

PEDIATRIC CARDIAC

ACYANOTIC CHD

NGN NCLEX 2026 • HIGH-YIELD VISUAL REFERENCE

Ventricular Septal *Defect*

The **most common congenital heart defect** — an abnormal opening in the ventricular septum producing a **left-to-right shunt** with increased pulmonary blood flow. Acyanotic at first; can become cyanotic if Eisenmenger syndrome develops.



SOURCE NOTE

VSD was not covered in your uploaded personal notes. Content compiled from standard NCLEX references: *Saunders Comprehensive Review for the NCLEX-RN, ATI RN Maternal Newborn & Nursing Care of Children, Lippincott Pediatric Nursing*, AHA pediatric cardiology guidelines, and AAP recommendations.

1

DEFINITION • OVERVIEW

What is VSD?

- ◆ A **hole in the ventricular septum** — the wall separating the right and left ventricles. Most common congenital heart defect (~20–25% of all CHDs).
- ◆ Classified as an **acyanotic defect** with **increased pulmonary blood flow**. Blood shunts from the higher-pressure **LEFT** ventricle to the lower-pressure **RIGHT** ventricle.
- ◆ Severity depends on size: **small** (often asymptomatic, ~50% close spontaneously by age 2), **moderate**, or **large** (CHF in infancy, requires surgical repair).
- ◆ **Hallmark:** loud, harsh, **holosystolic (pansystolic) murmur at the LEFT lower sternal border (LLSB)** — often with a palpable thrill.

QUICK
STATS

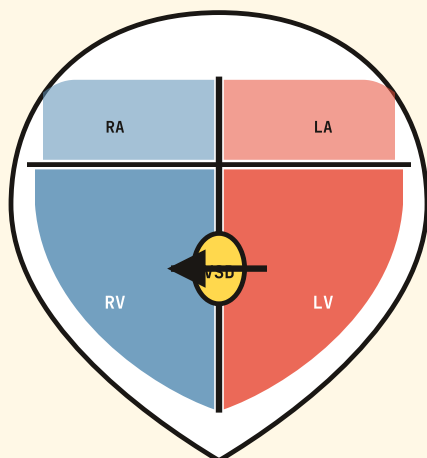
Need-to-Know

- ◆ **Incidence:** 1 in 500 live births; #1 CHD overall.
- ◆ **Direction of shunt:** L → R (acyanotic).
- ◆ **Murmur location:** LLSB (3rd–4th intercostal space).
- ◆ **Murmur quality:** Loud, harsh, holosystolic ± thrill.
- ◆ **Spontaneous closure:** ~50% of small VSDs by age 2.
- ◆ **Gold-standard test:** Echocardiogram.
- ◆ **Surgical fix:** Patch closure (open heart) or transcatheter device.

2

PATHOPHYSIOLOGY

How a Left-to-Right Shunt Hurts the Lungs



L → R shunt through the septal defect

1 Opening exists between the LV and RV.



2 LV pressure > RV pressure → oxygenated blood is pushed **LEFT → RIGHT**.



3 **Increased pulmonary blood flow** → RV and pulmonary arteries are volume-overloaded.



4 Pulmonary congestion → tachypnea, recurrent respiratory infections, poor feeding, failure to thrive.



5 LV is forced to pump more volume → **CHF develops** (usually within first 2 months as PVR drops).



6 Untreated → chronic pulmonary HTN → **EISENMENGER SYNDROME**: shunt reverses to R → L → **CYANOSIS**.

3

SIGNS & SYMPTOMS

Clinical Picture by Defect Size

SMALL VSD (MILD)

- ◆ Often **asymptomatic**; thriving infant.
- ◆ **Loud, harsh holosystolic murmur at LLSB** — only finding.
- ◆ Normal growth, feeding, activity.
- ◆ Many close **spontaneously** by age 2.

MODERATE / LARGE VSD (CHF PICTURE)

RED FLAG 🚩

- ◆ **Tachypnea & tachycardia** at rest.
- ◆ **Diaphoresis with feeds** — classic infant CHF sign.
- ◆ **Poor feeding**, takes >30 min, tires quickly.
- ◆ **Failure to thrive**, poor weight gain.
- ◆ Recurrent respiratory infections / pneumonia.
- ◆ Hepatomegaly, periorbital edema.
- ◆ Murmur may be softer (large defect = less turbulence).

