single-stranded, positive-sense RNA virus.

Parameter	Details
Origin / History	First reported in Guangdong, China (Nov 2002); global epidemic 2002–2003; 8,098 cases, 774 deaths worldwide (CFR ~10%).
Reservoir	Bats (natural reservoir); civets as intermediate host.
Mode of Transmission	Droplet infection (primary); close contact with secretions; fomites; some evidence of airborne in healthcare settings.
Incubation Period	2–7 days (up to 10 days).
Clinical Features	High fever (>38°C), rigors, myalgia, headache → dry cough, dyspnoea → 10–20% progress to ARDS; bilateral pneumonia on X-ray.
Diagnosis	PCR for SARS-CoV RNA; serology (ELISA/IFA); chest X-ray and CT.
Treatment	Supportive: oxygen therapy, ventilation; antivirals (ribavirin) and corticosteroids tried but efficacy uncertain.

▸ Prevention and Control of SARS

1. **Isolation and quarantine:** strict case isolation; 14-day quarantine of contacts.
2. **Droplet and contact precautions:** N95 respirators, gloves, gowns, face shields for healthcare workers.
3. **Surveillance:** immediate notification to WHO and national health authorities.
4. **Travel restrictions:** screening at airports, WHO travel advisories.
5. **Hand hygiene:** frequent handwashing; disinfection of surfaces.
6. **No licensed vaccine or specific antiviral:** research ongoing.
7. **Ring containment strategy:** identify, isolate, trace contacts.

3. EBOLA VIRUS DISEASE (EVD)

Communicable Disease — Viral | Haemorrhagic Fever

At a Glance — Ebola

Parameter	Details
Causative Agent	Ebola virus — Filoviridae family; single-stranded RNA virus; 5 species (Zaire most lethal).
Origin	First outbreak in Democratic Republic of Congo (Zaire) in 1976; largest outbreak in West Africa 2014–2016 (>11,000 deaths).
Reservoir	Fruit bats (Pteropodidae) — natural reservoir; non-human primates.

Parameter	Details
Mode of Transmission	Direct contact with blood, secretions, organs or body fluids of infected person or animal; no airborne transmission; spreads via burial practices.
Incubation Period	2–21 days (average 8–10 days).
Clinical Features	Sudden fever, fatigue, muscle pain, headache, sore throat → vomiting, diarrhoea, rash, impaired kidney/liver function → internal & external bleeding; CFR 25–90%.
Diagnosis	RT-PCR (gold standard); ELISA for antigen/antibody; virus isolation (BSL-4 lab).
Treatment	Supportive care: IV fluids, electrolyte balance, oxygen; mAb therapy — Atoltivimab-Maftivimab-Odesivimab (Inmazeb®); Ansuvimab (Ebanga®). Vaccine: rVSV-ZEBOV (Ervebo®) — WHO approved 2019.

▸ Prevention and Control of Ebola

1. **Vaccination:** rVSV-ZEBOV (Ervebo®) — approved for Zaire Ebola; ring vaccination strategy used.
2. **Strict barrier nursing:** PPE (gown, gloves, face shield, mask) for healthcare workers.
3. **Safe burial practices:** trained teams handle bodies; no traditional burial customs involving body contact.
4. **Contact tracing:** identify and monitor all contacts for 21 days.
5. **Avoid bushmeat:** do not handle or eat bats, monkeys in endemic areas.
6. **Community engagement:** education about safe practices; cultural sensitization.
7. **Surveillance:** WHO GOARN (Global Outbreak Alert and Response Network) coordination.

4. INFLUENZA (FLU)

Communicable Disease — Viral | Respiratory

At a Glance — Influenza

Parameter	Details
Causative Agent	Influenza virus — Orthomyxoviridae family; Types A, B, C (A is most virulent and pandemic-prone).

Parameter	Details
Reservoir	Humans (Types A, B, C); birds, pigs (Type A) — zoonotic reservoir for pandemic strains.
Mode of Transmission	Droplets (primary); airborne; direct contact with contaminated surfaces (fomites).
Incubation Period	1–4 days (average 2 days).
Clinical Features	Abrupt onset of high fever, chills, severe myalgia, headache, fatigue, dry cough, sore throat, runny nose. Complications: pneumonia, ARDS especially in elderly, pregnant women, immunocompromised.
Antigenic Variation	Antigenic DRIFT (minor, seasonal) and SHIFT (major, pandemic) — reason for annual vaccine reformulation.
Diagnosis	Rapid Influenza Diagnostic Tests (RIDTs); RT-PCR (gold standard); viral culture.
Treatment	Antivirals: Oseltamivir (Tamiflu®), Zanamivir — within 48 hours of onset. Symptomatic: paracetamol, rest. No aspirin in children (Reye's syndrome).

