

# Cardiac Evaluation of the Newborn



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## KEYWORDS

- Term newborn cardiovascular examination
- Term newborn with congenital heart disease (CHD)
- Common types of neonatal congenital heart disease
- Pulse oximetry screening
- Critical congenital heart disease (CCHD)

## KEY POINTS

- Although congenital heart defects can be diagnosed using fetal cardiac ultrasonography, some defects can be challenging to identify.
- Even with a careful complete physical examination, some infants seem normal and are discharged home undiagnosed.
- The persistence of fetal channels can mask the presence of critical congenital heart disease, and the rather short postpartum hospital stay contributes to the diagnostic challenges.
- It is essential for the examiner to use all physical examination skills, including inspection, palpation, and auscultation, and to perform more than one physical assessment before discharge or shortly thereafter.
- The recent introduction of Pulse Oximetry Screening has been an extremely helpful adjunct in assisting with the diagnosis of CCHD.

## CARDIAC EVALUATION OF THE NEWBORN

The approach to the cardiac evaluation of a newborn can be challenging. As a result, many pediatricians report that they often feel uncomfortable when it comes to differentiating the normal from the abnormal state with regard to a newborn's

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cardiovascular examination. It is the authors' goal for this article to provide the reader with the background knowledge that will make the cardiac evaluation of newborns less intimidating and assist the general pediatrician in understanding, detecting, and treating a newborn with congenital heart disease (CHD).

CHD is the most common congenital disorder in newborns, occurring in approximately 8 out of 1000 live births, and is responsible for almost 30% of infant deaths related to birth defects. Of those children with CHD, about 1 in 4 (25%) babies born with a heart defect will have critical CHD (CCHD), defined as needing intervention within the first year of life.<sup>1-3</sup>

Although CHD can be diagnosed using fetal cardiac ultrasonography, some defects can be challenging to identify. Similarly, even with a careful complete physical examination, some infants seem normal and are discharged home undiagnosed. The persistence of fetal channels can mask the presence of CCHD, and the rather short postpartum hospital stay contributes to the diagnostic challenges. Thus it is essential for the examiner to use all physical examination skills, including inspection, palpation, and auscultation, and to perform more than one physical assessment before discharge or shortly thereafter. The recent introduction of pulse oximetry screening (POS) has been an extremely helpful adjuvant in assisting with the diagnosis of CCHD before signs of decompensation occur.<sup>4</sup>

### **Initial Evaluation**

The first step in the assessment of the newborn infant's cardiovascular system is a careful review for conditions that are associated with an increased risk of CHD (**Table 1**). The presence of any of these factors should raise the index of suspicion, but a complete physical examination should be performed regardless.<sup>5-7</sup>

### **Inspection and Palpation of the Skin and Mucous Membranes**

The color of the skin and briskness of capillary refill can be indicators of the adequacy of oxygenation and cardiac output. The mucous membranes of a normal newborn should be pink. This is usually checked by looking at the tongue and lips. When light

**Table 1**  
Common conditions associated with CHD

<b>Maternal</b>	<b>Perinatal</b>
Diabetes	TORCH infection
Obesity	Premature delivery <37 wk
Hypertension	Genetic/chromosomal disorders
Systemic lupus erythematosus	VACTERL
Epilepsy	Omphalocele
Influenza or flulike symptoms	Congenital diaphragmatic hernia
First-trimester smoking	
Maternal thyroid conditions	
Maternal CHD	
Maternal alcohol/medication use	
Multifetal pregnancy	

*Abbreviations:* TORCH, toxoplasmosis, other agents, rubella, cytomegalovirus, herpes simplex; VACTERL, vertebral, anal, cardiac, tracheal, esophageal, renal, and limb.

*Data from Refs.*<sup>1-3,5</sup>

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