⚠️ LATE • EISENMENGER SYNDROME (IRREVERSIBLE)

- ◆ **Cyanosis** (the previously acyanotic child now turns blue) — shunt has reversed R → L.
- ◆ Clubbing of digits, polycythemia, exercise intolerance.
- ◆ Surgical correction is **no longer possible** once pulmonary HTN is fixed — only heart-lung transplant. This is why early closure matters.

4

PRIORITY NURSING INTERVENTIONS

ABC-Driven Care

- ◆ **AIRWAY / BREATHING:** Monitor **RR, work of breathing, SpO₂**. Position semi-Fowler / upright to ease respiratory effort. Suction PRN.
- ◆ **CIRCULATION:** **Apical pulse × 1 full minute** before every digoxin dose. Hold & notify HCP if HR <90–110 (infant) or <70 (older child).
- ◆ **NUTRITION (huge priority):** **Small, frequent, high-calorie feeds**. Limit feeding to ≤30 min – gavage if infant tires. Use higher-calorie formula (24–30 kcal/oz) per HCP order.
- ◆ **ENERGY CONSERVATION:** Cluster nursing care. Plan rest periods. Hold & comfort during procedures.
- ◆ **FLUID BALANCE:** Strict I&O, **daily weights (same scale, same time, same clothing)**, monitor for edema.
- ◆ **INFECTION CONTROL:** Keep child away from sick contacts. Hand hygiene. Up-to-date immunizations including **palivizumab (Synagis)** for RSV prophylaxis.
- ◆ **MONITOR FOR CHF:** Tachypnea, tachycardia, crackles, hepatomegaly, periorbital edema, weight gain, decreased UO.
- ◆ **POST-OP (after repair):** Monitor chest tube drainage, pain, dysrhythmias (heart block is a known complication of patch closure), incision care.

5

PHARMACOLOGY

The "Triple D" Regimen

Medical management of VSD-related CHF before surgical repair = **Digoxin** · **Diuretics** · **Diet (high-cal)**, plus afterload reduction with ACE-I.

DRUG

Digoxin

Cardiac glycoside ·
↑ contractility, ↓
HR

Furosemide

Loop diuretic · ↓
preload

Spironolactone

K⁺-sparing diuretic

Captopril /

Enalapril

ACE inhibitor · ↓
afterload

DRUG

**Palivizumab
(Synagis)**
RSV monoclonal
antibody

6

NCLEX TEST TRAPS • ⚠️ COMMON CONFUSIONS

Wrong vs. Right Thinking

Trap ✗

"VSD causes cyanosis." Selecting cyanosis as an early VSD finding.

Truth ✓

VSD is **acyanotic**. Cyanosis only appears late if **Eisenmenger syndrome** develops and the shunt reverses to R → L.

Trap ✗

Auscultating the murmur at the apex or upper right sternal border.

Truth ✓

VSD murmur is loudest at the **Left Lower Sternal Border (LLSB)**, 3rd–4th intercostal space — loud, harsh, holosystolic ± thrill.

Trap ✗

Holding digoxin because "the child seems sleepy" without checking the heart rate.

Truth ✓

Always take an **apical pulse × 1 full minute** before every dose. Hold for HR <90–110 (infant) or <70 (older child) and notify HCP.

Trap ✗

Encouraging large, calorie-dense meals to "fatten up" a failure-to-thrive infant with VSD.

Truth ✓

Give **small, frequent feeds** with high-calorie formula. Cap feeding time at 30 minutes — gavage the rest if infant tires.

Trap ✗

Treating diaphoresis with feeds as overdressing or warm room temp.

Truth ✓

Diaphoresis with feeds is a classic sign of CHF in an infant. Report it — it signals the heart is working too hard.

Trap ✗

Assuming a louder murmur = worse defect.

Truth ✓

The **opposite** can be true. Small VSDs make loud, harsh murmurs (turbulent flow). **Large** VSDs may have softer murmurs because pressures equalize. Judge severity by **CHF signs**, not murmur loudness.