▸ Prevention and Control of Influenza

1. **Annual vaccination:** Inactivated Influenza Vaccine (IIV), Live Attenuated Influenza Vaccine (LAIV — FluMist), Recombinant Influenza Vaccine. Priority: elderly, HCWs, pregnant women, chronic disease patients, children <5 yrs.
2. **Respiratory hygiene:** cover mouth/nose with elbow when coughing/sneezing; use and discard tissues.
3. **Hand hygiene:** frequent handwashing with soap/sanitizer.
4. **Antiviral chemoprophylaxis:** Oseltamivir for high-risk contacts during outbreaks.
5. Avoid crowded places during peak flu season.
6. **Global surveillance:** WHO GISRS (Global Influenza Surveillance and Response System).
7. **Pandemic preparedness:** WHO Pandemic Influenza Preparedness (PIP) Framework; National Action Plans.

📌 Pandemic Influenza — Notable Examples

- 1918 — Spanish Flu (H1N1) — >50 million deaths.
- 1957 — Asian Flu (H2N2).
- 1968 — Hong Kong Flu (H3N2).
- 2009 — Swine Flu Pandemic (H1N1pdm09) — first pandemic of 21st century.

5. ACUTE RESPIRATORY INFECTIONS (ARI)

Communicable Disease — Viral/Bacterial | Respiratory

At a Glance — ARI

ARI is a major cause of morbidity and mortality, especially in children under 5 years. It includes infections of the upper and lower respiratory tract.

Classification	Examples	Common Pathogens
Upper Respiratory Tract Infection (URTI)	Common cold, pharyngitis, sinusitis, otitis media, epiglottitis	Rhinovirus, Adenovirus, RSV, Group A Streptococcus
Lower Respiratory Tract Infection (LRTI)	Bronchitis, bronchiolitis, pneumonia, bronchopneumonia	RSV (infants), Influenza virus, S. pneumoniae, H. influenzae, Mycoplasma

▸ Clinical Assessment — WHO ARI Classification (Children)

Category	Features	Action
No pneumonia (Cough or cold)	No fast breathing, no chest indrawing	Home management — ORS, paracetamol, keep warm, continue feeding.
Pneumonia	Fast breathing (≥50/min in 2–12 months; ≥40/min in 1–5 yrs)	Oral amoxicillin for 5 days; refer if no improvement.
Severe Pneumonia	Chest indrawing, stridor, central cyanosis, convulsions	URGENT referral; parenteral benzylpenicillin/ampicillin + gentamicin; oxygen.

▸ Prevention and Control of ARI

1. **Immunization:** Hib vaccine, Pneumococcal Conjugate Vaccine (PCV), Influenza vaccine; BCG for tuberculosis.
2. **Breastfeeding:** exclusive breastfeeding for 6 months — reduces ARI incidence by 50%.
3. **Nutrition:** Vitamin A supplementation (reduces ARI severity in deficient children).
4. **Reduce indoor air pollution:** clean cooking fuels (LPG, biogas); avoid biomass burning indoors.
5. **Hand hygiene:** reduces transmission of respiratory viruses significantly.

6. Avoid exposure to tobacco smoke.
7. **Early case detection:** IMNCI (Integrated Management of Neonatal and Childhood Illness) protocol.
8. **Warm clothing:** protect children from cold weather.

