NGN NCLEX 2026 · NEUROLOGICAL / INFECTIOUS

# Meningitis

Inflammation of the meninges — complications & management

HIGH-YIELD | PRIORITY ASSESSMENT | DROPLET PRECAUTIONS | ABC PRIORITY | NCJMM INTEGRATED

## 01 Definition & Overview

What it is + why it matters

### 🧠 What It Is

Inflammation of the **meninges** (pia, arachnoid, dura) surrounding the brain and spinal cord — often with inflammation of the CSF.

### ⚠️ Why It Matters

Bacterial meningitis is a **medical emergency**. Untreated, it can cause cerebral edema, septic shock, coma, and death within **24 hours**.

### 👥 At-Risk Populations

Infants, college dorm residents, military recruits, immunocompromised clients, unvaccinated persons, post-neurosurgery, basilar skull fracture.

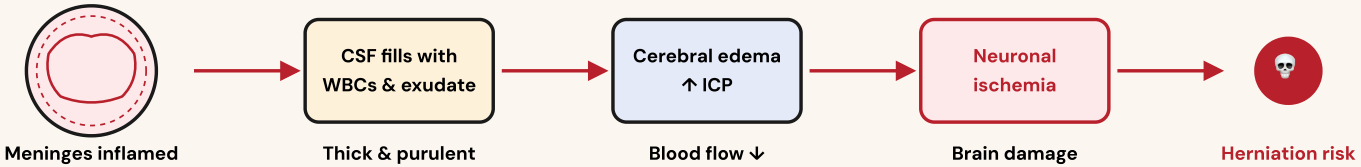
### Three Main Types

| TYPE | CAUSE | SEVERITY | CSF FINDINGS |
|---|---|---|---|
| **Bacterial**<br>"Septic" | *N. meningitidis, S. pneumoniae, H. influenzae, Listeria* | **EMERGENCY**<br>High mortality | Cloudy · ↑WBC (neutrophils) · ↑Protein · **↓Glucose** · ↑Pressure |

| TYPE | CAUSE | SEVERITY | CSF FINDINGS |
|---|---|---|---|
| **Viral** "Aseptic" | Enterovirus, HSV, mumps, West Nile | Most common · Usually self-limiting | Clear · ↑WBC (lymphocytes) · Normal protein · **Normal glucose** |
| **Fungal** | *Cryptococcus* (HIV/AIDS); slow onset | Chronic · Immunocompromised | Clear/cloudy · ↑Lymphocytes · ↑Protein · ↓Glucose |

## 02 Pathophysiology (Simplified)

How one infection can crush a brain




**STEP 1**
**Pathogen entry** → bloodstream (sinus, ear, skull fx, surgery) crosses blood-brain barrier

→

**STEP 2**
Pathogen multiplies in CSF → triggers **massive inflammatory response**

→

**STEP 3**
WBCs, protein, and exudate thicken CSF → **obstructs flow** → hydrocephalus

→

**STEP 4**
Cerebral edema + ↑ ICP → **decreased cerebral perfusion** → neuronal death

# 03 Signs & Symptoms

Classic triad · meningeal signs · red flags

## 🎯 THE CLASSIC TRIAD (memorize!)

🌡️

**Fever**

Often > 101°F / 38.3°C

🤕

**Severe Headache**

"Worst of my life"

🧍

**Nuchal Rigidity**

Stiff neck on flexion

## 🟡 Early / Common Signs

- Photophobia (sensitive to light)
- Phonophobia (sensitive to sound)
- Nausea & vomiting
- Irritability, restlessness
- Flu-like malaise
- **+ Kernig sign / + Brudzinski sign**

### Kernig

`HIP FLEXED 90°`

Pain or resistance when trying to **straighten the knee**.

### Brudzinski

`NECK FLEXION`

Involuntary **hip & knee flexion** when neck is flexed.

## 🚨 Late / Severe — RED FLAGS

- **↓ LOC**, confusion, coma
- **Seizures** (new onset)
- **Petechial / purpuric rash** (meningococcal — notify provider STAT)
- **Cushing's triad**: ↑BP, ↓HR, irregular respirations (impending herniation)
- Positive **Babinski**, pupillary changes
- Bulging fontanels (infants), high-pitched cry
- Opisthotonos (arched back posturing)
- Hypotension, tachycardia, septic shock

🚨 **Purpuric rash = Neisseria meningitidis.** This is a septic emergency — rapid deterioration, DIC, Waterhouse-Friderichsen syndrome possible.

