

doi:10.1093/eurheartj/ehy489

## Are all children born the same?

**Roberto Ferrari discusses the European Heart for Children Foundation that is addressing the plight of children born with congenital heart disease in some less affluent countries**

European Heart for Children



Let's for one moment imagine you are taking a stroll on a lovely sunny day. You are wearing an expensive suit and a new pair of shoes. You are passing a lake and you see a small child who looks like he is drowning. What would you do? You know that jumping into the lake would ruin your expensive suit and new shoes. However, we *are sure* that this would not even cross your mind as you try to save the drowning boy because human instinct is to want to help.

The problem is that the lake is a metaphor for the poverty which we see on a daily basis and a very small number are willing to sacrifice their expensive suit and new shoes. Some people pretend not to see whilst some are even oblivious to the lake's existence at all. Sadly, there are millions of children that are waiting to be saved by someone. Some of these are literally drowning with pulmonary oedema or lack of oxygen. These are the children from some countries who are born with congenital heart disease and are waiting to be saved by an operation or intervention, which unfortunately, will never materialize (Figures 1–4).

European Heart for Children (EHC) can perform an open heart surgery or three percutaneous interventions for the same cost as a suit and shoes!

### Inequalities worldwide and within the European Society of Cardiology family

The European Society of Cardiology (ESC) is a federation of 56-member national cardiac societies and 48 affiliated cardiac societies, each with its own national health system and of course, economic status. European Society of Cardiology is a world leader in the discovery and dissemination of best practices in cardiovascular medicine using many different educational tools and Guidelines, fully aware that there are differences and that the level of care provided is markedly although not exclusively, related to the financial status of the country.<sup>1,2</sup> In other words, inequalities are part of our everyday life and the recent issues/problems related to immigration highlight these disparities.

This is of course, an old problem and not the scope of this report. It is a fact that we are not all born the same. However, if this can be



**Figures 1–4** Children awaiting interventions during various EHC missions.

This is why EHC was created but it is not its ultimate objective.

Regrettably, children continue to drown in some countries. Saving 1 or 2 at a time is obviously good but what about the others? To solve the problem at least partially, one would need to eliminate the lake, which is easier said than done, or build a unit near it which saves as many children as possible. This is the ultimate goal of EHC: building a unit that is able to care locally for these children in danger.

accepted on a national scale, when it comes to children, it is difficult to accept that some were born in the wrong part of the world, are vulnerable and therefore cannot be saved. They have no concept of inequalities and are just hoping and praying that someone will jump in and rescue them. Saving these children would actually be possible as, contrary to cancer or other pathologies, congenital heart disease can be effectively treated, allowing the child to go on and live a normal life.

That is why, 9 years ago, EHC was created by a group of people closely linked to the ESC.

## About European Heart for Children

It goes back 9 years. It was Claudia Florio, wife of Roberto Ferrari at that time President of the ESC, who realized that the ESC mission to 'reduce the burden of cardiovascular disease' could not be achieved in a large number of the member countries. With the help of the ESC CEO, Isabel Bardinet and François Heraud, CFO at the time, a separate Foundation (fond de dotation) was created and named European Heart for Children. Although separate entities, the ESC and EHC are linked in many ways.



Claudia Florio

Isabel Bardinet

The EHC Board consists of three ESC Past Presidents: Roberto Ferrari, Michel Komajda, and Fausto Pinto together with Claudia Florio, who is acting President. The Project Committee is chaired by another Past ESC President, Panos Vardas and the members are Alain Deloche, Alessandro Frigiola, Sir Magdi Yacoub, and Steen Dalby Kristensen—all ESC members.

The Foundation is located at the Heart House in Nice and administered by the same accountants used by the ESC and audited by the same auditors: Ernst and Young. The ESC provides a donation every year and a free booth during the Annual Congress where EHC related merchandise is sold (Figure 5).

During the Congress, EHC organizes a fundraising dinner where national and affiliated societies and affiliations participate. Namely, the constituent bodies of the ESC! In 2018, the dinner was held in Munich on Monday 27 August at Zum Augustiner, a typical Bavarian ale house with entertainment provided by Ugo Saner and his jazz band, well-known figures within the ESC (Figure 6).

