

## 新生儿筛查血氧不足 (先天性心脏缺陷、败血症和肺炎)



# 早期诊断：建立一个新生儿的健康筛查系统 这一切都始于一个婴儿



Eve Isley Saarinen  
出生日期: 12/12/08  
6 lbs, 9 oz; 9 APGAR  
诊断: CCHD, 48小时

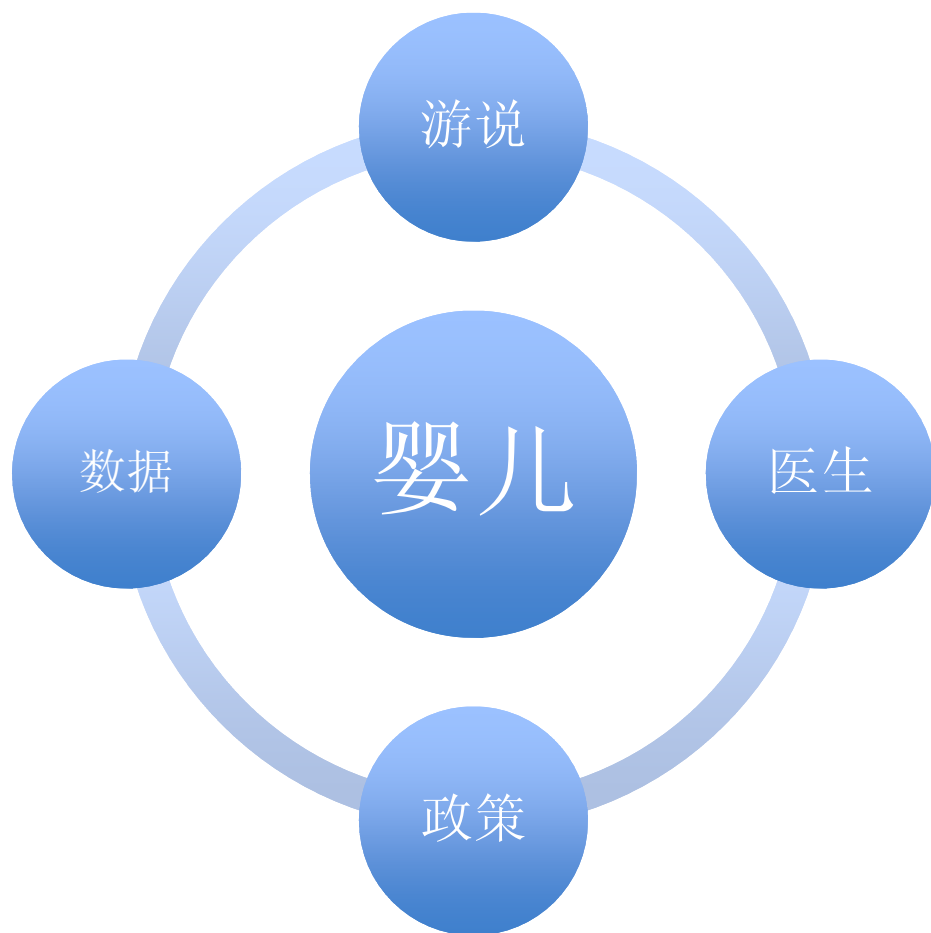
# How Saving Eve Is Saving Other Newborns With Heart Conditions

FAIRVIEW SYSTEM, APRIL 4, 2013



**Eve Isley Saarinen was born at Fairview Southdale Hospital with two serious heart defects. Eve is alive and well today and, with her mom, is ensuring other babies are diagnosed early through use of pulse oximetry screening.**

## 早期诊断：建立一个新生儿的健康筛查系统



## 早期诊断：建立一个新生儿的健康筛查系统

英国2008年对历年数据统计结果显示：  
669名CCHD患儿，其中超过1/3是在出院后确诊、  
1/6是婴儿患病死亡后确诊的

产前诊断- 55(8%)

有症状的- 416(62%)

无症状、出院后确诊

——活着- 168(25%)

——死亡- 30(5%)



数据



# 早期诊断：建立一个新生儿的健康筛查系统

美国疾控中心的最新研究预计近1/3的患有危重先天性心脏病的新生儿在出生后三天内确诊；这归功于婴儿出生后常规筛查的血氧测量。



数据

## Late Detection of Critical Congenital Heart Disease Among US Infants Estimation of the Potential Impact of Proposed Universal Screening Using Pulse Oximetry