6. MALARIA

Communicable Disease — Parasitic | Vector-borne

At a Glance — Malaria

Parameter	Details
Causative Agent	Plasmodium species: P. falciparum (most dangerous), P. vivax (most common in India), P. malariae, P. ovale, P. knowlesi.
Vector	Female Anopheles mosquito (bites at night — dusk to dawn).
Mode of Transmission	Bite of infected female Anopheles; blood transfusion; congenital (mother to child); needle sharing.
Incubation Period	P. falciparum: 9–14 days; P. vivax: 12–17 days (can be 6–12 months in some strains).
Clinical Features	Classic malarial paroxysm — Cold stage (shivering, rigors) → Hot stage (high fever 40°C+) → Sweating stage (drenching sweat, fever subsides). Periodicity: P. vivax — 48 hrs (tertian); P. malariae — 72 hrs (quartan). P. falciparum → severe malaria: cerebral malaria, blackwater fever, ARDS, acute renal failure, hypoglycaemia.
Diagnosis	Peripheral Blood Smear (Gold Standard) — thick and thin smear with Giemsa stain; Rapid Diagnostic Tests (RDTs — detect HRP2, pLDH); PCR.
Treatment	P. vivax: Chloroquine + Primaquine (14 days for radical cure). P. falciparum: Artemisinin-based Combination Therapy (ACT) — Artemether-Lumefantrine (AL) or Artesunate + Amodiaquine. Severe: IV Artesunate.

▸ Prevention and Control of Malaria — National Vector Borne Disease Control Programme (NVBDCP)

1. **Vector control (most important):** Indoor Residual Spraying (IRS) with insecticides (DDT/malathion/synthetic pyrethroids).
2. **Personal protection:** Insecticide-Treated Bed Nets (ITBNs / LLINs); repellents (DEET); full-sleeved clothing.

3. **Biological control:** Gambusia fish in ponds and tanks eat mosquito larvae.
4. **Source reduction:** eliminate stagnant water; drain waterlogged areas; anti-larval measures (oil/kerosene/temephos).
5. **Early case detection and treatment:** MPW-based diagnosis; village health workers distribute ACT.
6. **Chemoprophylaxis:** Doxycycline or Mefloquine for travellers to endemic areas; Chloroquine weekly for P. vivax endemic zones.
7. **Vaccine:** RTS,S/AS01 (Mosquirix®) — WHO recommended for sub-Saharan Africa. R21/Matrix-M — newer; India trials ongoing.
8. **Mass Drug Administration (MDA):** in high transmission areas.

IN National Malaria Control in India

- NVBDCP (National Vector Borne Disease Control Programme) controls malaria.
- National Framework for Malaria Elimination (NFME) 2016–2030 — target: eliminate malaria by 2030.
- API (Annual Parasite Incidence) used to classify districts.

7. CHIKUNGUNYA

Communicable Disease — Viral | Vector-borne (Arbovirus)

At a Glance — Chikungunya

Parameter	Details
Causative Agent	Chikungunya virus (CHIKV) — Alphavirus; Togaviridae family; single-stranded RNA virus.
Name Origin	Makonde language (Tanzania) — 'to become contorted'; refers to stooped posture due to joint pain.
Vector	Aedes aegypti and Aedes albopictus mosquito (day-biting).
Mode of Transmission	Mosquito bite; no direct human-to-human; vertical transmission possible.
Incubation Period	2–12 days (usually 3–7 days).
Clinical Features	SUDDEN ONSET of high fever (>39°C) + SEVERE JOINT PAIN (arthralgia — hallmark; can persist for months–years); headache, myalgia, maculopapular rash. Rarely fatal; confusion with dengue.
Diagnosis	Serology: IgM ELISA (after day 5); RT-PCR (early — within 5 days); viral isolation.

Parameter	Details
Treatment	No specific antiviral. Symptomatic: NSAIDs (Naproxen/Ibuprofen) for joint pain; paracetamol for fever; adequate hydration. Avoid aspirin and other NSAIDs in early phase (until dengue excluded).

▸ Prevention and Control of Chikungunya

1. **Vector control — same as Dengue:** eliminate Aedes breeding sites.
2. **Personal protection:** repellents, long-sleeved clothes, mosquito nets (daytime too).
3. **Source reduction:** drain stagnant water in containers, flower pots, coolers, tyres.
4. Health education — 'Dry Day' concept: drain and dry all water containers once a week.
5. **No licensed vaccine available:** mRNA vaccine candidates in trials.