7

PATIENT & FAMILY EDUCATION

Teaching the Caregivers

- ◆ **Recognize CHF warning signs:** fast breathing, sweating during feeds, poor weight gain, increased fussiness, fewer wet diapers — *call HCP*.
- ◆ **Feeding strategy:** small frequent feeds, upright position, burp often, limit feeds to 30 minutes, use prescribed high-calorie formula.
- ◆ **Daily weights** at home if instructed — same scale, same time, same clothing. Report sudden gain.
- ◆ **Medication safety:** give digoxin at the same times daily, do NOT give a second dose if vomiting occurs, keep locked away (looks like other meds; toxicity is dangerous).
- ◆ **Infection prevention:** hand hygiene, limit exposure to sick contacts, stay on schedule with vaccines, ask about **RSV (palivizumab)** and flu immunization.
- ◆ **SBE (endocarditis) prophylaxis:** children with unrepaired cyanotic CHD, recently repaired CHD with residual defects, or prosthetic material need antibiotics before dental and certain surgical procedures (AHA guidelines).
- ◆ **Growth & development:** the child can still play and reach milestones — let them self-limit activity rather than imposing strict bed rest.
- ◆ **Post-op care:** incision care, avoid lifting under arms, no rough play / contact sports for several weeks, report fever, drainage, redness.
- ◆ **Genetic counseling:** VSD recurrence risk in future pregnancies is slightly elevated; encourage discussion with HCP.

8

MEMORY
BOOSTERS ·
MNEMONICS

Make It Stick

3 D's

VSD MEDICAL
MANAGEMENT

Digoxin ·
Diuretics ·
Diet (high-
cal, small
frequent
feeds)

L→R

ACYANOTIC

Left → Right
shunt =
**increased
pulmonary
blood flow** =
NO cyanosis
(until
Eisenmenger).

SOS

BEFORE
DIGOXIN

Stop · One
minute apical
· Stop if HR
too low. Hold
& call HCP.

9

NCJMM CLINICAL JUDGMENT SCENARIO · 6
STEPS

Apply the Model: VSD Infant in Clinic

Scenario: A 3-month-old infant with a known moderate VSD is brought to the pediatric clinic for routine follow-up. The mother reports the baby "sweats and breathes really

fast" during feedings and has only gained 4 oz in the past month. Vitals: HR 178, RR 68, SpO₂ 94% on room air, T 37.0°C, weight 4.8 kg (down from 25th to 5th percentile). On auscultation, you hear a loud, harsh holosystolic murmur at the LLSB; lungs reveal fine bibasilar crackles. Liver palpable 3 cm below the right costal margin.

Step 1 • Recognize Cues

What stands out?

- › Tachypnea (RR 68), tachycardia (HR 178)
- › Diaphoresis with feeds + feeding fatigue
- › Failure to thrive (25th → 5th %ile)
- › Crackles, hepatomegaly
- › Harsh holosystolic murmur at LLSB

Step 2 • Analyze Cues

What do they mean?

- › Cues cluster into **infant CHF** secondary to VSD
- › L → R shunt has overloaded pulmonary circulation
- › Caloric demand exceeds intake
- › Crackles + hepatomegaly = pulmonary and venous congestion

Step 3 • Prioritize Hypotheses

What's most urgent?

- › **#1 Decreased cardiac output** r/t L→R shunt
- › **#2 Imbalanced nutrition** r/t fatigue + ↑ metabolic demand
- › **#3 Impaired gas exchange** r/t pulmonary overcirculation
- › **#4 Risk for infection** (RSV / pneumonia)

Step 4 • Generate Solutions

What options work?

- › Start/optimize **digoxin + furosemide ± ACE-I**
- › High-calorie formula (24–30 kcal/oz); small frequent feeds <30 min; gavage if tires
- › O₂ as needed; semi-Fowler positioning
- › Cluster care; rest periods
- › Refer to pediatric

Step 5 • Take Action

What do you do NOW?

- › Position semi-Fowler; assess work of breathing
- › Notify HCP / cardiologist of FTT + worsening CHF
- › Give scheduled digoxin **after apical × 1 min**
- › Give furosemide; check K⁺ before dose
- › Teach mother feeding plan; weigh daily; log feeds

Step 6 • Evaluate Outcomes

What tells you it worked?

- › RR < 60, HR trending down toward baseline
- › Weight gain ≥ 20–30 g/day
- › Crackles clearing; liver edge receding
- › Feeds completed in ≤ 30 min without diaphoresis
- › Mother verbalizes warning signs & med plan

cardiology —
surgical
closure likely

› Schedule
echo &
cardiology
referral

› Definitive
resolution:
**surgical
patch closure**

NGN NCLEX 2026 • PEDIATRIC CARDIAC • ACYANOTIC CHD

VSD • L → R SHUNT • ↑ PULMONARY BLOOD FLOW

VISUAL STUDY LIBRARY — PRINT READY