INFECTIOUS DISEASES

Comprehensive Past Paper Study Guide

Finals 2018 · Finals 2020 · Dr Ahmad Alhaj File

⭐ HIGH-YIELD TOPIC CHECKLIST

The following topics appear most frequently in past papers — master these first:

Topic	Key Focus Areas
1. Brucellosis	Species virulence, transmission routes, treatment duration, focal complications, most common cause of death
2. Tuberculosis	PPD thresholds, sputum AFB, infectiousness, drug side effects (isoniazid → lupus), rule of 3
3. HIV & AIDS	When to start ART, AIDS-defining illnesses (vs non-defining), vertical transmission rate, needle-stick risk
4. Antibiotic Side Effects	Vancomycin, levofloxacin/ciprofloxacin, metronidazole — know every side effect cold
5. Vaccines	Live-attenuated vs inactivated, safety in pregnancy, contraindications in immunocompromised
6. C. difficile	Gram stain, diagnosis method, high-risk antibiotics, treatment, immune mechanism
7. SIRS Criteria	All four criteria values exactly — tested repeatedly (2012–2020)
8. Parasites	Ascaris, Enterobius, Schistosoma, Tinea — organism-specific features
9. Needle-Stick	Rule of 3: HIV 0.3%, HCV 3%, HBV 30%; post-exposure management
10. PPD Test	Three-tier threshold system; know which population = 5, 10, 15 mm cut-off

1. HIV & AIDS

1.1 When to Start ART

Current guidelines: Start antiretroviral therapy (ART) in ALL HIV-positive patients regardless of CD4 count or viral load — treat everyone immediately upon diagnosis.

> ⚠️ **EXAM TRAP:** Old criteria (CD4 <200 or <350) are OBSOLETE. The exam answer is: start ART as soon as diagnosed.

1.2 Key Numbers

Parameter	Value / Significance
CD4 < 200 cells/mm³	Defines AIDS (even without an AIDS-defining illness)
CD4 < 200	Risk for PCP (Pneumocystis jirovecii pneumonia) → start prophylaxis
CD4 < 100	Risk for Toxoplasmosis, Cryptococcus
CD4 < 50	Risk for MAC, CMV retinitis
Vertical transmission (untreated)	~25% (range 15–45%)
Vertical transmission (with ART)	< 1–2%
Needle-stick HIV risk	0.3%
Peak age in Jordan	25–35 years

1.3 AIDS-Defining Illnesses (CDC)

The following automatically classify a patient as having AIDS:

System	AIDS-Defining Illness
Pulmonary	PCP (Pneumocystis jirovecii pneumonia) — CD4 < 200
Pulmonary	TB (Mycobacterium tuberculosis)
CNS	Toxoplasma encephalitis, Cryptococcal meningitis
GI	Cryptosporidiosis (chronic > 1 month), CMV colitis
Ophthalmology	CMV retinitis
Oncology	Kaposi sarcoma, Primary CNS lymphoma, Burkitt lymphoma
Fungal	Esophageal or pulmonary candidiasis (NOT oral thrush)
Mycobacterial	MAC (Mycobacterium avium complex), M. kansasii
Viral	Progressive multifocal leukoencephalopathy (PML — JC virus)
Other	Wasting syndrome, HIV encephalopathy

⚠️ **EXAM TRAP:** Oral thrush (oropharyngeal candidiasis) is NOT AIDS-defining. Only ESOPHAGEAL or pulmonary/bronchial candidiasis qualifies. Herpes zoster is also NOT AIDS-defining.

1.4 Early HIV Testing

- Within 7 days of exposure: PCR / Viral load (RNA) — detects virus before antibodies form
- 2–4 weeks: p24 antigen (4th-generation combo test)
- 4–12 weeks: HIV antibody seroconversion
- Positive HCV antibody → next step: HCV RNA by PCR (distinguishes resolved vs active infection)

✓ **EXAM TIP:** If asked what to do after a positive HCV antibody test → order HCV RNA (PCR), not liver biopsy or LFTs as the first step.

2. Brucellosis

2.1 Organism & Microbiology

- Gram-negative coccobacillus (NOT gram-positive, NOT cocci)
- Facultative intracellular pathogen — lives inside macrophages
- Zoonotic infection — human-to-human transmission is EXTREMELY RARE

2.2 Species & Virulence

Species	Host Animal / Notes
B. melitensis	Goats & sheep — MOST VIRULENT in humans, most common cause
B. abortus	Cattle — less virulent
B. suis	Pigs — associated with suppurative destructive lesions
B. canis	Dogs — less common in humans

⚠️ **EXAM TRAP:** B. melitensis = most virulent. B. abortus is from cattle. A common exam trap is attributing virulence to abortus.

