

CONGENITAL CARDIOLOGY TODAY

News and Information for Pediatric and Congenital Cardiovascular Physicians and Surgeons

Vol. 5 / Issue 7

July 2007

International Edition

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INSIDE THIS ISSUE

Linked by a Common Purpose: Global Efforts for Improving Pediatric Heart Health: A Report by Children's HeartLink

by Bistra Zheleva, International Programs Coordinator, Children's HeartLink

-Page 1

DEPARTMENTS

Medical Symposia

-Page 4

Medical News, Products and Information

-Page 10

CONGENITAL CARDIOLOGY TODAY

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Potomac, MD 20854 USA
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page 5

LINKED BY A COMMON PURPOSE: GLOBAL EFFORTS FOR IMPROVING PEDIATRIC HEART HEALTH:

A REPORT BY CHILDREN'S HEARTLINK

By Bistra Zheleva, International Programs Coordinator, Children's HeartLink

Children's HeartLink is an international non-governmental organization whose mission is to support cardiac centers in developing countries to enhance and expand sustainable pediatric cardiac programs so more children have the opportunity to receive quality treatment for congenital and acquired heart disease in their own countries.

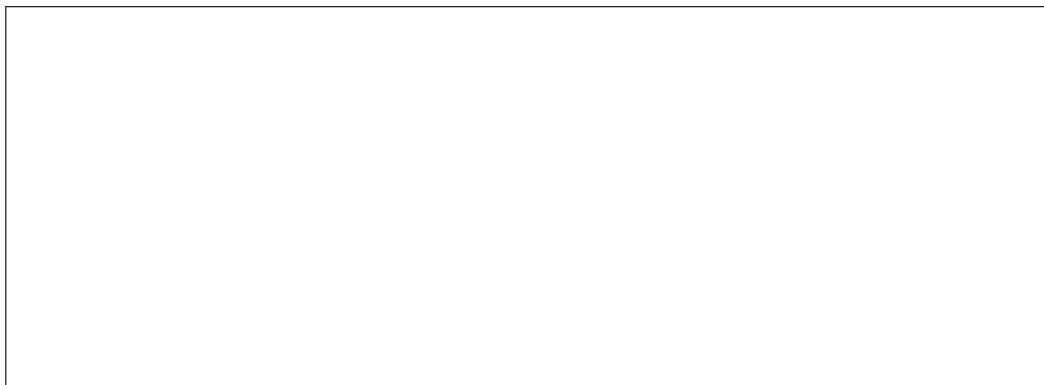
In 2005 we published the first edition of what we envisioned to be a series of reports on the state of pediatric cardiac services in the developing world. The 2005 Children's HeartLink report, "To Save a Child," gave an overview of acquired and congenital heart disease and the impact these diseases have on children in the developing world. This year we are publishing the second report in which we offer a more in-depth look at congenital heart disease, and in particular, the factors that make its diagnosis and treatment so difficult outside of the developed world.

As was noted in the first publication, the needs of children with heart disease in the developing world are both understudied and un-responded

to. We have tried in this second publication to again gather some of the latest thinking on pediatric heart disease and the challenges in addressing it in underserved regions of the world.

The first section of the report discusses factors in treatment and detection of congenital heart disease in the developing world. The second is a shorter discussion of acquired heart disease in children, spotlighting two rheumatic heart disease prevention projects, one in India and one in the Pacific Island of Fiji and a Chagas disease prevention project in Ecuador. There is a discussion of the relevance of the United Nations Millennium Development Goals to children's heart disease in the developing world, as well as one about the effect the health worker migration crisis has on pediatric cardiac care in the developing world. The last section discusses the results from a web survey conducted to explore the views of practitioners in the field of pediatric cardiac care concerning the challenges in the successful treatment, detection and prevention of pediatric cardiac disease.

For the purposes of this article we will focus on our findings on congenital heart disease, the web survey findings, and the health workers migration crisis.