**FREE** **ONLINE FIRST**

Cora Peterson, PhD<sup>1,2</sup>; Elizabeth Ailes, PhD, MPH<sup>1,3</sup>; Tiffany Riehle-Colarusso, MD, MSE, MPH<sup>1</sup>; Matthew E. Oster, MD, MPH<sup>1,4</sup>; Richard S. Olney, MD, MPH<sup>1</sup>; Cynthia H. Cassell, PhD<sup>1</sup>; David E. Fixler, MD, MSc<sup>5</sup>; Suzan L. Carmichael, PhD<sup>6</sup>; Gary M. Shaw, DrPH<sup>6</sup>; Suzanne M. Gilboa, PhD, MHS<sup>1</sup>

[\[+\] Author Affiliations](#)

*JAMA Pediatr.* Published online February 03, 2014. doi:10.1001/jamapediatrics.2013.4779

Text Size: [A](#) [A](#) [A](#)



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First author	Years	CCHD				Missed CCHD		
		live born		/1,000 live births	deaths	n	% CCHD	% deaths
		prenatal Dx	postnatal Dx					
Aamir [19]	1999–2004	18	94	0.2	–	47	50	–
Abu-Harb [22]	1985–1990	–	–	–	185	56	–	30
Brown [4]	1999–2002	56	230 <sup>1</sup>	–	–	73	32	–
Chang [21]	1989–2004	–	–	–	898	152	–	17
de Wahl-Granelli [6]	2004–2007	2	60 <sup>2, 3</sup>	1.3		19	32	
		9	109 <sup>4</sup>	1.0		28	28	
Koppel [16]	1989–1999	9	11	1.8		3	27	
Kuehl [20]	1981–1989	–	4,390	–	800	76		9.5
Liske [17]	2000–2002	–	62 <sup>5</sup>	2.78	–	15	25	–
		–	110 <sup>6</sup>	–	–	–	–	–
Meberg [23]	2005–2006	31	50 <sup>7</sup>	1.2	–	6	12	–
		7	48 <sup>8</sup>			11	23	
Mellander [24]	1993–2001	–	259 <sup>9</sup>	–	–	51	20	–
Schultz [25]	2000–2003	31	45 <sup>10</sup>	–	–	12	27	–
Wren [15]	1985–2004	55	614	0.97	–	198	32	15 <sup>11</sup>

Hoffman, J. It is time for routine neonatal screening by pulse oximetry. *Neonatology* 2011;99:1-9

## 早期诊断：建立一个新生儿的健康筛查系统

先天性心脏病是最常见的出生缺陷和新生儿致死率最高的原因 (9/1,000活产儿)

其中超过四分之一的孩子患有危重先天性心脏病,在出生一个月后需要手术或介入治疗

“三分之一患有潜在威胁生命的心血管畸形的新生儿在出院前未发现。提高产前诊断率和普及脉搏血氧仪的使用可以提高早期诊断率。”

*Wren, Arch Dis Child 2008, 93:F33-5*




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## 早期诊断：建立一个新生儿的健康筛查系统

- 先天性心脏病的产前诊断
- 产前超声诊断检出率低于50%，在农村地区则更低
- 单心室畸形的检出率最最高
- 双心室畸形的检出率不到30%
- 产前诊断检出率地域和人口基数差异大



医生

*“Standard prenatal ultrasound is failing to show heart disease in most fetuses.”*

*Prenatal Detection of CHD in Nevada,  
Pediatr Res. 1995;37:216A, Kao, et al:*



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## 早期诊断：建立一个新生儿的健康筛查系统

### Detection of CCHD Lesions (SpO<sub>2</sub> ≤ 95%)

CCHD Lesion	Total	Percent Detected
DORV	3/3	100
HLHS	5/5	100
PA	5/5	100
d - TGA	9/9	100
TAPVC	6/7	85.7
Truncus	7/8	87.5
TA	1/1	100
AA/AS	3/4	75.0
TOF	9/13	69.2
AVSD	4/5	80.0
CoA	8/15	53.3
PS	2/6	33.3