2.3 Transmission

- Unpasteurized dairy (milk, cheese)
- Direct contact with infected animal secretions, placentas, aborted fetuses
- Inhalation (high-risk in lab workers and slaughterhouse workers)
- Male-to-female ratio: 2–3:1 (occupational exposure predominates)

✓ **EXAM TIP:** Cannot be acquired from unpasteurized milk: Bacillus anthracis. CAN be acquired: M. bovis, Listeria, Brucella, Salmonella.

2.4 Clinical Features

Category	Details
Classic triad	Undulant fever, night sweats, arthralgia/arthritis
Most common focal complication	Osteoarticular infections (sacroiliitis, spondylitis, osteomyelitis)
Sacroiliitis	Common focal complication — NOT rare
Most common cause of death	Endocarditis (rare but lethal — ~80% of brucellosis deaths)
Liver involvement	Hepatomegaly, granulomatous hepatitis
Other	Epididymo-orchitis in males

⚠️ **EXAM TRAP:** Sacroiliitis is the most common focal complication, NOT rare. Endocarditis is the most common cause of death.

2.5 Treatment

Population	Regimen	Duration
Adults	Doxycycline + Rifampin (or Streptomycin)	≥ 6 weeks
Children < 8 yrs	Rifampin + TMP-SMX	6 weeks
Pregnancy	Rifampin + TMP-SMX (avoid doxycycline)	6 weeks
Neurobrucellosis	Triple therapy: Doxycycline + Rifampin + Ceftriaxone	3–6 months

★ **HIGH-YIELD:** Shorter treatment = higher relapse risk. Minimum 6 weeks is essential due to intracellular nature of Brucella. No human Brucella vaccine exists.

3. Tuberculosis (TB)

3.1 Microbiology

- Mycobacterium tuberculosis: acid-fast bacillus (AFB), NOT gram-positive or gram-negative on standard Gram stain
- Obligate aerobe — thrives in upper lobes (high O_2 tension)
- Intracellular pathogen (lives in macrophages)

3.2 PPD (Tuberculin Skin Test) — Threshold System

Induration ≥ X mm = POSITIVE:

Cut-off	Population
≥ 5 mm	HIV+ patients, immunosuppressed (steroids, TNF-α inhibitors), recent close contact with active TB, chest X-ray with fibrotic changes
≥ 10 mm	Immigrants from high-prevalence countries (within 5 years), IV drug users, healthcare/lab workers, residents of high-risk settings (prisons, homeless shelters), children < 4 years, patients with diabetes, CKD, silicosis, leukemia, lymphoma, head/neck cancer
≥ 15 mm	All other persons with NO identified risk factors

⚠️ **EXAM TRAP:** A healthy 60-year-old woman with NO risk factors needs ≥ 15 mm to be positive. A reading of 10 mm in this scenario = NEGATIVE. This was a direct exam question.

3.3 Infectiousness

TB Site	Infectiousness
Laryngeal TB	MOST infectious — droplets from coughing/speaking spread directly
Cavitating pulmonary TB	Very infectious (high bacterial load, open cavity)
Pulmonary TB (non-cavitating)	Moderately infectious
Calcified lung lesion	NOT infectious (latent, walled off)
Spinal TB (Pott's disease)	Not directly infectious
CNS TB	Not directly infectious
GI TB	Not directly infectious

✓ **EXAM TIP:** Laryngeal TB is the most infectious form. If cavitating pulmonary TB is not a choice, laryngeal TB is the answer.

3.4 Diagnosis of Active TB

- Gold standard: 3 sputum AFB samples (on 3 separate days, early morning)
- If sputum AFB negative x3 but strong clinical suspicion → bronchoscopy with BAL
- PPD/TST: tests for exposure/latent TB, NOT diagnostic for active TB
- Most sensitive test for typhoid: bone marrow culture (blood culture is commonly cited but bone marrow is more sensitive)

3.5 TB Treatment

Phase	Drugs	Duration
Intensive (RHZE)	Rifampin + INH + Pyrazinamide + Ethambutol	2 months
Continuation (RH)	Rifampin + Isoniazid	4 months
Total standard regimen	RHZE × 2 months → RH × 4 months	6 months minimum
CNS/Bone TB	Extended continuation phase	9–12 months total

3.6 TB Drug Side Effects

Drug	Key Side Effects
Isoniazid (INH)	Drug-induced lupus, peripheral neuropathy (give B6/pyridoxine), hepatotoxicity, pellagra
Rifampin	Orange discolouration of secretions, hepatotoxicity, potent CYP450 inducer (drug interactions)
Pyrazinamide	Hyperuricemia/gout, hepatotoxicity
Ethambutol	Optic neuritis (red-green colour blindness) — monitor visual acuity
Streptomycin	Ototoxicity (vestibular > cochlear), nephrotoxicity

> ★ **HIGH-YIELD:** Isoniazid causes drug-induced lupus — the only anti-TB drug to do so. This appeared as a direct MCQ.