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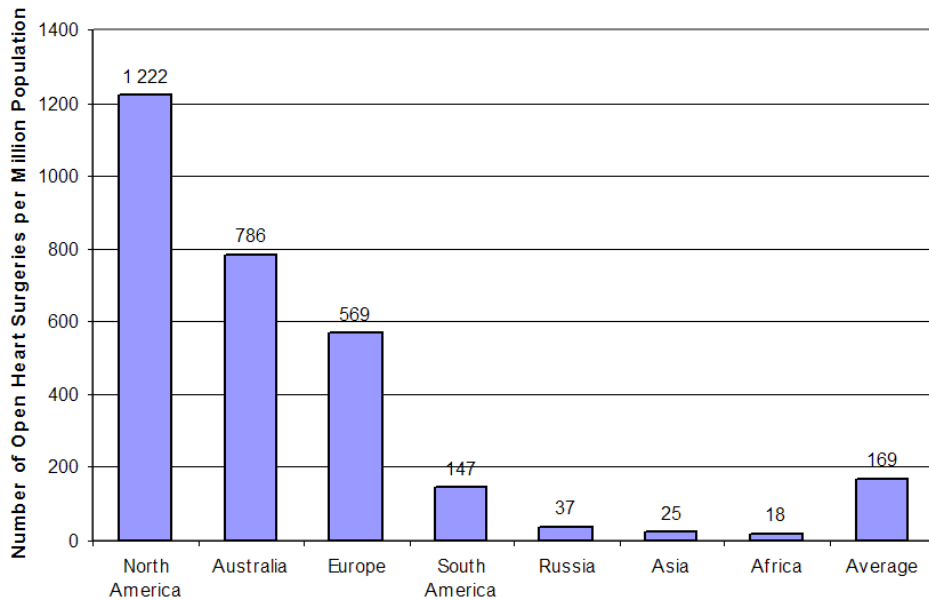


Figure 1: Number of open-heart operations per million people in selected regions.

Congenital Heart Disease

In 2001, childhood deaths from congenital abnormalities in developed countries, while still 20% of total childhood mortality, totaled approximately 20,000 children. However, congenital abnormalities in low-income countries, while only 3.7% of total mortality, took the lives of over 440,000 children. Even though congenital heart diseases account for only some of the congenital anomalies in these estimates, the overall pattern of childhood mortality undoubtedly holds when considering only congenital heart lesions in high-income versus low-income countries: more children die of congenital heart disease in low-income countries than in more developed countries.

Factors Preventing Diagnosis and Treatment of Congenital Heart Disease in the Developing World

A. Lack of Access to Cardiac Care

A basic obstacle to treating pediatric cardiac diseases is that cardiac treatment is simply inaccessible to most of

the world's population. Worldwide, there are over 4,000 medical facilities specifically equipped to support cardiac surgery, and more than 6,000 cardiothoracic surgeons conduct between 2 and 2.5 million open heart surgical operations per year. However, the vast majority of these operations occur in the developed world (see Figure 1) and these heart centers are predominately located in the West. At most, they serve perhaps only seven percent of the world's population. In addition, approximately one facility capable of open-heart surgery exists for every 120,000 people in North America, and one center for every million people in Europe and Australia; however, there is only one center per 16 million people in Asia. Africa is the most underserved by cardiac care facilities: on average, there is only one center per 33 million Africans with the facilities, equipment, and staff capable of supporting open-heart operations and advanced cardiac care. Combined, these statistics indicate that there is only one cardiac

care center per 1.4 million people worldwide.

B. Few Facilities to Treat Pediatric Heart Disease

While there are few general cardiac care facilities (mostly in urban areas), even fewer have the capacity to treat children, particularly young children and infants, with heart disease. When two thirds of the world's population has no access to advanced cardiac care for adults, access to cardiac care is even scarcer for children and infants with CHD.

C. Shortage of Trained Pediatric Cardiac Specialists

Compounding the lack of access to cardiac facilities outside of the developed world is the fact that very few doctors or medical specialists have any training in treating pediatric heart disease, particularly in very small children or neonates. There are limited opportunities for training in pediatric cardiac care outside of the advanced medical centers that specialize in cardiac care for children. Often, pediatricians in most parts of the developing world are not familiar with the presentation of severe CHD at birth or early infancy, so only a small fraction of the heart defects present at birth are detected and the early signs of CHD may be missed.