## 早期诊断：建立一个新生儿的健康筛查系统

新生儿死亡的主要原因：

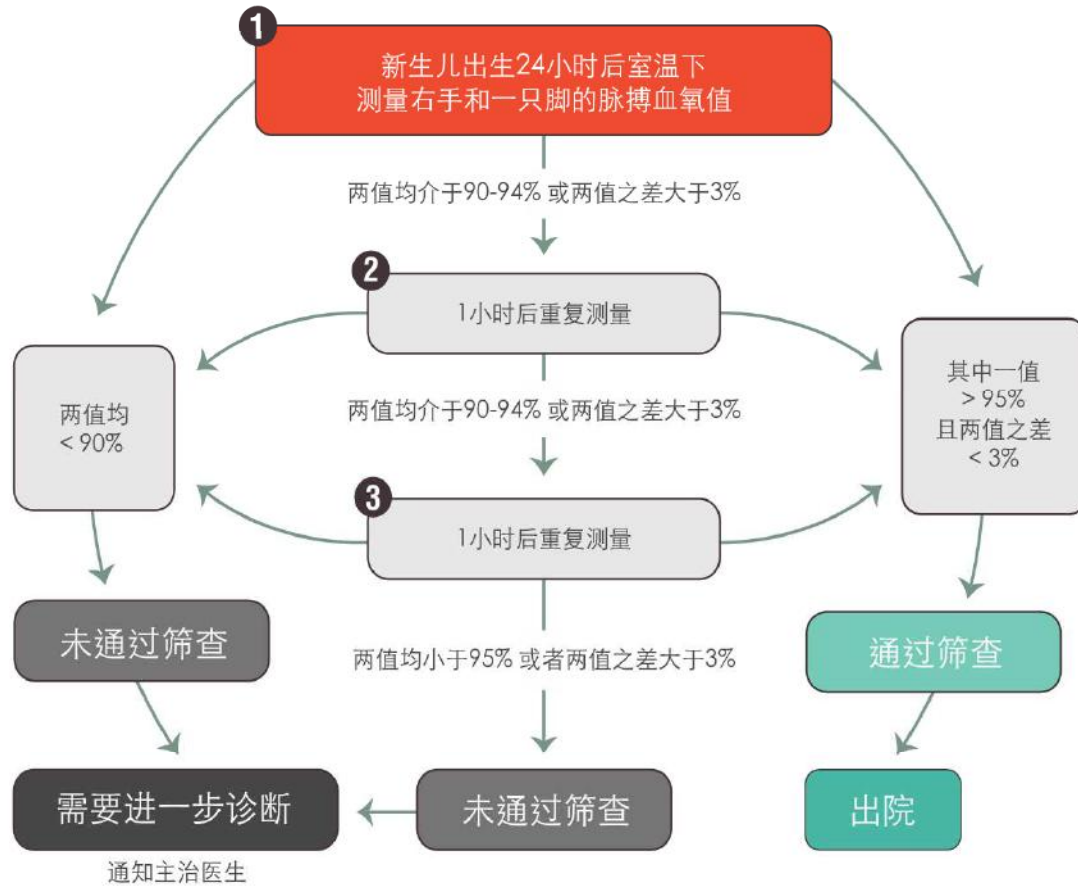
- 早产
- 窒息
- 感染
- 出生缺陷

早期诊断：

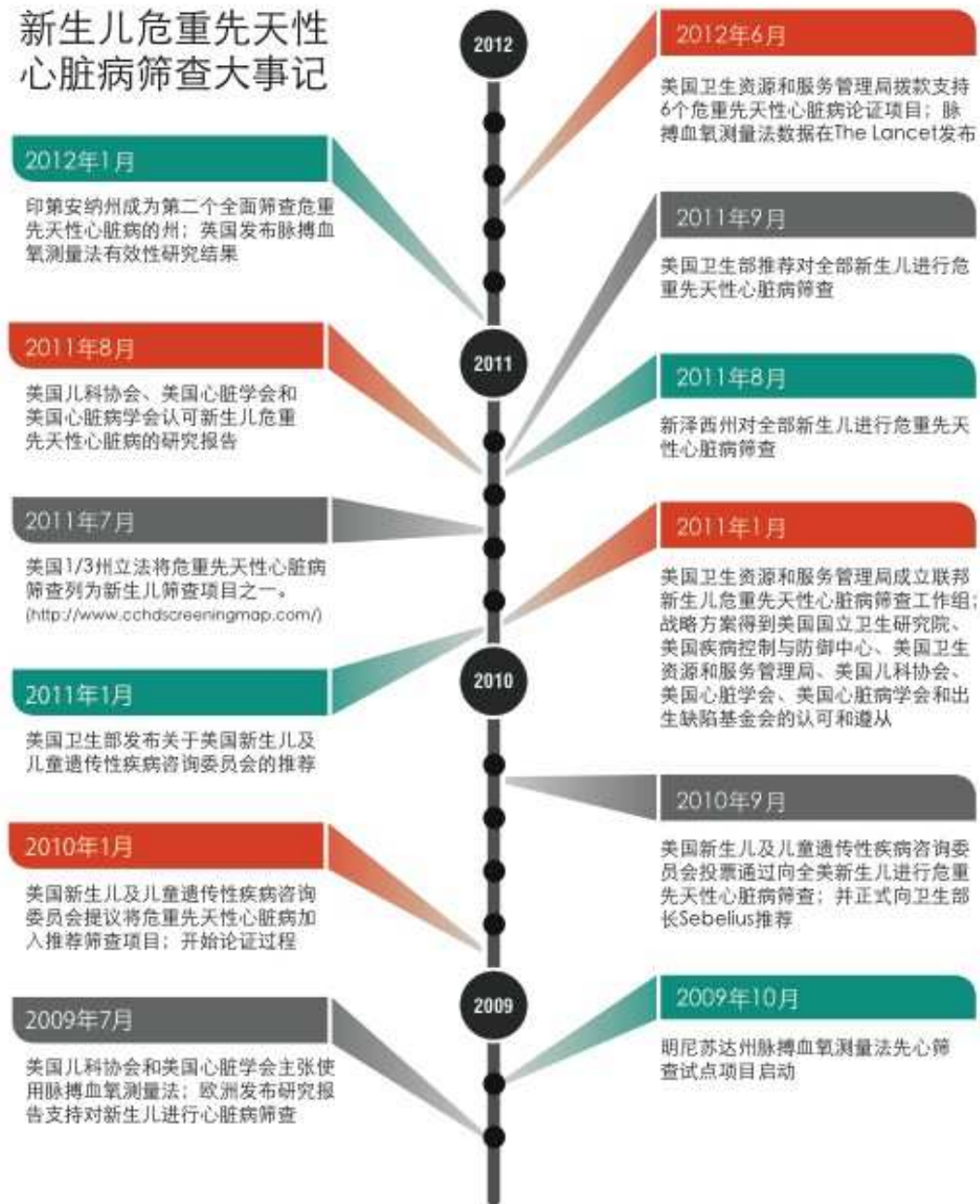
- 降低新生儿死亡率和发病率
- 稳定病情
- 提高转诊信息
- 改善治疗设施



# 脉搏血氧测定法筛查危重先天性心脏病



# 新生儿危重先天性心脏病筛查大事记

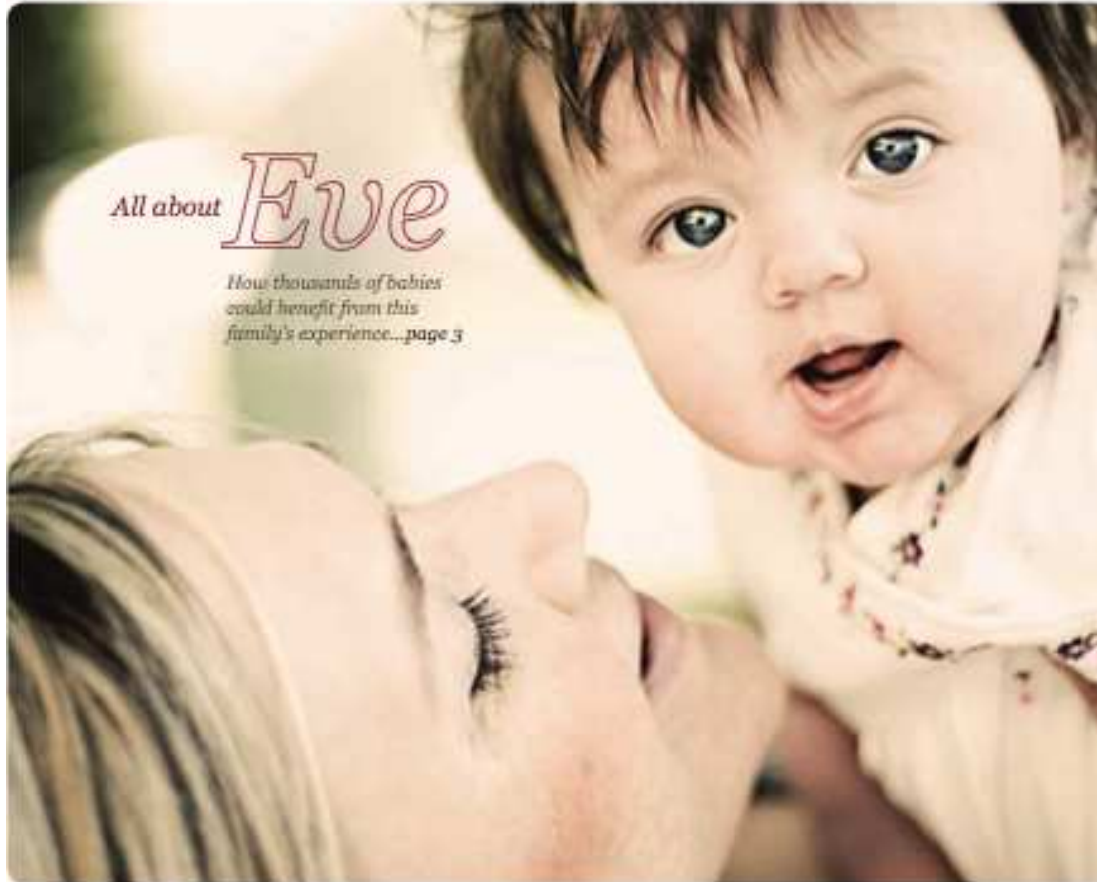






UNIVERSITY OF MINNESOTA  
Amplatz Children's Hospital

# THE HEART CENTER UPDATE



## All about *Eve*

How thousands of babies could benefit from this family's experience...page 3



## The New York Times

### A Mother's Fight for Newborn Hearts

By DARSHAK SANGHAVI, M.D.



Family

As a pediatric cardiologist, I had grown increasingly concerned over the years about the many seemingly healthy newborns who left the hospital, only to return a few hours or days later in shock as a result of undetected heart problems. Two years ago, I wrote about the problem on the Well blog in an article, "[Screening Babies for Broken Hearts](#)," in which I described a simple, cheap and painless screening test to check newborns for potentially lethal heart defects.

5

Offering A New  
Transcatheter  
Heart Valve

4

The Adult Congenital  
Heart Disease Program:  
Expanded Hours and  
Increased Staffing

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A New Outlook for Baby Oliver.....	9
CME.....	see insert