4. Antibiotic Side Effects & Properties

4.1 Vancomycin

Side Effect	Notes
Red man syndrome	Flushing, erythema, pruritis — due to rapid infusion (NOT allergy). Prevented by slow infusion rate
Nephrotoxicity	Especially dangerous in combination with aminoglycosides (worst combo: vancomycin + amikacin)
Phlebitis	Local vein inflammation at infusion site
Ototoxicity	Hearing loss — especially at high levels
Neutropenia	Thrombocytopenia can also occur with prolonged use
NOT a side effect	Seizures — do not attribute seizures to vancomycin
NOT a side effect	Neuropathy — not a recognised vancomycin side effect

⚠️ **EXAM TRAP:** Seizures and peripheral neuropathy are NOT vancomycin side effects. This appeared multiple times across past papers.

4.2 Fluoroquinolones (Ciprofloxacin / Levofloxacin)

Side Effect	Notes
Tendinopathy / Tendon rupture	Especially Achilles tendon. Levofloxacin = arthropathy. Ciprofloxacin = tendinitis in rotator cuff
Arthropathy	Levofloxacin — contraindicated in children (cartilage damage)
QT prolongation	Cardiac side effect — avoid with other QT-prolonging drugs
Nausea, GI upset	Common
CNS effects	Headache, dizziness, rarely seizures (lowered seizure threshold)
Photosensitivity	Especially with ciprofloxacin
Anti-pseudomonal activity	Ciprofloxacin is anti-pseudomonal. Levofloxacin has lesser activity
Cyst penetration	Both are lipophilic → excellent penetration into renal cysts (ADPKD cyst infection = ciprofloxacin)

4.3 Metronidazole

Side Effect	Notes
Metallic taste	Very common — almost universal
Disulfiram-like reaction	Avoid alcohol completely during and 48h after treatment
Headache	Common
Nausea, GI upset	Common

Peripheral neuropathy	With prolonged high-dose use
NOT a side effect	Red man syndrome — this belongs to vancomycin

4.4 G6PD Deficiency — Drug-Triggered Hemolysis

The following drugs cause hemolytic anemia in G6PD-deficient patients:

- **Dapsone (most commonly tested)**
- **Nitrofurantoin**
- **TMP-SMX (trimethoprim-sulfamethoxazole)**
- Primaquine (antimalarial)
- Rasburicase

✓ **EXAM TIP:** Levofloxacin does NOT trigger G6PD hemolysis — it was a deliberate distractor in the past paper.

4.5 Anti-Pseudomonal Antibiotics

The following antibiotics have activity against Pseudomonas aeruginosa:

Class	Anti-Pseudomonal Agents	Non-Pseudomonal
Fluoroquinolones	Ciprofloxacin (best), levofloxacin (limited)	—
Aminoglycosides	Gentamicin, tobramycin, amikacin	Streptomycin (no pseudomonal activity)
Cephalosporins	Cefepime (4th gen), ceftazidime (3rd gen)	Ceftriaxone — NOT anti-pseudomonal
Beta-lactams	Piperacillin-tazobactam, ticarcillin-clavulanate	Amoxicillin, ampicillin
Carbapenems	Imipenem, meropenem (not ertapenem)	Ertapenem — no pseudomonal activity
Other	Aztreonam (monobactam)	—

★ **HIGH-YIELD:** Ceftriaxone is NOT anti-pseudomonal. It is the classic distractor. Also: ertapenem has no pseudomonal coverage.

4.6 Antibiotic Contraindications

Antibiotic	Contraindication / Key Concern
Doxycycline	Pregnancy (fetal bone/teeth), children < 8 years
Fluoroquinolones	Children (cartilage toxicity), QT-prolonging drug combinations
Metronidazole	Avoid alcohol (disulfiram reaction)
Aminoglycosides	Renal impairment (require dose adjustment); ototoxicity
Vancomycin + aminoglycosides	Worst combination for nephrotoxicity

5. Clostridioides difficile (C. diff)

5.1 Microbiology & Pathogenesis

- Gram-POSITIVE (NOT gram-negative) anaerobic spore-forming bacillus
- Pathogenesis: Toxin A (enterotoxin) + Toxin B (cytotoxin) → NOT immune-complex mediated
- Forms hardy spores resistant to alcohol-based hand sanitizers — hand washing with soap and water essential

> ⚠️ **EXAM TRAP:** C. difficile is Gram-POSITIVE. A very common exam trap — do not write gram-negative.

