

● NGN NCLEX 2026 · ONCOLOGY & SAFETY

Radiation *Therapy* for the NGN NCLEX.

A complete visual study guide to External Beam Radiation (EBRT), Sealed Brachytherapy, and Unsealed (Systemic) Radiation — including nurse safety, client care, and the clinical-judgment cues the examiners love to test.

EXTERNAL BEAM · EBRT

SEALED BRACHYTHERAPY

UNSEALED / SYSTEMIC

TIME · DISTANCE · SHIELDING

01 Definition & Overview

THE BIG PICTURE

EXTERNAL BEAM • EBRT

Aimed From Outside

High-energy **x-rays/beams** are directed at the tumor from an external machine. **Nothing radioactive is placed in or on the client.**

- Also called **beam or x-ray** therapy
- Client is **not radioactive** after treatment
- Safe for family, visitors, and all staff

INTERNAL • SEALED (BRACHY)

Solid Source • In a Cavity

A **solid radioactive implant** (seeds, ribbons, cesium, iridium) is placed inside a body cavity (e.g., cervix) or tissue.

- Client **emits radiation** while source is in place
- **MOST dangerous** to staff & visitors
- Body fluids are **NOT** radioactive

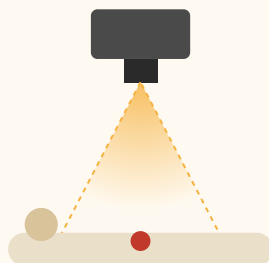
INTERNAL • UNSEALED (SYSTEMIC)

Liquid • Injected or Swallowed

A **radioactive liquid** (e.g., I-131, P-32) is given IV or by mouth and travels through the bloodstream.

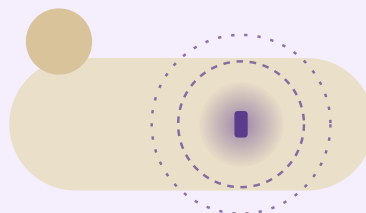
- Body **secretions ARE radioactive**
- Urine, stool, sweat, saliva, tears, emesis
- Gloves & special disposal required

External Beam



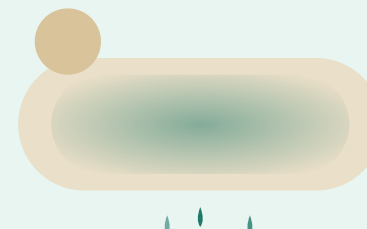
Beam from outside • patient is NOT radioactive

Sealed • Brachytherapy



Implant in cavity • body fluids NOT radioactive

Unsealed • Systemic



Secretions **ARE** radioactive

02 Pathophysiology — How Radiation Kills Cancer

MECHANISM SIMPLIFIED

1

Ionizing Energy

High-energy photons or radioactive decay release energy into rapidly

2

DNA Damage

Energy breaks DNA strands & creates free radicals inside the tumor cell.

3

Cell Can't Divide

Damaged DNA stops mitosis — fast-growing cells are hit hardest (cancer,

4

Apoptosis

Tumor cells die → tumor shrinks. Nearby normal fast-dividing tissue also

dividing cells.

mucosa, marrow).

suffers → side effects.

WHY IT MATTERS

The same mechanism that kills the tumor damages **skin, GI mucosa, and bone marrow** — that is exactly where side effects show up. Healthy slow-dividing cells (muscle, bone) are largely spared.

03 Signs & Symptoms of Radiation

SIDE EFFECTS BY SEVERITY

● Early / Mild (Local)

Pruritus (itching) Erythema (redness) Burning sensation Fatigue
Anorexia Nausea / Vomiting Diarrhea (abd/pelvic fields)
Dry or moist desquamation

● Late / Severe (Systemic)

Sloughing of skin Bone marrow depression ↓ WBC → infection risk 🚨
↓ Platelets → bleeding risk 🚨 ↓ RBC → anemia, fatigue
Fibrosis & tissue scarring Secondary malignancy (long-term)

🚨 RED FLAG PRIORITY

Bone marrow depression (pancytopenia) is the most life-threatening effect. Monitor **CBC** closely — institute neutropenic and bleeding precautions when counts drop.