### Peds-Specific Cues

#### 👶 Infant

- Bulging anterior fontanel
- High-pitched cry
- Poor feeding, lethargy
- May *lack* nuchal rigidity

#### 🧒 Child

- Fever, HA, stiff neck
- Irritable, photophobic
- Opisthotonos
- Seizures common

#### 👵 Older Adult

- May present only with confusion
- Low-grade or *no* fever
- High mortality — don't miss it

## 04 Priority Nursing Interventions

ABCs · Safety · NCLEX prioritization

### ⏱️ FIRST 60 MINUTES (Priority Actions)

1. **Airway, Breathing, Circulation** — suction ready, prepare for intubation if ↓LOC
2. **Initiate DROPLET precautions** immediately (private room, mask within 3 ft) — continue × 24 hrs after effective antibiotics begin
3. **Obtain blood cultures** → then administer IV antibiotics (do NOT delay antibiotics waiting on LP results)
4. **Assist with lumbar puncture** (gold standard diagnostic)

5. **Monitor ICP**: neuro checks q1–2h, HOB 30°, neutral head/neck alignment
6. **Seizure precautions**: padded rails, suction at bedside, $O_2$ ready

## Ongoing Assessment

- Neuro checks (LOC, pupils, GCS) every 1–2 hours
- Vital signs q2h — watch for **Cushing's triad**
- Strict I&O — monitor for **SIADH** (dilutional hyponatremia)
- Daily weights, specific gravity, serum $Na^+$
- Assess for focal deficits, cranial nerve changes
- Monitor temperature — aggressive fever management

## Environment & Comfort

- **Dim lights**, quiet room (photophobia, phonophobia)
- Cool cloth to forehead; cluster care to minimize stimulation
- HOB elevated 30°; avoid hip flexion > 90° (↑ICP)
- Avoid Valsalva — stool softeners PRN
- Pain management (opioids used cautiously — mask neuro changes)
- Antipyretics (acetaminophen preferred)

## Fluid & Electrolyte

- **Cautious fluid replacement** — overhydration worsens cerebral edema
- Isotonic fluids (0.9% NS) per order
- Monitor for **SIADH**: ↓$Na^+$, ↑urine specific gravity, concentrated urine
- If SIADH: **fluid restriction**, hypertonic saline if severe
- Watch for diabetes insipidus (opposite problem)

## Prophylaxis & Infection Control

- **Droplet precautions × 24 hrs** after effective antibiotics
- Identify close contacts → **prophylactic rifampin or ciprofloxacin**
- Report to public health (reportable disease)
- Hand hygiene, mask, eye protection
- Private room until cleared

# 05 Pharmacology

Core regimens & nursing considerations

## 💊 Ceftriaxone (Rocephin) + Vancomycin

EMPIRIC IV ANTIBIOTICS · CLASS: 3RD-GEN CEPHALOSPORIN + GLYCOPEPTIDE

**Mechanism:** Bactericidal — inhibit cell wall synthesis; cross the BBB.

- **Side effects:** GI upset, rash, nephrotoxicity (vanco), "red man syndrome" if vanco infused too fast
- **Nursing:** Obtain cultures BEFORE first dose · infuse vanco over ≥ 60 min · monitor BUN/Cr · trough levels
- **Duration:** 7–21 days depending on organism

## 💊 Ampicillin (added for infants < 1 mo and adults > 50)

COVERS LISTERIA MONOCYTOGENES

- Always add for extremes of age
- Check penicillin allergy

## 💊 Dexamethasone (Decadron)

CORTICOSTEROID · ADJUNCT THERAPY

**Mechanism:** Reduces inflammatory response → ↓ cerebral edema, ↓ hearing loss (esp. *S. pneumoniae*).

- **Timing:** Give *before or with* the first antibiotic dose (not after)
- **Side effects:** Hyperglycemia, ↑infection risk, GI bleeding
- **Nursing:** Monitor blood glucose, taper dose, protect from infection

## 💊 Acyclovir (Zovirax)

ANTIVIRAL · ADDED EMPIRICALLY IF HSV SUSPECTED

- Given until HSV meningitis/encephalitis ruled out
- **Nursing:** ↑ fluids to prevent nephrotoxicity (crystalluria), monitor renal function

## 💊 Rifampin or Ciprofloxacin (Prophylaxis for close contacts)

POST-EXPOSURE PREVENTION FOR N. MENINGITIDIS

- **Rifampin:** turns body fluids **orange/red** — warn client; stains contact lenses; ↓ OCP effectiveness
- **Cipro:** single dose; avoid in pregnancy and peds
- **Ceftriaxone IM:** alternative, especially for pregnant clients