5.2 Risk Factors

- Recent antibiotic use — destroys normal flora
- High-risk antibiotics: Clindamycin (highest risk), Fluoroquinolones, Cephalosporins, Ampicillin
- PPIs (proton pump inhibitors) — reduce gastric acid barrier
- Hospitalization, elderly (> 65 years), immunosuppression
- Note: Most antibiotic-associated diarrhea is NOT caused by C. diff (usually mild and resolves on its own)

5.3 Diagnosis & Treatment

Aspect	Details
Diagnosis	Stool toxin assay (detect Toxin A/B) — NOT serum antibodies, NOT endoscopy alone
NOT diagnosed by	Serum antibodies — this is FALSE (appeared as exam question)
Classic finding	Pseudomembranous colitis on colonoscopy
Most common cause of	Hospital-acquired diarrhea
Recurrence rate	Up to 20–25%
Complication	Toxic megacolon, bowel perforation, sepsis
First-line treatment	Oral vancomycin or fidaxomicin (mild-moderate); add IV metronidazole for severe/complicated
Historically (still tested)	Metronidazole was classic DOC for mild disease
Recurrence treatment	Fidaxomicin, bezlotoxumab, fecal microbiota transplant (FMT)
Asymptomatic carriage	Common in infants and hospitalized adults — NOT treated

6. Vaccines

6.1 Live-Attenuated vs Inactivated

Type	Examples	Safe in Pregnancy?	Safe in Immunocompromised?
Live-attenuated	MMR, Varicella (VZV), Yellow fever, Oral typhoid, Oral polio (Sabin), Nasal flu (LAIV), BCG	NO — risk of fetal infection	NO — risk of disseminated infection
Inactivated (killed)	Injectable influenza (IM), Hepatitis A, Salk polio	YES	YES
Toxoid	Tetanus, Diphtheria	YES	YES
Recombinant/subunit	Hepatitis B, HPV, Conjugated pneumococcal	YES (HBV, HAV)	YES
Polysaccharide	PPSV23 (pneumococcal)	YES	YES

⚠️ **EXAM TRAP:** MMR is live-attenuated → contraindicated in pregnancy AND in immunocompromised patients. Inject influenza (IM) is inactivated → safe in pregnancy, safe in immunocompromised.

6.2 Influenza Vaccine — High-Yield Facts

- Injectable (IM) influenza vaccine = inactivated = safe in pregnancy
- Nasal spray (LAIV) = live-attenuated = NOT safe in pregnancy, NOT in immunocompromised
- Contraindicated in: egg allergy (classic, though newer guidelines allow with precautions), Guillain-Barré syndrome (within 6 weeks of prior flu vaccine), children < 6 months
- Given annually (strains change yearly); contains 3–4 influenza strains
- NOT contraindicated in: immunocompromised (inactivated form is safe), bone marrow transplant patients (inactivated form OK)

✓ **EXAM TIP:** All three statements (contraindicated in pregnancy, immunocompromised, BMT) are WRONG about the injectable flu vaccine — all three wrong answers appeared in one MCQ.

6.3 Vaccines Safe in Pregnancy

Vaccine	Notes
Injectable influenza (IM)	Recommended in pregnancy — protects mother and newborn
Tdap (tetanus-diphtheria-pertussis)	Recommended in 3rd trimester of every pregnancy
Hepatitis B	Safe — recommended if at risk
Hepatitis A	Safe — if indicated
NOT safe: MMR	Live-attenuated — avoid in pregnancy
NOT safe: Varicella	Live-attenuated — avoid in pregnancy

NOT safe: HPV	Defer until after pregnancy
NOT safe: LAIV (nasal flu)	Live-attenuated — avoid

6.4 Hepatitis B Vaccine — Special Points

- Recombinant subunit vaccine (contains HBsAg)
- Protective against Hepatitis D (delta virus) — because HDV requires HBV for replication
- Post-exposure prophylaxis (unvaccinated): give BOTH vaccine AND Hepatitis B immunoglobulin (HBIg) simultaneously

7. SIRS & Sepsis

7.1 SIRS Criteria — Memorize Exactly

SIRS is defined as ≥ 2 of the following 4 criteria:

Criterion	Values (Positive Thresholds)
Temperature	> 38°C (100.4°F) OR < 36°C (96.8°F) — fever OR hypothermia
Heart Rate	> 90 beats/min (tachycardia)
Respiratory Rate	> 20 breaths/min OR $PaCO_2$ < 32 mmHg
WBC	> 12,000/mm³ OR < 4,000/mm³ OR > 10% bands (immature neutrophils)

⚠️ **EXAM TRAP:** WBC of 10,000 is NORMAL — does NOT satisfy SIRS. Must be > 12,000 or < 4,000 or > 10% bands. This was a tested exam trap.

✓ **EXAM TIP:** Tachypnea can be the FIRST presenting sign of sepsis. Hypothermia is a POOR prognostic sign. Sepsis → metabolic ACIDOSIS (lactic acidosis), NOT alkalosis.