04 Priority Nursing Interventions

BY MODALITY · ABCS + SAFETY

EXTERNAL BEAM · EBRT

Skin Is the Target Organ

Protect the Skin Marks

Do **NOT wash off** the ink markings. Use **plain water only**, no soap, no scrubbing. **Pat dry** — never rub.

Avoid These on the Field

No ointments with **metals (zinc oxide)**, no **talcum powder**, no perfumes, lotions, deodorants, sunscreen, or heating pads over the treatment field.

Manage Itch & Nutrition

Cornstarch is allowed for itching. Offer small, bland, high-protein meals for anorexia & N/V; monitor CBC for marrow suppression.

SEALED INTERNAL · BRACHYTHERAPY

Time · Distance · Shielding = The 3 Rules

⌚ Time

Limit time in the room to **30 minutes per nurse per shift**. Cluster all care. Talk to client from the **doorway**.

📏 Distance

Stand at the **head of the bed** (radiation falls off rapidly with distance). Private room. No visitors <18 yrs, no pregnant visitors.

🛡️ Shielding

Wear a **lead apron / dosimeter badge**. Keep a **lead container & long-handled forceps** at the bedside. Pregnant nurses **never** assigned.

🚨 IF THE IMPLANT IS DISLODGED

NEVER touch it with your hands — not even with gloves. Pick it up with **long-handled forceps** only, place it in the lead container at bedside, and notify the radiation safety officer immediately.

UNSEALED INTERNAL · SYSTEMIC (E.G., I-131)

Body Secretions Are Radioactive

Contact Precautions

Wear **gloves and gown** when handling urine, stool, emesis, sweat, or linens. Double-flush the toilet.

Special Disposal

Urine and body fluids are disposed of with **radiation safety protocols**; linens & waste stay in the room until cleared by the officer.

Pregnancy Rule

Pregnant nurse **may** provide care — **only if she avoids contact with body secretions**. Sealed implant = **NEVER**.

05 Modality Comparison at a Glance

PHARM-EQUIVALENT REFERENCE

Feature	External Beam (EBRT)	Sealed Internal (Brachy)	Unsealed Internal (Systemic)
Source	External machine (linac, x-ray)	Solid implant in body cavity (cesium, iridium, seeds)	Radioactive liquid IV or PO (I-131, P-32)
Is the client radioactive?	NO — never	YES — while implant in place	YES — secretions radioactive
Nurse danger level	None (unless in treatment room)	HIGHEST 🚫	Moderate — from body fluids
Pregnant nurse assignment	OK	NEVER	MAYBE — avoid fluids
Key protections	Skin care of entry field	Time · Distance · Shielding Forceps + lead container	Gloves + gown for body fluids; special waste disposal
Client positioning	Ambulatory; outpatient	Absolute bed rest · HOB ≤45° side-to-side only	Private room; encourage PO fluids to flush isotope

06 ! NCLEX Test Traps

WHAT STUDENTS MISS



"The client had radiation — wear a lead apron"

False if EBRT. Once the beam is off, the client is NOT radioactive. Lead apron is only required for **sealed** implants. Don't over-isolate an EBRT client.



"Wash off the skin markings before bathing"

NEVER. The ink/tattoos tell the radiation tech exactly where to aim. Use water only, no scrubbing. Losing the marks = missed treatment.



"Pick up a dislodged implant with gloves"

Gloves do **NOT** shield radiation. Use **long-handled forceps** into a **lead container**. Never skin-to-source, even briefly.



"Provide full perineal care to the cesium implant client"

No. Only essential care. Extra perineal care increases exposure time with the pelvis — the source location. Cluster care and limit.