## 💊 Phenytoin (Dilantin) or Levetiracetam (Keppra)

ANTICONVULSANT · SEIZURE PROPHYLAXIS/TREATMENT

- **Phenytoin therapeutic level:** 10–20 mcg/mL
- **Side effects:** gingival hyperplasia, nystagmus, ataxia
- **Nursing:** IV only with NS (precipitates in D5W); give slowly — cardiac monitoring

## 💊 Mannitol (Osmitrol)

OSMOTIC DIURETIC · REDUCES ↑ICP

- Pulls fluid from brain tissue into vasculature → ↓ cerebral edema
- **Nursing:** use **in-line filter** (can crystallize) · monitor I&O, serum osmolality, electrolytes
- Hold if serum osmolality > 320 mOsm/L

## 💉 Vaccines — Primary Prevention

THE BEST INTERVENTION IS PREVENTION

- **Hib vaccine** — infants (2, 4, 6, 12–15 mo)
- **Pneumococcal (PCV13, PPSV23)** — infants, ≥ 65, high-risk
- **Meningococcal (MenACWY)** — age 11–12 with booster at 16; college dorm, military
- **MenB** — recommended for high-risk age 16–23

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# Complications & Management

What can go wrong — and what you do about it

| COMPLICATION | CUES TO RECOGNIZE | NURSING MANAGEMENT |
|---|---|---|
| **↑ Intracranial Pressure** | ↓ LOC, Cushing's triad (↑BP, ↓HR, irregular resp), pupil changes, vomiting, papilledema | HOB 30°, neutral alignment, avoid Valsalva, mannitol, hyperventilate (short-term), seizure precautions |
| **Seizures** | New-onset generalized or focal seizures; aura; post-ictal state | Airway, side-lying, **don't restrain**, time the seizure, IV lorazepam/phenytoin, suction |
| **SIADH** | ↓ serum $Na^+$, ↑ urine specific gravity, weight gain without edema, concentrated urine, confusion | Fluid restriction, hypertonic saline (3% NS) for severe hyponatremia, daily weights, I&O |
| **Septic Shock / DIC** (Waterhouse-Friderichsen) | Hypotension, tachycardia, widespread petechiae/purpura, adrenal hemorrhage, prolonged PT/PTT | Aggressive fluid resuscitation, vasopressors, transfusions, ICU — life-threatening |
| **Hydrocephalus** | Enlarging head circumference (infants), bulging fontanel, sunset eyes, ↓LOC | Monitor HC, prepare for VP shunt, neurosurgery consult |
| **Cranial Nerve Damage (permanent)** | **Hearing loss** (CN VIII — most common!), vision changes (CN II, III, IV, VI), facial weakness | Early audiology referral, steroids reduce risk, educate family on long-term follow-up |
| **Cerebral Infarct / Stroke** | New focal deficits, hemiparesis, aphasia | Neuro checks, CT/MRI, supportive care, rehab |

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# NCLEX Test Traps ⚠️

Where students lose points

### Trap #1 — "LP first" thinking

Students pick "perform LP" as the first action. **WRONG.** If ↑ICP is suspected, an LP can cause *herniation*. Do a **CT scan first** to rule out ↑ICP — *then* LP.

### Trap #2 — Delaying antibiotics

Blood cultures before antibiotics — but **do not delay antibiotics** waiting on LP results. Cultures → antibiotics within 30 min → LP when safe.

### Trap #3 — Wrong isolation

Bacterial meningitis = **DROPLET precautions**, not airborne. Private room, surgical mask within 3 ft. Airborne is TB/measles/varicella.

### Trap #4 — Overhydration

A dehydrated-looking client gets aggressive fluids, right? **NO.** Cerebral edema + SIADH risk mean *cautious* fluid replacement. Isotonic only, watch $Na^+$.

### Trap #5 — Missing subtle peds signs

Infants often have **NO nuchal rigidity**. Look for bulging fontanel, high-pitched cry, poor feeding, lethargy, hypothermia (not always fever).

### Trap #6 — Forgetting prophylaxis

Close contacts of *N. meningitidis* need **rifampin, cipro, or ceftriaxone** prophylaxis. Household, dorm, intimate contacts, healthcare workers with direct exposure.

### Trap #7 — Rifampin orange urine panic

Orange/red body fluids on rifampin = **expected**, not an adverse effect. Warn the client; remove contacts; not a reason to stop the drug.

### Trap #8 — Steroid timing

Dexamethasone must be given **before or WITH the first antibiotic** dose. After is too late — inflammation cascade already launched.

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# NCJMM Clinical Judgment Framework

Recognize → Analyze → Prioritize → Evaluate

## Recognize Cues

1

**Relevant:** Fever + severe HA + nuchal rigidity + photophobia. Petechial rash. ↓ LOC. Recent URI / ear infection / neurosurgery.