8. DENGUE FEVER

Communicable Disease — Viral | Vector-borne (Arbovirus)

At a Glance — Dengue

Parameter	Details
Causative Agent	Dengue virus (DENV) — Flavivirus; 4 serotypes (DENV-1, 2, 3, 4). Infection with one → lifelong immunity to that serotype; secondary infection with different serotype → severe dengue risk.
Vector	Aedes aegypti (primary); Aedes albopictus (secondary). Day-biting mosquito.
Incubation Period	4–10 days (range 3–14 days).
Clinical Features	Classic Dengue (DF): Sudden high fever, severe headache, retro-orbital pain, myalgia, 'break-bone fever', maculopapular rash, mild bleeding. Dengue Haemorrhagic Fever (DHF): positive tourniquet test, petechiae, thrombocytopenia (<1 lakh/mm³), plasma leakage. Dengue Shock Syndrome (DSS): DHF + circulatory failure — LIFE-THREATENING.
Warning Signs	Abdominal pain, persistent vomiting, fluid accumulation, mucosal bleeding, lethargy, liver enlargement >2 cm, platelet <20,000.
Diagnosis	NS1 antigen (early, days 1–5); IgM/IgG ELISA (after day 5); CBC — thrombocytopenia, leukopenia; PCR.

Parameter	Details
Treatment	No specific antiviral. Supportive: paracetamol only (NO aspirin/NSAIDs — risk of bleeding); oral/IV fluids; platelet transfusion if <10,000 or active bleeding; close monitoring.

▸ Prevention and Control of Dengue

1. **Aedes control — 5 S's:** Search for stagnant water → Scoop/scrub → Seal containers → Screen (mesh) → See a doctor early.
2. **Source reduction:** drain coolers, pots, tyres; clean flower vases weekly; cover overhead tanks.
3. **Biological control:** Bacillus thuringiensis israelensis (Bti) larvae killing agent; Wolbachia-infected mosquitoes.
4. **Personal protection:** repellents, full-sleeve clothing, mosquito nets during day.
5. **Fogging and IRS:** during outbreaks with pyrethroid insecticides.
6. **Vaccine:** Dengvaxia® (CYD-TDV) — approved in some countries only for seropositive individuals. TAK-003 (Qdenga®) — WHO recommended 2023.
7. **Surveillance:** weekly platelet count trends used as surrogate outbreak marker.

⚠ Remember — Dengue vs Chikungunya

- Dengue: Thrombocytopenia + haemorrhage + plasma leakage → can be FATAL.
- Chikungunya: Severe joint pain (arthralgia) persisting for months → RARELY FATAL.
- Both spread by Aedes aegypti; both need same vector control measures.
- Avoid NSAIDs in early dengue (until excluded) — risk of bleeding.

9. LYMPHATIC FILARIASIS (ELEPHANTIASIS)

Communicable Disease — Parasitic | Vector-borne

At a Glance — Lymphatic Filariasis

Parameter	Details
Causative Agent	Wuchereria bancrofti (90%), Brugia malayi, Brugia timori — filarial nematodes (roundworms).
Vector	Culex mosquito (W. bancrofti — night-biting); Mansonia mosquito (Brugia).
Mode of Transmission	Bite of infected Culex/Mansonia mosquito → microfilariae enter lymphatics → adult worms.

Parameter	Details
Incubation Period	8–12 months to manifest; microfilaraemia — 6–12 months after infection.
Clinical Features	Asymptomatic microfilaraemia (most cases) → Acute filarial fever (adenolymphangitis — ADL) → Chronic: Lymphoedema, hydrocele, elephantiasis (gross oedema of limbs/genitalia). Tropical Pulmonary Eosinophilia (TPE) in lung.
Diagnosis	Peripheral blood smear (thick smear — night blood: 10 PM–2 AM for W. bancrofti); ICT card test (filarial antigen); IgG4 ELISA.
Treatment	Diethylcarbamazine (DEC) 6 mg/kg × 12 days (kills microfilariae). WHO MDA: DEC + Albendazole annually; or Ivermectin + Albendazole where onchocerciasis coexists.

▸ Prevention and Control of Lymphatic Filariasis — National Programme (NVBDCP)

1. **Mass Drug Administration (MDA):** DEC 6 mg/kg + Albendazole 400 mg annually to all eligible persons in endemic districts (excluding pregnant women, children <2 yrs, seriously ill).
2. **Vector control:** Culex mosquito control — anti-larval measures; IRS; draining drains and pits.
3. **Morbidity management:** limb hygiene; elevation; exercise; wound care for lymphoedema.
4. **Night blood screening:** identify microfilaraemia in community.
5. **Goal:** WHO's Global Programme to Eliminate Lymphatic Filariasis (GPELF) — eliminate as a public health problem by 2030.