"Use zinc oxide for skin breakdown in the EBRT field"

Contraindicated. Metal-based products (zinc oxide, aluminum in deodorants) scatter the beam and worsen skin reactions. Use **cornstarch** for itch.



"Pregnant nurse can't care for ANY radiation client"

Too absolute. Pregnant nurse: **EBRT = safe**, **unsealed = maybe** (no secretions), **sealed implant = NEVER**. Read the modality carefully.

07 NCJMM Clinical Judgment Scenario

NEXT-GEN CASE STUDY

Case: 58-year-old woman with cervical cancer, Day 1 cesium implant

You walk into the room to give morning medications. The client is tearful and asks, *"Can you sit with me for a while?"* You notice the implant applicator appears slightly displaced on the linen at the foot of the bed, and vital signs are T 101.4°F, HR 108, BP 96/58.

① RECOGNIZE CUES

What stands out?

Fever, tachycardia, hypotension + implant appears dislodged + emotional distress. Three competing issues.

② ANALYZE CUES

Cluster & interpret

Dislodged implant = **staff & client radiation exposure**. Fever + tachycardia + hypotension = possible **sepsis/perforation**. Emotional need is real but not immediate.

③ PRIORITIZE HYPOTHESIS

Which first?

Radiation safety first. Retrieve implant with **forceps** into **lead container** → then rapid assessment → notify HCP & radiation safety officer.

④ TAKE ACTION / EVALUATE

Do & reassess

Secure source, step out, call officer & provider, draw cultures & start IV fluids per order, reassess VS & client emotional state once safe.

NGN PEARL

When the stem combines **radiation safety** with **another acute problem**, radiation containment comes first — because **every second of exposure harms multiple people**, not just the client. Then ABCs. Then emotional care.

08 Patient & Family Education

HOME & DISCHARGE TEACHING

EBRT SKIN CARE

Protect the Treatment Field

- Wash with plain **water only** — no soap
- **Pat dry**; never rub
- No lotion, perfume, deodorant, powder, or heating pad on the field
- **No sun exposure** — cover with loose cotton clothing
- Use **cornstarch** for itching
- Do NOT wash off skin markings

POST-BRACHYTHERAPY

After the Implant Is Out

- Once implant is removed, client is **NOT radioactive**
- Expect vaginal discharge; report foul odor or heavy bleeding
- Resume activity gradually
- Report fever, severe pain, or N/V
- Follow-up pelvic exams as scheduled

RADIOACTIVE IODINE (I-131)

Home Precautions 24–72 hr

- **Flush toilet 2–3 times** after voiding
- Wash hands thoroughly after bathroom use
- Use separate utensils, towels, linens
- Sleep alone; **no close contact** with pregnant women & children
- Increase fluids to flush the isotope
- Avoid kissing & sexual contact for prescribed interval

09 Memory Boosters & Mnemonics

PATTERN RECOGNITION

TDS

The Three Rules of Radiation Safety

- Time** — minimize it (≤ 30 min/shift for sealed)
- Distance** — maximize it (stand at HOB, talk from doorway)
- Shielding** — lead apron, lead container, dosimeter

SUE

Which Radiation Is Most Dangerous?

- Sealed** → highest staff risk
 - Unsealed** → middle (body fluids)
 - External** → safest (not radioactive)
- Alphabetical danger from most → least.*

NO ZAP

EBRT Skin — Things to Avoid

- Zinc oxide & metal-based ointments**
- Antiperspirants/deodorants on the field**
- Powders (talc)** — scatter the beam

FIFE

Report to HCP — Cesium Implant

- Fever** ($>100.4^{\circ}\text{F}$)
- Implant dislodgement**
- Foul vaginal discharge** (infection/perforation)
- Emesis or nausea**

★ ONE-LINE EXAM PEARL

EBRT = skin care. Sealed = shielding. Unsealed = secretions. If you remember only one thing, remember which hazard matches which modality — almost every NCLEX item maps to this pattern.