D. Prohibitive Expense of Pediatric Cardiac Treatment

While there are pockets of affluence in almost all countries that can afford high-quality health care, the vast majority of people in the developing world cannot afford to pay for surgery and hospital fees if their children are born with heart disease. In a world in which one in five people subsist on less than 1 US dollar a day, advanced medical treatments for CHD are simply out of reach for the vast majority of the world's people.



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48th Annual Meeting of the European Society for Paediatric Research

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5th Annual Symposium on Advances in Perinatal Cardiology (Special Focus: Evolution of Fetal Congenital Heart Disease)

Oct. 11-13; San Diego, CA USA
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E. Lack of Basic Health Care

The inability of most of the world's population to receive cardiac treatment is merely emblematic of a much larger problem. Over 80% of modern health care is performed in the countries of North America, Western Europe, and the developed countries of Asia. Because the Western world represents only nine percent of the total world's population, most of the world's people are left with little or no access to advanced medical treatments. Treatment of CHD requires expensive infrastructure that most government health-care systems cannot afford and many countries often choose to devote the few resources they have to more readily treatable pediatric health problems.

F. Shortage of Health Care Workers

Not only are most of the world's surgeons and cardiac specialists concentrated in the Westernized world, most of the world's doctors and medical personnel are predominately found in more industrialized countries. According to the World Health Organization, the United States (US) and the United Kingdom (UK), have an average of 21.3 doctors and 27.9 doctors per 10,000 citizens, respectively. In comparison, India has 5.9 doctors per 10,000 people (Southeast Asia has 5.0 per 10,000), and Kenya has only 1.3 doctors per 10,000 people (Africa has an average of 1.8 per 10,000 citizens). In addition, while the US and UK have 125.1 and 75.2 health care workers per 10,000, India, and Kenya have only 13.8 and 10.3, respectively.

G. Migration of Health Care Workers to Developed Countries

"Brain drain," the persistent loss of medical workers to more developed countries, is a major issue for many countries that cannot compete with the wages, opportunities, and advanced facilities of richer

nations. The shortage of health care workers is a worldwide issue, with an estimated shortfall of over 4.3 million workers globally. Sub-Saharan Africa has the most severe shortage, with only 3% of the world's health care personnel. This shortfall is particularly serious, as this region has 11% of the world's population and 24% of the world disease burden.

H. Lack of Investment in Public Health Sectors

Under-investment in health care in developing or underdeveloped countries has led to poorly-developed health infrastructures that do not offer enough jobs to absorb the number of available health care workers. While the US spends 5,274 US dollars per person, India, with a population of over 1 billion, spends only 96 US dollars per person or 4.4% of its total government spending, on health care.

I. Competing Priorities in Health Care

Treatment of pediatric cardiac diseases requires an expensive health infrastructure and specially trained staff, which most government-sponsored health institutions in developing countries are unable to afford. Over time, the lack of investment in health care has created a situation in which poorly staffed facilities with few resources are often unable to provide anything more than primary health care. The existing public health systems in many of these underdeveloped countries are already struggling to deal with widespread malnutrition and outbreaks of common communicable diseases, such as malaria and tuberculosis and many health care systems are stretched beyond their limits as they deal with the AIDS epidemic.

International Strategies to Treat Congenital Heart Disease

Because so many countries' medical systems are unable to afford treatment for



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children with congenital heart diseases, the international community often steps in to offer treatment for these children and infants. Numerous nonprofit and non-governmental organizations, as well as hospitals and institutions, work with facilities in developing countries to provide interventional techniques and cardiac operations available for children. Many of these organizations have been working in other countries for years, while others have begun their partnerships with overseas hospitals more recently. The ways in which these organizations offer treatment has also changed over the years and modes of delivery for treatment have evolved as costs of health care and transportation change. The four major strategies employed by international organizations to treat children with pediatric heart diseases in developing countries are:

1. Transporting children with heart disease to other countries for treatment
2. Sending surgical teams to developing countries to carry out treatment
3. Training local doctors and staff in developed countries
4. Creating regional centers for treatment of pediatric heart disease

In addition to continuing their current activities, the report's two main recommendations for international organizations involved in charitable assistance for children with heart disease are:

1. Coordinated efforts between organizations, individuals, facilities, and partner hospitals around the world to consolidate their efforts.
2. Advocacy for increased international assistance. Organizations that treat congenital heart disease can potentially make a greater long-term impact on addressing CHD in developing countries if they use their influ-

ence to advocate together for greater investment in health care for the developing world. Their advocacy can help keep the issue of poor children with pediatric heart disease on the international community's agenda. Only if congenital heart disease comes to the attention of the policy-making international community will this issue receive enough attention to increase foreign assistance for international health in general, and for treatment of CHD in particular.

Managing the Health Worker Migration Crisis

In order for a young heart patient to receive top-quality medical assistance, she needs an entire medical team of trained professionals providing her care. When medical teams lose and cannot replace experienced staff in a timely manner, that patient's cardiac care is compromised. In the developing world, where often the hospitals are under-resourced and staff is poorly paid and works long hours, maintaining quality personnel is even more difficult.

According to the WHO, there are 57 countries with health care systems on the verge of collapse due to staff shortages. More than four million additional health workers are needed, in these countries, to fill personnel gaps. More than half of these additional workers are needed in Sub-Saharan Africa, an area of the world that shoulders 24% of the world's disease burden, 11% of the world's population and only 3% of the world's health workers.

Research shows there are currently four methods for managing health workers migration utilized by the international community:

Retaining Health Workers

Although low salary is an impetus for nurses and other health professionals to



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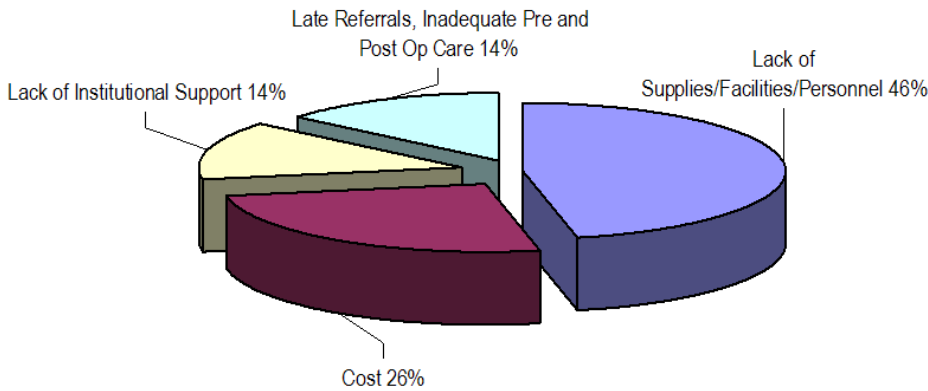


Figure 2: What do you consider the greatest frustration/challenge when you work to treat children with heart disease in developing countries? - Children's Heartlink Web Survey.