10. PNEUMONIA

Communicable Disease — Bacterial/Viral/Fungal | Respiratory

At a Glance — Pneumonia

Parameter	Details
Definition	Pneumonia is an acute infection of lung parenchyma (alveoli and interstitium) causing consolidation. Leading cause of death in children under 5 globally.

Parameter	Details
Causative Agents	Children: Streptococcus pneumoniae, Haemophilus influenzae, RSV. Adults: S. pneumoniae, Klebsiella, Legionella, Mycoplasma. Atypical: Mycoplasma pneumoniae, Legionella, Chlamydophila.
Types	Community-Acquired Pneumonia (CAP); Hospital-Acquired (Nosocomial) Pneumonia (HAP); Aspiration Pneumonia; Ventilator-Associated Pneumonia (VAP).
Clinical Features	Fever, rigors, productive cough (rusty sputum in pneumococcal), pleuritic chest pain, dyspnoea, tachycardia; dullness on percussion, bronchial breath sounds on auscultation.
Diagnosis	Chest X-ray (consolidation/opacity); CBC (leukocytosis); sputum culture; blood culture; urine antigen (Legionella/pneumococcal); CURB-65 score for severity.
Treatment	CAP mild: Amoxicillin/Amoxicillin-Clavulanate. Moderate: Azithromycin/Clarithromycin + beta-lactam. Severe: IV Piperacillin-Tazobactam or Cefotaxime + Azithromycin; ICU care.

▸ Prevention and Control of Pneumonia — GAPPD Strategy (WHO/UNICEF)

1. **Vaccination:** Pneumococcal Conjugate Vaccine (PCV) — PCV13/PCV15/PCV20; Hib vaccine; Influenza vaccine; COVID-19 vaccine.
2. **Breastfeeding:** exclusive breastfeeding for 6 months — protective against pneumonia.
3. **Adequate nutrition:** Vitamin A supplementation; zinc supplementation.
4. **Reduce indoor air pollution:** clean cooking fuels; no tobacco smoke exposure.
5. **IMCI/IMNCI protocol:** early classification and appropriate treatment by health workers.
6. **Zinc supplementation:** reduces severity and duration of pneumonia.
7. **GAPPD:** Global Action Plan for Prevention and Control of Pneumonia and Diarrhoea (2013).

PART B — NON-COMMUNICABLE DISEASES (NCDs)

📌 What are NCDs?

Non-communicable diseases (NCDs) are chronic diseases that are not passed from person to person. They result from a combination of genetic, physiological, environmental and behavioural factors. Major NCDs: cardiovascular diseases, cancers, chronic respiratory diseases, diabetes. NCDs cause 74% of all deaths globally (WHO 2023).

11. HYPERTENSION (HIGH BLOOD PRESSURE)

Non-Communicable Disease — Cardiovascular Risk Factor

At a Glance — Hypertension

Parameter	Details
Definition	Persistent elevation of blood pressure ≥ 140/90 mmHg on two separate occasions. (JNC 8 / WHO). ACC/AHA 2017: ≥130/80 mmHg.
Classification	"Normal: <120/80 mmHg. Elevated: 120-129/<80. Stage 1 HTN: 130-139/80-89. Stage 2 HTN: ≥140/90. Hypertensive Crisis: >180/120 mmHg."
Types	Essential (Primary) — 90–95%; no identifiable cause. Secondary — 5–10%; causes: renal disease, renovascular, Cushing's, hyperaldosteronism, coarctation, drugs.
Risk Factors	Non-modifiable: Age, sex (males >45, females >55 yrs), race, family history, genetics. Modifiable: Obesity (BMI>30), excess salt intake (>5g/day), physical inactivity, smoking, alcohol, diabetes, stress.
Symptoms	Mostly SILENT — 'Silent Killer'. Symptoms when severe: headache (occipital), dizziness, blurred vision, nocturia, nausea.
Complications	Target organ damage: Heart (LVH, MI, heart failure); Brain (stroke, encephalopathy); Kidneys (nephrosclerosis, CKD); Eyes (hypertensive retinopathy); Aorta (aneurysm).
Diagnosis	BP measurement on 2+ occasions; BP ≥140/90 mmHg; investigations: ECG, echo, serum creatinine, urinalysis, fundoscopy.
Treatment	Non-pharmacological: DASH diet, weight reduction, exercise, smoking cessation, alcohol limit, salt restriction (<5g/day). Pharmacological:

Parameter	Details
	Thiazides, ACE inhibitors, ARBs, Calcium Channel Blockers, Beta-blockers. Most patients need 2+ drugs.