**Irrelevant:** Mild seasonal allergies, old migraine history.

## Analyze Cues

2

Clustered cues point to bacterial meningitis with ↑ICP risk. Petechial rash suggests meningococcal → septic shock risk. Link CSF findings to type.

## Prioritize Hypotheses

3

**Highest priority:** airway compromise from ↓LOC → herniation → death. Next: sepsis/DIC. Then: seizures, SIADH, hearing loss.

## Generate Solutions

4

Droplet precautions · blood cultures · IV antibiotics within 30 min · dexamethasone · CT before LP · neuro checks q1h · seizure precautions · quiet, dim room · monitor $Na^+$.

## Take Action

5

Implement in priority order: ABCs → isolation → cultures → antibiotics → steroids → ICP management. Notify provider for Cushing's triad or rash changes.

## Evaluate Outcomes

6

**Expected:** LOC improves, temp ↓, HA resolves, CSF clears, $Na^+$ stable, no new focal deficits, audiology screen normal. **Unexpected:** seizure, petechiae spreading, ↑ICP → escalate.

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# Patient & Family Education

Discharge teaching that prevents readmission

## 📘 Prevention

- Stay up-to-date on vaccines: **Hib, PCV, MenACWY, MenB**
- College students in dorms, military recruits, travelers to "meningitis belt" (sub-Saharan Africa) → MenACWY required
- Hand hygiene; avoid sharing drinks, utensils, lipstick, toothbrushes
- Treat ear and sinus infections promptly
- Close contacts of meningococcal cases need prophylaxis

## 🏠 Home Recovery

- Complete **full course of antibiotics** (even if feeling better)
- Rest, gradual return to activity — fatigue lasts weeks
- Follow up with **audiology screening** (hearing loss is common)
- Neuro follow-up — watch for cognitive, memory, concentration changes
- Return-to-school clearance from provider

## 🚨 When to Call the Provider

- Fever returns or worsens
- New or worsening headache, neck stiffness
- Confusion, difficulty waking, seizures
- New hearing or vision changes
- Rash that doesn't blanch with pressure

## 💊 Medication Teaching

- **Rifampin:** orange body fluids (urine, sweat, tears) — expected; will stain contacts and clothes; reduces birth control effectiveness
- **Phenytoin:** good oral hygiene (gingival hyperplasia); no abrupt stop; therapeutic level 10–20
- **Dexamethasone:** taper, don't stop abruptly; monitor glucose; signs of infection

# 10 Memory Boosters & Mnemonics

Pattern recognition for test day

## 🧠 Assessment: "MENINGITIS"

**M** – Meningeal signs (Kernig, Brudzinski)

**E** – Elevated temperature

**N** – Nuchal rigidity

**I** – Irritability / altered LOC

**N** – Nausea & vomiting

**G** – Grumpy (photophobia, phonophobia)

**I** – Increased ICP signs

**T** – Tight neck (nuchal rigidity reinforced)

**I** – Irregular respirations (Cushing's)

**S** – Seizures

## 🎯 Nursing Care: "DROPLETS"

**D** – Droplet precautions × 24h after antibiotics

**R** – Reduce stimuli (dim lights, quiet)

**O** – Oxygen & airway management

**P** – Position HOB 30°, neutral alignment

**L** – Lumbar puncture (after CT if ↑ICP suspected)

**E** – Electrolytes & I&O (SIADH)

**T** – Temperature control

**S** — Seizure precautions

## 🩸 CSF: Bacterial vs Viral — "CLOUDY & LOW"

**Bacterial CSF** = **C**loudy, **L**ow glucose, **O**ff-the-charts WBC (neutrophils), **U**pregulated protein, **D**ramatic pressure, **Y**ields bacteria on gram stain.

**Viral CSF** = Clear, normal glucose, lymphocytes.

## 📎 Kernig vs Brudzinski — "KKK / BBB"

**K**ernig → **K**nee → you straighten the **K**nee and they resist.

**B**rudzinski → **B**end the neck → **B**oth knees/hips come up.

## 💊 Classic Triad — "FHN"

**F**ever · **H**eadache · **N**uchal rigidity. If you see all three on NCLEX → **think meningitis first**.

## 🧠 Cushing's Triad (↑ICP) — "BP up, HR down, breathing wild"

↑ Systolic BP (widening pulse pressure) · ↓ HR (bradycardia) · Irregular respirations (Cheyne-Stokes). **This is late — prepare for herniation.**

***Diane's NGN NCLEX 2026 High-Yield Series***

Meningitis · Neurological / Infectious · Priority: Airway, ICP, Sepsis Recognition