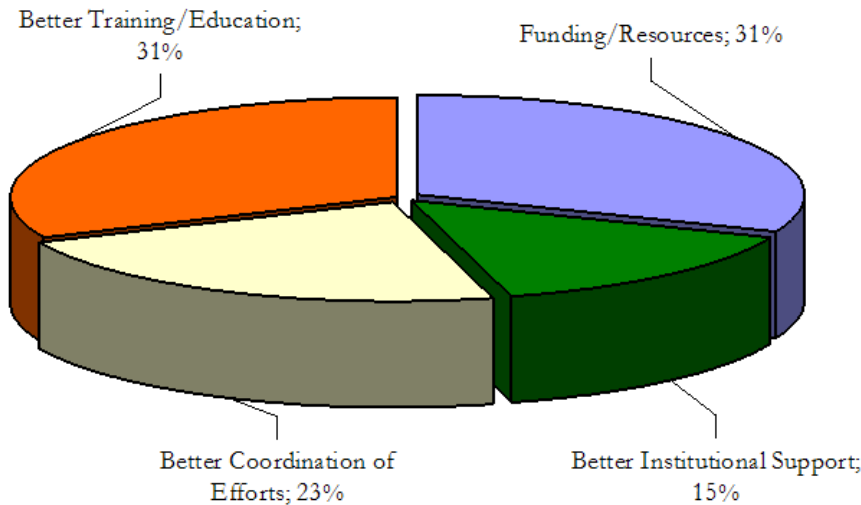


Figure 3: What do you think the International donor community (NGOs, government, intergovernmental organizations, community health organizations, etc.) can do to better treat and prevent pediatric heart disease in developing countries? - Children's Heartlink Web Survey.

consider working abroad, offering health workers a clear job description, feedback on performance, fair supervision and on-the-job training has proven to improve job satisfaction and, in turn, performance as well. While more pay would be welcome by many health workers, simply receiving payment on time and in full builds confidence between worker and institution.

Training Local Professionals Inside the Country

For years, countries such as the US, UK, Canada and Australia have relied upon foreign countries to train up to a quarter of the physicians that their nations need. Efforts are now underway, within developed nations, to increase the number of locally trained health professionals. The hope is that by increasing

the local pool of qualified health professionals, the pressure to recruit workers from developing countries will decrease.

Restraining Health Workers from Leaving

One solution to discourage unwanted migration is bonding. Bonding asks those that have benefited from government financial assistance – for example, physicians that have received government loans or grants for their training – to pay back their cost of training if they are unable or unwilling to serve a minimum number of years in their own country.


Abstaining from Unethical Recruitment

The UK has been a leader in instituting codes of conduct regarding the ethical recruitment of health professionals from medically underserved countries. Starting in 1999, the UK's Department of Health has discouraged its National Health Service (NHS) from directly recruiting health professionals from South Africa and India. Since then, the NHS has included additional nations on the list. Ultimately, the strength of the code of conduct rests upon its enforcement which, according to many developing countries, is weak.

Pediatric Cardiac Survey Results

In preparation for this publication, Children's HeartLink conducted a web survey reaching out to the pediatric cardiac community to identify the biggest obstacles in effectively addressing the burden of CHD in the developing world. Cardiac surgeons, cardiologists, and others working in the field of pediatric cardiac care from over 90 countries were invited to participate by email.

When asked to list the biggest frustration/challenge in working to treat children with heart disease in the developing countries, most responses fell into four general categories (see Figure 2):



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3. Prohibitive cost of treatment; and
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Another big frustration appeared to be the patients' ability to pay for their treatment, which can be directly related to poverty and poor health care support in the developing world. Yet again, it brings back the issues of health system and infrastructure and government support for health care.

"Congenital and acquired heart diseases affect millions of children around the world, but the majority of them will never receive the treatment they need. These children have no access to treatment, not only because of a lack of access to cardiac care, but also because of a general lack of socio-economic development and health care investment in their countries."

The findings in this survey suggested that children's heart disease remains a largely unmet challenge in the developing world. Among the factors that contribute to it, lack of funding for treatment and supplies and equipment top the list. However, the cost of the treatment and the costs of investing in a tertiary health program suggest that it can be prohibitive for many hospitals to even start developing pediatric cardiac centers. Many may consider the challenge of primary care needs to take precedence over the development of tertiary programs such as pediatric cardiac care.

Another issue that surfaced was the lack of trained personnel, as discussed earlier. Shortage of trained personnel affects the quality and quantity of health services and directly affects pediatric cardiac programs in many developing countries. Many respondents mentioned that losing trained personnel to hospi-

tals in the developed world has been a significant challenge in providing sustainable, quality pediatric cardiac care.

The respondents were also asked to describe programs that have been successful in treating and preventing pediatric heart disease in the developing world. The most often cited components of a successful program were commitment to pediatric cardiac care, good communication among the cardiac team members, and stable financial support from a variety of sources.

