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# Pulse oximetry screening of critical congenital heart defects in the neonatal period. The Spanish National Neonatal Society recommendation☆

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**Abstract** Due to its severity, as well as the consequences of a late diagnosis, critical congenital heart defects (CCHD) represent a challenging situation, making an early diagnosis necessary and ideally before symptoms appear when circulatory collapse or death of the newborn can occur.

Due to this, a prenatal and very early postnatal diagnosis is very important. Prenatal ultrasound screening and physical examination of the newborn can miss a considerable number of CCHD cases. Pulse oximetry screening has been demonstrated to be an effective, non-invasive, inexpensive, and well accepted tool in the early diagnosis of CCHD.

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The Spanish National Society of Neonatology, through its Standards Committee, and based on the current evidence, recommend the implementation of pulse oximetry screening of CCHD in Spain, and then to offer the best therapy possible to these newborn infants.


**PALABRAS CLAVE**
Cribado;
Cardiopatías congénitas;
Recién nacidos;
Pulsioximetría

**Cribado de cardiopatías congénitas críticas en el periodo neonatal. Recomendación de la Sociedad Española de Neonatología**

**Resumen** Debido a su gravedad y a las consecuencias de un diagnóstico tardío, los defectos cardíacos congénitos críticos (DCCC) representan un reto, por lo que es necesario su diagnóstico muy precoz, idealmente antes del comienzo de los síntomas clínicos, que normalmente preceden al colapso circulatorio o muerte del recién nacido.

Por ello es importante su diagnóstico prenatal y posnatal muy precoz; sin embargo, tanto el diagnóstico por ecocardiografía foetal como la exploración física del recién nacido pueden ser insuficientes para diagnosticar un número importante de estos DCCC. El cribado de DCCC mediante el uso de pulsioximetría ha demostrado ser un método eficaz, no invasivo y de bajo coste, además de bien tolerado, para detectar a recién nacidos asintomáticos y afectos de DCCC en las primeras horas después del nacimiento.

La Sociedad Española de Neonatología, a través de su Comisión de Estándares, hace una recomendación, basada en la evidencia actual, para la implementación en nuestro medio de la pulsioximetría como cribado neonatal de DCCC, y poder ofrecer a estos recién nacidos el mejor tratamiento posible en cada caso.


## Introduction

In 2011, the United States Department of Health recommended the use of pulse oximetry (PO) for screening of critical congenital heart defects (CCHDs),[1] followed by the development of consensus guidelines by a work group.[2,3] Providers from different countries are advocating for recommending such screening in Europe.[4]

This document of the Standards Committee of the Sociedad Española de Neonatología (Spanish Society of Neonatology) endorses the recommendation of screening full term or late preterm newborns who are asymptomatic and do not require admission to a neonatal unit. The purpose of this measure is to reduce the risk of delays in the diagnosis of CCHDs, defined as congenital heart defects requiring invasive intervention or resulting in death in the first 30 days of life.[5]

## Methods

We conducted a systematic review, searching for sources by means of MeSH and free text terms in the Medline and ISI Web of Knowledge databases.

We determined the quality of the evidence and the strength of recommendation according to the levels of evidence established by the Oxford Centre for Evidence-Based Medicine (http://www.cebm.net) and the grades of recommendations established by the Canadian Task Force on Preventive Health Care.[6]

## Rationale for screening

The incidence of moderate and severe congenital heart defects is of 6 in 1000 live births (19/1000 with the inclusion of bicuspid aortic valve), while the overall incidence of congenital heart disease is of 75 in 1000 live births.[7]

The reported incidence of CCHDs ranges between 2.3 cases in 1000 live births and 1 case in 26,000 live births (25% of the total).[5,7] The diagnosis of CCHDs is delayed in 30% of cases.[8]

There is evidence that the sensitivity of foetal echocardiography is low (68.1%; 95% CI, 59.6–75.5).[9] While the diagnostic yield of prenatal echocardiography may be higher in some facilities, their experience cannot be generalised,[10,11] and a study conducted in a population similar to that of Spain found that only 60% of cases of CCHDs were detected prenatally by this method.[12]

The physical examination fails to detect up to 20–30% of CCHDs.[13,14] Heart murmurs are not always present in CCHDs, and may occur in up to 60% of healthy newborns.[15,16] Visual assessment of newborn colour is not effective for the detection of hypoxaemia.[17,18]

The combination of prenatal ultrasound and physical examination may fail to detect between 29.5%[8] and 20%[12] of CCHDs.