## 早期诊断：建立一个新生儿的健康筛查系统

缩小差距、降低医疗费用和改善健康状况、及早干预早期诊断发现的**心脏缺陷**和其他疾病，例如新生儿败血症和肺炎

提供低成本、快捷、易操作的测试方法测量新生儿的血氧饱和度

促进有依据和可操作性强的测试推广

为医院、妇产中心、临床医生、公共卫生部门和政策制定部门提供成本和效果数据

减少不必要的转院



# 新生儿筛查在政策领域的推广和普及

对培训者进行培训的模式  
筛后随访和护理网络

Grand Rounds: Children's Hospitals & Clinics

Newborn Screening for Critical Congenital Heart Disease (CCHD): Primer for Pediatric Care

*Lazaros Kochilas, MD, MPH, Associate Professor of Pediatrics, University of MN Ampatz Children's Hospital*

*Annamarie Saarinen, MA, Chair, Newborn Coalition/1in100, Policy Principal, Ainsley Shea*

*Amy Gaviglio, MS, CGC, Short Term Follow-Up Supervisor, Minnesota Department of Health, Newborn Screening Program*



# PEDIATRICS®

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## **Implementation of Critical Congenital Heart Disease Screening in Minnesota**

Lazaros K. Kochilas, Jamie L. Lohr, Eric Bruhn, Emily Borman-Shoap, Becky L. Gams, Mary Pylipow, Annamarie Saarinen, Amy Gaviglio and Theodore R. Thompson

*Pediatrics*; originally published online August 19, 2013;  
DOI: 10.1542/peds.2013-0803

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/early/2013/08/13/peds.2013-0803>



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# Newborn HeartConnect China Project

"Such a program (newborn screening) helps secure a newborn's right to health, but by 2009, only 57 percent of Chinese babies were screened, lagging far behind western countries."

*~ Zhu Jun, Director of the National Maternal and Child Health Surveillance Office, Ministry of Health, People's Republic of China*

In 2011, the U.S. Department of Health and Human Services endorsed adding newborn screening for Critical Congenital Heart Disease (CCHD) to the Recommended Uniform Screening Panel.

The American Academy of Pediatrics, American Heart Association, American College of Cardiology, March of Dimes and the Newborn Coalition recommend all newborns be screened for CCHD.



Nurses attend newborn babies at the maternity department of No.1 People's Hospital in Xiangfan City, central China's Hubei Province.







2013年4月- 四川 北京

Inaugural China Summit on Newborn Screening and Early  
Detection of Congenital Heart Disease



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宿霧、菲律賓  
Vincente Sotto Memorial Medical Center





## Resources

Downloadable nurse / hospital training video

Univ of Minnesota Amplatz Children's / Minnesota Department of Health / Newborn Foundation

[newborn-foundation.org](http://newborn-foundation.org)

<http://vimeo.com/51325521>



Annamarie Saarinen  
新生儿基金会  
newborn-foundation.org  
[annamarie@newborncoalition.org](mailto:annamarie@newborncoalition.org)  
+1.612.964.6728