The last question of the survey addressed suggestions for the international community involvement in addressing the treatment and prevention of children's heart disease in the developing world. The responses could be grouped in the following general categories (see Figure 3):

1. Better training and education for cardiac professionals
2. Lack of funding and resources
3. Better coordination of efforts to support pediatric cardiac care
4. Better institutional support – work with national and local governments

All four categories can be viewed as interdependent and most respondents touched on at least one of them.

The rates of congenital heart disease are not significantly different between developing and developed countries. However, the fact it does not get diagnosed or treated in the developing world as early as in developed countries creates a backlog of untreated heart disease cases. In addition, acquired heart problems such as rheumatic heart disease, almost eradicated in the developed world, still is very prevalent in some developing countries. Another dynamic contributing to this issue is the disproportionate attention paid to adult cardiac disease as opposed to pediatric.

Conclusions

While children's heart diseases are only one of a myriad of health problems facing poor and underdeveloped countries, they are intrinsically linked to many of the other health problems in the developing world. International organizations have a unique position when it comes to dealing with major issues, whether they are of a medical nature or not. Nonprofit organizations can treat problems at a local level, and may have a more objective position than many governments would on the issues that surround problems and prevent find-



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"While children's heart diseases are only one of a myriad of health problems facing poor and underdeveloped countries, they are intrinsically linked to many of the other health problems in the developing world."

ing easy solutions. Organizations can also act on a global level, and can use their influence and their high profile within their home communities to advocate for greater attention and assistance to address problems. They must begin to advocate for increased foreign investment in both tertiary medical centers and health care infrastructure, as well as for the creation of national health care policies that include pediatric heart disease management. Organizations can also increase their effectiveness by working with other nonprofits or institutions to improve their outreach, increase their efforts, and better direct their resources and skills to where they are most needed. The international community of donor and recipient governments, nongovernmental organizations, and international agencies must work together to address the root causes of poor health care in developing countries.

Congenital and acquired heart diseases affect millions of children around the world, but the majority of them will never receive the treatment they need. These children have no access to treatment,

not only because of a lack of access to cardiac care, but also because of a general lack of socio-economic development and health care investment in their countries. These factors work together to create poor public health systems, a lack of medical training, and a shortage of health care workers that prevent children from receiving corrective treatment. Pediatric heart disease is a serious issue, but it is not a problem created in a vacuum. Only when it is placed within the global context of economic and health care disparities will the international community be able to make real strides toward reducing the prevalence of acquired pediatric heart disease and improving the diagnosis and management of congenital heart disease. Only when we improve health care for entire regions of the world will we ensure that all of the world's children with heart disease can access and receive the medical care they need to live normal, healthy lives.

For the last 40 years Children's HeartLink has been dedicated to the mobilization of global resources to prevent, treat and cure children's heart disease. We hope that this report contributes to the knowledge and understanding of pediatric heart disease and the efforts to offer greater access to its prevention and treatment in underserved regions of the world. With this report, we hope to further the knowledge of the field and come closer to preventing and curing cardiac heart disease for all of the world's children.

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To receive a copy of the full report and full list of references please go to www.childrensheartlink.org or contact the author.