▸ Prevention and Control of Hypertension

1. **SHAKE strategy (WHO):** Surveillance, Healthier environments, Adherence to treatment, Knowledge, Education.
2. **DASH Diet:** Dietary Approaches to Stop Hypertension — high fruits/vegetables, low fat, low sodium.
3. **Salt reduction:** national salt reduction initiatives; food labelling.
4. **Community screening:** BP measurement camps; Health & Wellness Centres in India (PMJAY).
5. **Tobacco control:** COTPA Act; cessation counselling.
6. **Physical activity:** ≥150 minutes moderate exercise per week.
7. **India's NCD programme:** NPCDCS (National Programme for Prevention and Control of Cancer, Diabetes, CVD and Stroke).

□ ABCDE of Hypertension Management

- A — ACE inhibitor/ARB (especially with diabetes or kidney disease).
- B — Beta-blocker (post-MI, heart failure).
- C — Calcium Channel Blocker (elderly, isolated systolic HTN).
- D — Diuretic (Thiazide — first-line for many).
- E — Extra: lifestyle modifications for ALL patients.

12. DIABETES MELLITUS

Non-Communicable Disease — Metabolic

At a Glance — Diabetes Mellitus

Parameter	Details
Definition	A group of metabolic diseases characterised by chronic hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. (ADA/WHO)
Types	Type 1 DM — Absolute insulin deficiency; immune-mediated destruction of beta cells; juvenile onset. Type 2 DM — Insulin resistance + relative insulin deficiency; >90% of cases; lifestyle-related. Gestational DM — During pregnancy. MODY, Secondary DM.

Parameter	Details
Risk Factors	Type 1: Genetic, autoimmune, viral triggers. Type 2: Obesity (BMI>25), physical inactivity, family history, age >45, dyslipidaemia, previous GDM, PCOS.
Classical Symptoms	3 Polys: Polydipsia (excess thirst) + Polyuria (excess urine) + Polyphagia (excess hunger) + Weight loss. Fatigue, blurred vision, slow healing wounds.
Diagnostic Criteria (ADA)	FPG ≥126 mg/dL; OR 2-h plasma glucose ≥200 mg/dL (OGTT); OR HbA1c ≥6.5%; OR Random plasma glucose ≥200 mg/dL + symptoms. (any one, confirmed on repeat)
Complications	Microvascular: Retinopathy (leading cause of blindness), Nephropathy (leading cause of CKD), Neuropathy. Macrovascular: MI, stroke, peripheral vascular disease — Diabetic foot.
Treatment	Type 1: Insulin — basal-bolus regimen (Insulin glargine + rapid-acting insulin). Type 2: Lifestyle → Metformin (first-line) → add SU/DPP4i/GLP-1RA/SGLT2i/Insulin as needed.

▸ Prevention and Control of Diabetes Mellitus

Level	Measures
Primordial	Promote healthy diet, physical activity from childhood; prevent obesity; anti-tobacco campaigns.
Primary	Identify pre-diabetes (IFG/IGT); intense lifestyle intervention (5–7% weight loss); delay onset by 58% (DPP study). Metformin for high-risk individuals.
Secondary	Screening: FPG, HbA1c testing in overweight adults >35 yrs, all adults >45 yrs. Early treatment to achieve HbA1c <7%.
Tertiary	Prevent/manage complications: annual dilated eye exam, urine microalbumin, foot exam, BP control, lipid management.

- **India's programme:** NPCDCS — free screening, drugs and management at PHC level.
- **ABC targets:** A: HbA1c <7%; B: BP <130/80 mmHg; C: Cholesterol (LDL <100 mg/dL).

📌 Pre-Diabetes — Window of Opportunity

Pre-diabetes: FPG 100–125 mg/dL (IFG) or 2h PG 140–199 mg/dL (IGT). Intensive lifestyle intervention (diet + 150 min/week exercise) reduces diabetes risk by 58%. Metformin reduces risk by 31% (DPP trial).