7.2 Sepsis Key Facts

- Blood culture is positive in only ~30–40% of sepsis cases (NOT 80% — that is FALSE)
- Causes metabolic acidosis (lactic acidosis from hypoperfusion) — NOT metabolic alkalosis
- Complications: ARDS, AKI, DIC, multi-organ failure
- Hypothermia = poor prognostic sign in sepsis (suggests overwhelmed host response)
- Dysesthesias in gloves-and-stocking distribution ARE associated with sepsis (peripheral neuropathy component)

Organism	Diagnosis	Treatment
Ascaris lumbricoides	Eggs in stool	Albendazole / Mebendazole
Enterobius vermicularis	Scotch tape test (perianal)	Albendazole / Mebendazole
Ancylostoma / Necator	Eggs in stool	Albendazole
Trichuris trichiura	Eggs in stool	Albendazole
Schistosoma haematobium	Eggs in urine	Praziquantel
Schistosoma mansoni	Eggs in stool	Praziquantel
Taenia solium	Imaging (head CT), serology	Praziquantel + Albendazole
Taenia saginata	Proglottids in stool	Praziquantel

8. Parasites & Helminths

8.1 High-Yield Worm Summary

Organism	Common Name	Route	Key Feature	Diagnosis	Trea
Ascaris lumbricoides	Roundworm	Fecal-oral	Most common helminth worldwide; 40 cm; Loeffler syndrome (pulmonary eosinophilia); peritoneal obstruction	Eggs in stool	Albe mebe
Enterobius vermicularis	Pinworm	Fecal-oral	Perianal pruritus (worst at night); children mostly; eggs on sticky tape (NOT in stool); no anemia	Scotch tape test (perianal)	Albe mebe
Ancylostoma / Necator	Hookworm	Skin penetration	Iron deficiency ANEMIA (blood loss from gut); ground itch	Eggs in stool	Albe
Trichuris trichuria	Whipworm	Fecal-oral	Rectal prolapse in heavy infection	Eggs in stool	Albe
Schistosoma haematobium	Blood fluke	Skin in freshwater	Bladder cancer (squamous cell carcinoma), hematuria	Eggs in urine	Praz
Schistosoma mansoni	Blood fluke	Skin in freshwater	Portal hypertension, liver disease	Eggs in stool	Praz
Taenia solium	Pork tapeworm	Eating undercooked pork	Cysticercosis (larvae → brain/muscle cysts)	Imaging (head CT), serology	Praz albe
Taenia saginata	Beef tapeworm	Eating undercooked beef	Intestinal infestation only — does NOT cause cysticercosis	Proglottids in stool	Praz

⚠️ **EXAM TRAP:** Enterobius does NOT cause anemia — hookworm causes iron deficiency anemia. Taenia saginata does NOT cause cysticercosis — only T. solium does.

8.2 Tinea / Tapeworm Clarification

Note: 'Tinea' in the exam context referred to Taenia (tapeworm), not tinea (ringworm fungal infection):

- Taenia solium → found in PORK → causes cysticercosis
- Taenia saginata → found in BEEF → does NOT cause cysticercosis
- Cysticercosis = caused by T. solium larvae, NOT saginata

8.3 Entamoeba histolytica

- Causes bloody (dysenteric) diarrhea — flask-shaped colonic ulcers → blood in stool
- Complication: amoebic liver abscess — right lobe, 'anchovy paste' aspirate
- Elevated ALP does NOT specifically diagnose liver abscess (many conditions raise ALP)
- Treatment: Metronidazole (7–10 days) for invasive disease, THEN luminal agent (paromomycin or iodoquinol) to clear cysts

9. Needle-Stick Injuries & Bloodborne Pathogens

9.1 Rule of 3 — Transmission Risks

Pathogen	Risk per Needle-Stick	Reason
HIV	0.3% (1 in 300)	Low viremia in blood usually
HCV	3% (1 in 30)	Moderately resistant, no effective prophylaxis
HBV	30% (1 in 3)	Highly virulent, survives on surfaces for 7 days

★ **HIGH-YIELD:** HBV > HCV > HIV — in that order for needle-stick risk. HBV is 100x more infectious than HIV.

9.2 Post-Exposure Management

Exposure Type	Immediate Action	Specific Prophylaxis
Any needle-stick	Wash immediately with soap and water	—
HIV exposure	Wash + start PEP (post-exposure prophylaxis) within 72 hrs	Tenofovir/emtricitabine + raltegravir × 28 days
HBV (unvaccinated)	Wash + administer simultaneously	HBV vaccine + HBIg (within 24 hrs)
HBV (vaccinated, anti-HBs adequate)	Wash	No further action needed
HCV	Wash + monitor HCV RNA	No approved PEP — monitor and treat if infected

✓ **EXAM TIP:** Immediate action after needle-stick = wash with soap and water. NOT tourniquet, NOT squeezing the wound.