## What has been achieved over the past 9 years?

We are very lucky to have been able to jump into several lakes, supporting 26 missions in various ESC member countries during which 2218

children were examined, diagnosed, and treated and 306 successfully operated on. The children ranged from 2 months to 14 years of age with many diagnoses including transposition of the great arteries, Tetralogy of Fallot, pulmonary stenosis, patent ductus arteriosus, atrio-ventricular septal defects, and more. Indirectly, EHC has also contributed by donating six echocardiography machines—three in Egypt and one in Syria, Morocco, and Romania, respectively. European Heart for Children has also trained two cardiac surgeons, two cardiologists, and six nurses.

## Other European Heart for Children projects

In 2017, we contributed 100 000 Euros towards the construction of an auditorium and research centre at the Aswan Heart

Centre in Egypt, together with Professor Sir Magdi Yacoub and Chain of Hope.

Figure 7 shows progress on another important project which is ongoing with Bambini Cardiopatici nel mondo and Alessandro Frigiola with the University of Ibadan in Nigeria. We were asked by the university to provide a training centre for young doctors from Nigeria who aspire to become paediatric cardiologists. Education is a priority for the ESC, as it is for EHC, and this is why both the Project Committee and the Board agreed to co-fund the construction which has now reached the 3rd floor and is expected to be completed by the end of 2018.

This project complements another, comprehensive programme that Bambini Cardiopatici nel Mondo is conducting in Africa called 'Children Heart for Africa', and EHC is also participating in this initiative. Africa is a continent with a major lack of paediatric cardiology centres which are able to care for coronary artery disease. The situation is really dramatic: in Europe there are 105 active centres for 700 million inhabitants. In Africa, just five centres exist for 1.1 billion inhabitants. These numbers make every mission impossible! However, we cannot just observe this huge inadequacy and do nothing. The idea is to take advantage of the existing centres to provide local tutoring using an e-learning programme which will be managed by a cooperation of European centres. The project has obtained approval from the European Union.



**Figure 5** EHC booth at ESC Congress.



**Figure 6** Zum Augustiner, Munich. Fundraising dinner venue.



**Figure 7** EHC Centre construction in Ibadan, Nigeria.

But, if EHC is co-participating in all of these initiatives, the goal is to conduct a stand-alone project in Morocco, an ESC national society.

## The EHC Casablanca initiative

The Kingdom of Morocco has a population of 33 million inhabitants. It is estimated that every year 5000 children are born with congenital

heart disease who can be treated (for some minor pathologies) in a public centre in the capital Rabat, and in a private Centre in Casablanca, at a prohibitive cost. During a mission in 2010, at the Chu Ibn Rochd Public Hospital, the idea to build a dedicated centre was born, with immense support from Prof. Aziz Alami Aroussi, the Chief of Cardiac Surgery and Prof Alessandro Frigiola. Thereafter, EHC conducted other missions and started the long and immensely

bureaucratic journey to obtain a formal commitment from the leadership of the hospital and the university. This finally arrived in 2016 with an official signed declaration of interest (Figure 8). Thereafter, land was identified in the proximity of the current adult cardiac department. Plans were drawn for a four-storey building with 20 beds, one intensive

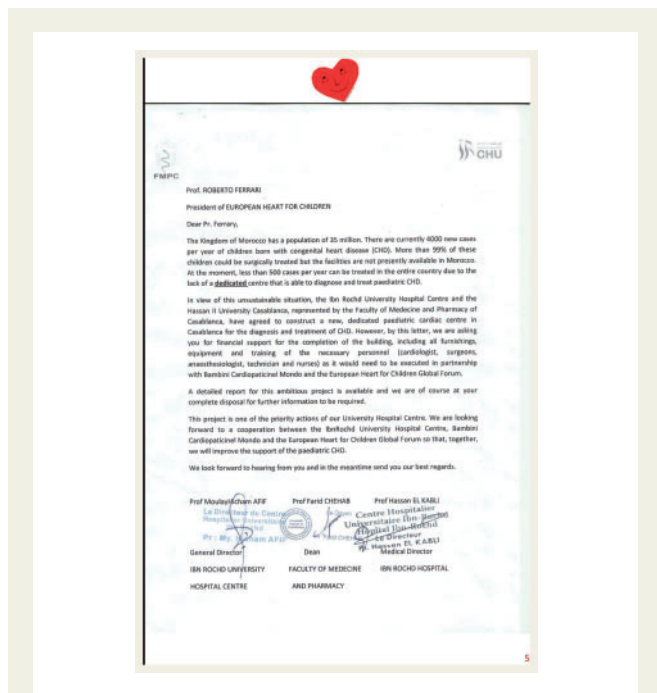


Figure 8 Signed declaration of interest.