13. CANCER (MALIGNANT NEOPLASM)

Non-Communicable Disease — Oncological

At a Glance — Cancer

Parameter	Details
Definition	Cancer is a disease in which cells grow uncontrollably, invade adjacent tissues and may spread (metastasize) to other body parts through blood/lymph.
Epidemiology	2nd leading cause of death globally (~10 million deaths/2022). India: 1.46 million new cases/year. Common cancers in India: Oral, Lung, Cervix, Breast, Oesophagus, Stomach.
Risk Factors	Tobacco (25–30% of all cancers); alcohol; poor diet; physical inactivity; overweight/obesity; HPV (cervical cancer); HBV/HCV (liver cancer); H. pylori (gastric cancer); radiation (ionising/UV); environmental carcinogens; genetic factors (BRCA1/2).
Warning Signs (7 Cs / CAUTION)	C: Change in bowel/bladder habits; A: A sore that won't heal; U: Unusual bleeding; T: Thickening or lump; I: Indigestion/difficulty swallowing; O: Obvious change in wart/mole; N: Nagging cough or hoarseness.
Staging	TNM system: T — tumour size; N — node involvement; M — metastasis. Stage I–IV (I = localised; IV = metastatic).
Types in India	Oral cavity (tobacco chewing); Lung (smoking); Cervical (HPV infection); Breast; Colorectal.
Treatment Modalities	Surgery (resection); Radiotherapy (XRT); Chemotherapy; Targeted therapy (Imatinib, Trastuzumab); Immunotherapy (PD-1/PD-L1 inhibitors — Nivolumab, Pembrolizumab); Hormone therapy (Tamoxifen for breast cancer); Palliative care.

▸ Prevention and Control of Cancer — WHO 3-Tier Approach

Level	Measures
Primary Prevention	Tobacco control (COTPA Act); HPV vaccine (Cervavac® in India — for girls 9–14 yrs); Hepatitis B vaccine; alcohol restriction; healthy diet; sun protection (sunscreen, avoid UV); workplace carcinogen control.

Level	Measures
Secondary Prevention (Screening)	Cervical cancer: Pap smear (every 3 years for 21–65 yr women), HPV DNA test, VIA (Visual Inspection with Acetic Acid). Breast: BSE monthly, CBE every 3 years; Mammography (40–74 yrs annually). Oral cancer: oral cavity inspection for high-risk (tobacco users). Colorectal: FOBT, colonoscopy >50 yrs.
Tertiary Prevention	Early treatment, rehabilitation, palliative care, pain management with opioids, psychosocial support.

1. **National Cancer Control Programme (NCCP):** under NPCDCS; Regional Cancer Centres (RCC) in each state; National Cancer Grid (NCG).
2. **PM-JAY:** Ayushman Bharat covers cancer treatment up to ₹5 lakh/year.

Cancer Awareness — Colours

- Pink — Breast Cancer Awareness (October).
- White — Lung Cancer Awareness (November).
- Gold — Childhood Cancer Awareness (September).
- Orange — Leukemia Awareness.
- Blue — Colon Cancer Awareness.

14. DRUG ADDICTION AND SUBSTANCE ABUSE

Non-Communicable Disease — Behavioural/Mental Health

At a Glance — Drug Addiction

Term	Definition
Drug Use	Intake of a substance for therapeutic or non-therapeutic purpose.
Drug Misuse	Use of a drug in a manner inconsistent with medical or legal purposes (e.g., taking more than prescribed dose).
Drug Abuse	Use of substances for non-medical purposes; self-administration for psychological effects; illegal use.
Drug Dependence	Compulsive drug-seeking behaviour despite harmful consequences; involves tolerance and withdrawal. Psychological + Physical dependence.
Drug Addiction	Chronic, relapsing disorder characterised by compulsive drug use, inability to stop and loss of control, despite harmful consequences. (NIDA definition)

Term	Definition
Tolerance	Decreasing response to a drug with repeated use; requires higher dose to achieve same effect.
Withdrawal	Physical/psychological symptoms occurring when a drug is discontinued after dependence.

Classification of Abused Substances

Category	Examples	Effects
CNS Depressants	Alcohol, Benzodiazepines, Barbiturates, Opioids	Sedation, euphoria, respiratory depression; high dependence potential.
CNS Stimulants	Cocaine, Amphetamine, Methamphetamine, Caffeine, Nicotine	Euphoria, increased alertness, tachycardia, psychosis with excess.
Opioids	Heroin, Morphine, Codeine, Tramadol, Fentanyl	Analgesia, euphoria, miosis, respiratory depression — fatal in overdose.
Cannabis	Marijuana, Hashish, Ganja, Charas, Bhang	Euphoria, relaxation, impaired memory, motivation, amotivational syndrome.
Hallucinogens	LSD, Psilocybin, MDMA (Ecstasy)	Altered perceptions, hallucinations, panic attacks.
Inhalants / Solvents	Whitener, Glue, Petrol, Paint thinner	Brief euphoria; brain, liver, kidney damage; sudden sniffing death.
Tobacco (Nicotine)	Cigarette, Bidi, Gutkha, Hookah, Snuff	High addiction potential; cancer, CVD, COPD; no intoxication at low dose.