10. Infections, Organisms & Clinical Pearls

10.1 Causative Organisms — High-Yield Associations

Clinical Scenario	Organism	Key Notes
Acute endocarditis	Staphylococcus aureus	Aggressive, rapid destruction — most common in IV drug users
Subacute endocarditis (dental procedure)	Viridans streptococci (alpha-hemolytic)	Post-dental procedure; most common cause of subacute IE overall
Otitis externa ('malignant')	Pseudomonas aeruginosa	Severe ear pain + discharge; especially in diabetics
Erysipelas	Group A Streptococcus (GAS)	Superficial skin infection with raised borders, well-demarcated
Follicular tonsillitis	Group A Streptococcus (GAS)	Exudative tonsillitis; treat to prevent rheumatic fever
Viral meningitis (most common)	Enteroviruses	Accounts for ~85% of viral meningitis cases
Viral encephalitis (most common)	HSV-1	Temporal lobe involvement, treat with acyclovir
Most common adult diarrhea	Norovirus	Highly contagious, projectile vomiting
Bloody diarrhea returning traveler	Shigella, Campylobacter, EHEC	Cholera = watery, NOT bloody
CSF: low glucose, high protein, lymphocytes	TB meningitis or fungal	NOT HSV (HSV = lymphocytic but normal/slightly low glucose)
Staph aureus food poisoning	Pre-formed toxin (not bacteria)	Symptoms within 1–6 hrs of eating; NO fever; V+D without fever
B. cereus / S. aureus	Pre-formed toxins	Rapid onset 1–6 hrs: custard, rice, cream
Cellulitis (most common cause)	S. aureus (or Strep pyogenes)	Both are common; exam depends on choices given

10.2 Animal-Source Associations

Organism / Disease	Animal Source
Brucella canis	Dogs
Brucella abortus	Cattle
Brucella melitensis	Goats & sheep
Pasteurella multocida	Cats and dogs (bites/scratches)
Salmonella enteritidis	Chicken and eggs
Cryptococcus neoformans	Pigeon droppings
Chlamydia psittaci	Birds (psittacosis — parrots, not bats)

Leptospira	Rat urine
Bacillus anthracis (anthrax)	Livestock / wool — NOT unpasteurized milk

⚠️ **EXAM TRAP:** Chlamydia is associated with BIRDS (psittacosis), NOT bats. Bats are associated with rabies and histoplasmosis.

10.3 Isolation Precautions

Precaution Type	Diseases
Airborne (N95 mask + negative pressure room)	TB, Measles, Varicella (chickenpox), Disseminated zoster
Droplet (surgical mask)	Influenza, Meningococcal disease, Mumps, Rubella, Pertussis, Group A Strep
Contact (gloves + gown)	MRSA, VRE, C. difficile, Scabies, Impetigo
Standard only	Most other infections, HBV, HCV, HIV

✓ **EXAM TIP:** MRSA = contact precautions only. TB = airborne (not contact). Influenza = droplet. These were direct exam questions.

10.4 Immunodeficiency — Quick Summary

Condition	Primary Defect	Classic Presentation
IgA deficiency	B cell — low IgA	Most common primary immunodeficiency; often asymptomatic; recurrent sinopulmonary infections; anaphylaxis with blood products
Bruton's agammaglobulinemia	B cell — absent B cells	X-linked; boys; recurrent bacterial infections after 6 months
Common variable immunodeficiency (CVID)	B cell — low IgG AND IgA	Late onset; recurrent infections; low immunoglobulins; B cells present but dysfunctional
Job syndrome (Hyper-IgE)	Neutrophil chemotaxis defect	Recurrent abscesses, pneumonia, eczema, very HIGH IgE; coarse facies
Chronic granulomatous disease (CGD)	NADPH oxidase defect (phagocytosis)	Recurrent catalase+ organism infections (Staph, Aspergillus, Nocardia)
T cell deficiency	Cell-mediated immunity	Susceptibility to intracellular parasites (Toxoplasma, Leishmania), fungi, viruses
SCID	Combined B + T cell defect	Most severe; presents in infancy; susceptible to ALL infections

★ **HIGH-YIELD:** Most common congenital immunodeficiency = IgA deficiency. Recurrent abscesses + very high IgE = Job syndrome (chemotaxis defect). Susceptibility to intracellular parasites = T cell deficiency.

11. Viral Hepatitis

Feature	HAV	HBV	HCV	HDV
Transmission	Fecal-oral	Blood/sexual/ vertical	Blood (mostly)	Blood (requires HBV)
Chronicity	Never	5–10% adults; 90% neonates	~70–85%	Co-inf: low; Superinf: 80%
Vaccine	Yes (killed)	Yes (recombinant)	None	HBV vaccine (prevents HDV!)
Vaccine in pregnancy	Safe	Safe	N/A	Prevented by HBV vaccine
Fecal shedding	Before symptom onset	No	No	No
Diagnosis	Anti-HAV IgM (acute)	HBsAg (active), anti-HBs (immune)	HCV antibody → confirm with HCV RNA PCR	Anti-HDV + positive HBsAg
Cancer risk	None	HCC (with cirrhosis)	HCC (with cirrhosis)	Accelerated cirrhosis

> ★ **HIGH-YIELD:** HBV vaccine is protective against Hepatitis D because HDV cannot replicate without HBsAg. HAV viral shedding in feces occurs BEFORE symptom onset (most infectious before jaundice).