Figure 9 Plans for paediatric unit in Morocco.



Figure 10 External façade of paediatric unit in Morocco.

care unit, one catheterization room, and two surgical rooms which were approved by the University (Figure 9). In the meantime, the local Foundation, Lalla Salma, showed an interest in co-financing the construction. The necessary building permissions were obtained, and tenders have been conducted. Construction commenced in July 2018.

European Heart for Children is responsible for obtaining all of the equipment and organizing the necessary medical training which has already started at the Hospital San Donato Milanese, under the guidance of Alessandro Frigiola. One million Euros have been assigned to the project and once completed, the centre will provide free medical care for the children of Morocco and neighbouring countries (Figure 10). It is estimated that the centre will be able to provide up to 300 open heart operations and 700 interventions each year. Eight years on from the idea to actual construction seems a long time but it isn't. After all, EHC is only 9 years old!

Thank you for reading about us and for supporting us.  
<http://www.europeanheartforchildren.com>

**Conflict of interest:** The authors declare that EHC initiatives are conducted in the absence of any commercial or financial



relationships that could be construed as a potential conflict of interest.

## References

References are available as [supplementary material](#) at *European Heart Journal* online.

doi:10.1093/eurheartj/ehy493

# The heart in the human foetus

## An additional perspective from history on who first wrote that the heart was the first functioning organ to develop during embryology

We have read the article written by Tajik *et al.*<sup>1</sup> on the heart in embryology with great interest and enjoyed this attractive subject about the first person who discovered the first functional organ formed during the development of the human foetus.

According to the authors, Avicenna (980–1032 AD), was the first physician who had considered the heart as the first functional organ formed during vertebrate development. Also, it was discussed that there are three opinions by different scientists about the first organ in the foetus, the brain and eyes (by Hippocrates), the liver (by an unknown person), and the heart (by Avicenna). Additionally, it was mentioned that Avicenna believed that observations on chicken eggs are not a reliable documentation for investigating this matter.<sup>1</sup>

The presented data were based on Avicenna's words in his great medical text book, *The Canon of Medicine*. But, by reviewing other medical history textbooks, further historical points about discovering the first functional organ that is formed during vertebrate development can be found.

It appears that there was disagreement between scientists and physicians about the first functional organ formed during vertebrate development before Avicenna. Ali-ibn-Raban Tabari (808–864 AD), a Persian physician noted that the heart is the first organ formed in the foetus, in his famous book, *Firdos-al-Hikmah*, which was published about 200 years before *The Canon of Avicenna*.<sup>2</sup>

Many centuries before, in 384–322 BC, the Greek philosopher, Aristotle, described an observation on chicken eggs and noted a blood spot area that appeared 3 days after the chicken laid on the eggs. So he stated that this bloody spot would become the heart, and therefore the heart was formed prior to other organs in his belief. Aristotle extended this finding to the human foetus, based on his theory of organ similarity which is discussed in his book *The Generation Animalium*.<sup>3</sup>

Mohammad ibn-Zakaria Razi, a Muslim physician (865–925 AD) believed that the beginning of life in the foetus is through the formation of the liver.<sup>4</sup>

Some other scientists e.g. Ibn Ilyas Shirazi (a Persian physician, 1310–1339 AD) expressed the opinion that Avicenna pointed to the umbilicus forming prior to the main organs.<sup>4</sup>

In addition to the three opinions above, another idea by an unknown physician proposed in a Persian text, *Tadbir al-Hobala Va al-Atfal va al-Sebian* from 1000 AD (written by Ahmad Mohammad Baladi), presented the spinal cord as the first organ.<sup>5</sup>

Interestingly, Aristotle's achievement was based on observation on chicken eggs, similar to Hippocrates' method, but with different results. Hippocrates believed that the brain and eyes were the first organs formed in the foetus.<sup>7</sup>

Therefore, it appears that Avicenna was not the first person to mention the heart as the first formed functional organ in the foetus. The subject has a long history in ancient Greece and Persia.