Effects / Consequences of Drug Addiction

- **Physical:** malnutrition, infections (HIV, Hepatitis B/C from IV drug use), overdose death, organ failure, dental decay ('meth mouth').
- **Psychological:** anxiety, depression, psychosis, suicidal ideation, personality changes.
- **Social:** broken families, loss of employment, crime, poverty, accidents, domestic violence.
- **Economic:** huge financial burden on family and society; loss of productivity.

Prevention and Control of Drug Addiction

Level	Strategies
Primary Prevention	School-based drug education; life-skills training (DARE Programme); mass media campaigns; reduce availability (NDPS Act, 1985); peer education; promote healthy recreation.
Secondary Prevention	Early identification of at-risk individuals; motivational interviewing; brief intervention at community level; Narcotic Anonymous (NA) groups.
Tertiary Prevention	De-addiction centres; Harm reduction: Needle Exchange Programmes (NEP), Opioid Substitution Therapy (OST) with methadone/buprenorphine; rehabilitation and vocational training; aftercare.

Pharmacological Treatment of Addiction

- **Nicotine:** Nicotine Replacement Therapy (NRT — patch, gum, inhaler); Bupropion; Varenicline (Champix®).
- **Alcohol:** Disulfiram (Antabuse); Naltrexone; Acamprosate; benzodiazepines for acute withdrawal (DTs).
- **Opioids:** Methadone (long-acting); Buprenorphine/Naloxone (Suboxone); Naltrexone (prevents relapse); Naloxone (Narcan) for overdose reversal.
- **Benzodiazepines:** gradual tapering with long-acting BZD; CBT.
- **General:** Cognitive Behavioural Therapy (CBT), Motivational Enhancement Therapy (MET), 12-Step programs.

Key Legislation — India

• NDPS Act 1985 (Narcotic Drugs and Psychotropic Substances Act) — controls manufacture, sale and possession of narcotics and psychotropic substances.
• COTPA 2003 (Cigarettes and Other Tobacco Products Act) — bans smoking in public places, advertisement, sale to minors.
• Prevention of Illicit Traffic in Narcotic Drugs and Psychotropic Substances Act 1988.
• National Drug Demand Reduction Policy (NDDP) and MANAS helpline 1800-11-0031.

Probable Exam Questions — Unit 2

Long Answer Questions (10 marks)

1. Discuss the prevention and control of malaria under NVBDCP.
2. Write a detailed note on Dengue fever — epidemiology, clinical features and prevention.
3. Define hypertension. Discuss risk factors, complications and prevention.

4. Discuss diabetes mellitus — types, diagnostic criteria and levels of prevention.
5. Define drug addiction. Classify abused substances and discuss the pharmacological management of addiction.
6. Write a note on cancer — risk factors, warning signs, screening and national control programme.
7. Write a detailed note on Ebola Virus Disease.

▸ Short Answer Questions (5 marks)

1. Prevention and control of Cholera.
2. Prevention and control of SARS.
3. Write a note on lymphatic filariasis.
4. Mass Drug Administration (MDA) programme for filariasis.
5. Difference between DHF and DSS in Dengue.
6. Influenza — antigenic shift vs antigenic drift.
7. Levels of prevention in Diabetes Mellitus.
8. Anti-cancer screening methods in India.
9. Write a note on drug tolerance and withdrawal.
10. Prevention and control of ARI in children (WHO classification).

▸ Very Short Answer (2 marks)

1. Define malnutrition. (Common link from Unit 1)
2. What is OST? Name the drugs used.
3. Expand NVBDCP, NPCDCS, COTPA.
4. Name any two vaccines for preventable communicable diseases.
5. What is the CAUTION acronym in cancer?
6. Define antigenic shift.
7. Normal BP vs Hypertensive BP values.
8. What is MDA? In which disease is it used?