12. Quick Reference Tables

12.1 Antibiotic Coverage Summary

Antibiotic	Gram+	Gram-	Anaerobes	Special Coverage	Notable Gaps
Vancomycin	✓✓✓ (MRSA, VRE)	✗	✗	MRSA, C. diff (oral)	No gram-neg coverage
Metronidazole	✗	Limited	✓✓✓	C. diff, amoeba, Giardia	No aerobic gram+ coverage
Ciprofloxacin	Limited	✓✓✓	✗	Pseudomonas, GI pathogens	Poor gram+ coverage
Levofloxacin	✓✓	✓✓	Limited	Atypicals, respiratory tract	Less anti-pseudomonal than cipro
Ceftriaxone	✓	✓✓	✗	Meningitis, PID, gonorrhoea	No Pseudomonas, no MRSA
Cefepime	✓	✓✓	✗	Pseudomonas	No MRSA
Doxycycline	Limited	Limited	✗	Atypicals, Rickettsia, Brucella, Chlamydia	No MRSA

12.2 Malaria — Rapid Review

Species	Key Feature
P. falciparum	MOST SERIOUS — cerebral malaria, sequestration, no dormancy, drug resistance
P. vivax	Dormant hypnozoites in liver; relapsing malaria; treat with primaquine
P. ovale	Like vivax — dormant hypnozoites; less common
P. malariae	Quartan fever (every 72 hrs); nephrotic syndrome

12.3 Congenital Infections — TORCHES

Pathogen	Key Neonatal Features	Most Critical Window
Toxoplasma (T)	Chorioretinitis, hydrocephalus, intracranial calcifications	Any trimester
Rubella (R)	Congenital heart disease (PDA), cataracts, deafness, microcephaly	1st trimester (90% risk)
CMV (C)	Most common congenital infection; sensorineural hearing loss, periventricular calcifications	Any trimester
HSV (H)	Neonatal herpes (encephalitis, disseminated disease)	At delivery
Syphilis (S)	Hutchinson's triad: notched teeth, keratitis, deafness; saddle nose	1st and 2nd trimester

HIV (H)	Vertical transmission; prevent with ART	Labor/delivery + breastfeeding

★ **HIGH-YIELD:** Congenital Rubella — 90% risk if mother infected in 1st trimester. Syphilis diagnosed definitively by BIOPSY (not VDRL or RPR, which are screening tests only).

13. Mnemonics & Memory Anchors

13.1 Rule of 3 (Needle-Stick Risks)

HIV: 0.3% | HCV: 3% | HBV: 30%

Each is 10x greater than the last going from HIV → HCV → HBV

13.2 SIRS Criteria — "Hot BRW" (or "Temp HR RR WBC")

- T = Temperature > 38 or < 36°C
- H = Heart Rate > 90
- R = Respiratory Rate > 20 (or $PaCO_2$ < 32)
- W = WBC > 12,000 OR < 4,000 OR >10% bands

13.3 Brucellosis Species Virulence

MELitensis is the MELO-DRAMATIC (most virulent) one — from goats

13.4 C. diff Treatment Progression

Mild: Metronidazole → Moderate/Severe: Oral Vancomycin → Recurrent: Fidaxomicin / FMT

13.5 AIDS-Defining Candidiasis

"It's NOT in your mouth" — Oral thrush is NOT AIDS-defining. It must be ESOPHAGEAL or pulmonary to count.

13.6 TB Drug Side Effects (RIPE)

Drug	Mnemonic / Key Side Effect
R — Rifampin	Red/Orange secretions, Rifampin is Radical (CYP450 inducer)
I — Isoniazid	It's Inflammatory (lupus), It needs B6 (neuropathy prevention)
P — Pyrazinamide	Painful uric acid (gout, hyperuricemia)
E — Ethambutol	Eyes (optic neuritis) — monitor vision monthly

13.7 Anti-Pseudomonal Antibiotics — GAPS (not Ceftriaxone)

Gentamicin, Aztreonam, Piperacillin, Cefepime/Ceftazidime = cover Pseudomonas

Ceftriaxone does NOT. Ertapenem does NOT.

14. Frequently Repeated Exam Questions

Question Topic	Correct Answer + Reasoning
When to start ART in HIV	Immediately upon diagnosis — regardless of CD4 or viral load
Most common cause of death in brucellosis	Endocarditis
Most common focal complication in brucellosis	Osteoarticular (sacroiliitis/spondylitis)
Brucella most virulent species	B. melitensis (goats/sheep)
PPD positive in healthy person with no risk factors	≥ 15 mm required
PPD positive in HIV+ / immunosuppressed	≥ 5 mm
Diagnostic test for active TB	3 sputum AFB specimens
Next step after sputum AFB negative x3 + strong TB suspicion	Bronchoscopy with BAL
Most infectious TB	Laryngeal TB (also cavitating pulmonary TB)
Vancomycin side effects NOT	Seizures, peripheral neuropathy
Red man syndrome belongs to	Vancomycin (infusion-rate related, not allergy)
Red man syndrome NOT a side effect of	Metronidazole
G6PD hemolysis triggers	Dapsone, nitrofurantoin, TMP-SMX (NOT levofloxacin)
Ceftriaxone vs pseudomonas	Ceftriaxone does NOT cover Pseudomonas
C. diff gram stain	Gram-POSITIVE bacillus
C. diff diagnosis	Stool toxin assay (NOT serum antibodies)
SIRS — WBC 10,000	Does NOT meet SIRS criteria (need > 12,000 or < 4,000 or > 10% bands)
Sepsis causes	Metabolic ACIDOSIS (lactic), NOT alkalosis
Enterobius and anemia	Enterobius does NOT cause anemia (hookworm does)
Schistosoma causing bladder cancer	S. haematobium (squamous cell carcinoma of bladder)
Taenia solium	From PORK; causes cysticercosis
Taenia saginata	From BEEF; does NOT cause cysticercosis
Injectable flu vaccine in pregnancy	SAFE — recommended
MMR in pregnancy	CONTRAINDICATED — live-attenuated
MMR in immunocompromised	CONTRAINDICATED
Hepatitis B vaccine protective	Also Hepatitis D (delta requires HBV to replicate)

against	
Post-exposure HBV (unvaccinated)	Give HBV vaccine + HBIg simultaneously
Most common viral meningitis	Enteroviruses (~85%)
Most common viral encephalitis	HSV-1
Most common adult diarrhea	Norovirus
Needle-stick immediate action	Wash with soap and water
Oral thrush — AIDS-defining?	NO — esophageal candidiasis is AIDS-defining, NOT oral
IgA deficiency	Most common primary immunodeficiency
Job syndrome	Chemotaxis defect → high IgE, recurrent abscesses, eczema
Most serious malaria	Plasmodium falciparum
Congenital rubella — highest risk trimester	First trimester (~90% risk)
Syphilis diagnostic test (not screening)	Dark-field microscopy / biopsy (not RPR or VDRL)
Cholera	Watery (rice-water) diarrhea — NOT bloody
EHEC (enterohemorrhagic E. coli)	Antibiotics CONTRAINDICATED (increase risk of HUS)
ESBL bacteria resistance defines	Resistance to ceftriaxone (3rd-gen cephalosporins)
Infected renal cyst in ADPKD	Ciprofloxacin (lipophilic → cyst penetration)
COVID PCR — most sensitive sample	Nasopharyngeal swab

15. Clinical Decision Flowcharts

15.1 TB Diagnosis Pathway

Suspected TB (cough > 3 weeks, night sweats, weight loss, haemoptysis, upper lobe cavity on CXR):

- Step 1: 3 × sputum AFB smears (early morning) — if positive → treat
- Step 2: If all 3 AFB negative but strong suspicion → bronchoscopy + BAL
- Step 3: Culture (Lowenstein-Jensen medium) — takes 4–8 weeks but gold standard
- Note: PPD/TST tests latent exposure — NOT diagnostic for active disease
- Note: CXR shows features but does not confirm TB

15.2 HIV Exposure Testing Timeline

Time After Exposure	Best Test
Within 7 days	HIV RNA PCR (viral load) — detects before antibodies form
2–4 weeks	p24 antigen (4th gen combo test)
4–12 weeks	HIV antibody (ELISA/Western blot)
PEP window	Must start within 72 hrs for maximum effectiveness

15.3 HCV Positive Antibody — Next Step

- Positive anti-HCV antibody = past EXPOSURE only (does not distinguish resolved vs active)
- → Next step: HCV RNA by PCR (viral load) to confirm active replication
- If RNA positive → chronic HCV → refer to hepatology for treatment (DAAs)
- If RNA negative → resolved infection (no treatment needed)

15.4 Needle-Stick Management Algorithm

- Immediate: Wash with soap and water for 15 minutes (do NOT squeeze or suck the wound)
- Report to occupational health immediately
- Assess source patient: HBV, HCV, HIV status
- HIV exposure → PEP if source HIV+ or unknown high risk (within 72 hrs)
- HBV exposure (unvaccinated) → vaccine + HBIg immediately
- HBV exposure (vaccinated, immune) → no further action
- HCV exposure → baseline HCV antibody + RNA, monitor at 6 weeks and 3 months

End of Study Guide

Prepared from Finals 2018 · Finals 2020 · Dr Ahmad Alhaj Past Paper File

Review all highlighted EXAM TRAPs and HIGH-YIELD PEARLS before the exam.