~CCT~

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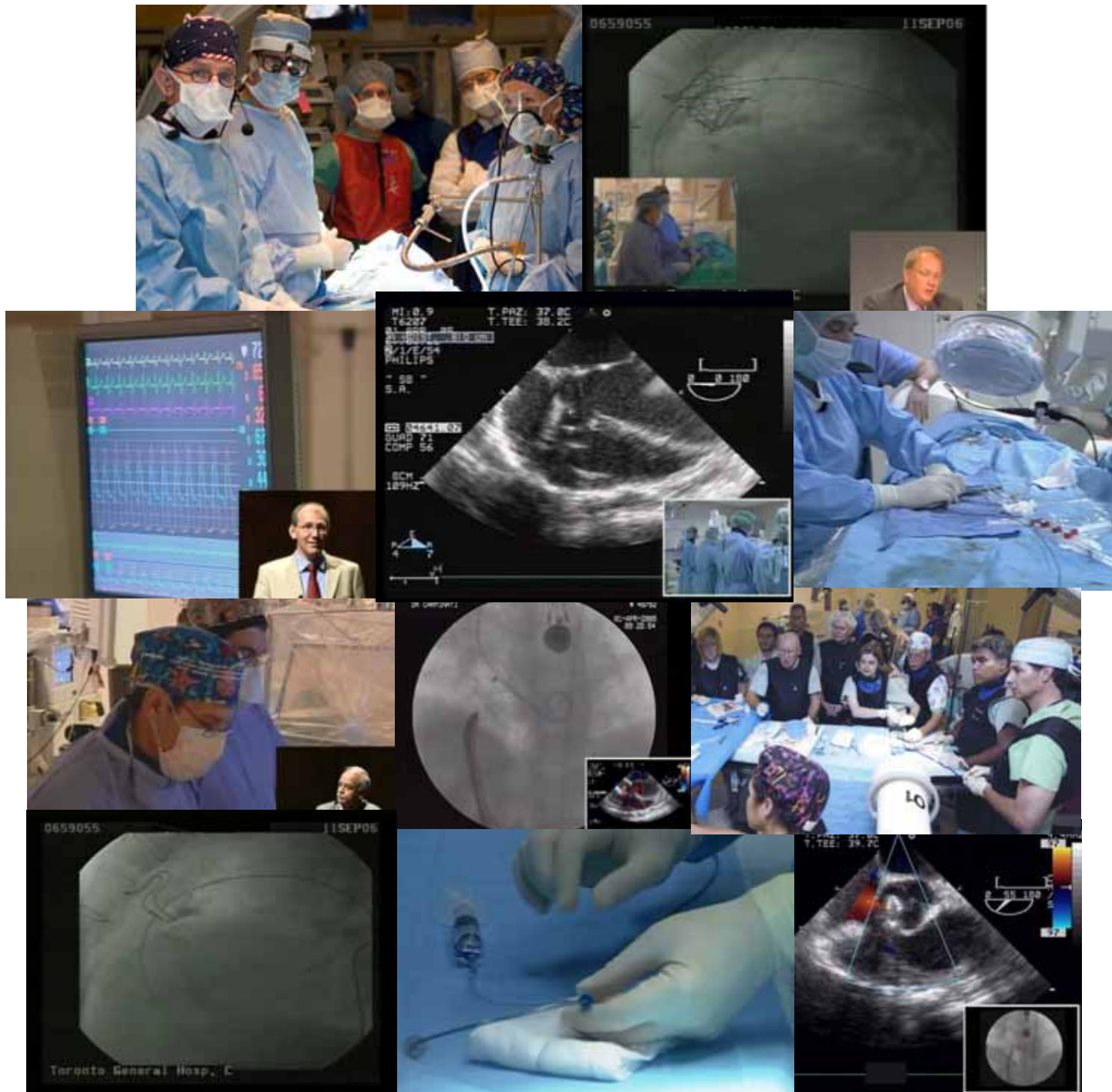
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MEDICAL NEWS, PRODUCTS AND INFORMATION

Remote Device Allows Cardiologist to Monitor Patients Daily at their Homes

An easy-to-use in home monitoring device for patients is changing the way doctors monitor the health of patients with implanted defibrillators. Rush University Medical Center is participating in a pilot study of the LATITUDE® Patient Management system to determine if the wireless home monitoring system can decrease hospitalizations for heart failure.

A mini-antenna built into the implanted defibrillator sends data to a wireless system placed in the patient's home. The data is automatically transmitted to a secure Internet server where the physician can access this medical information anytime, from anywhere.

Unlike other remote devices which only transmit data if certain parameters are out of range, the LATITUDE system uploads health information that can help physicians monitor the day-to-day changes in patients. In addition to the data stored before, during and after an arrhythmia, the system employs a wireless weight scale and blood pressure monitor to record vital statistics crucial for the management of cardiac failure patients. An abrupt change in weight could indicate worsening heart failure.

"This sophisticated system allows physicians to manage the patient much more closely. The same information that would normally require a visit to the office every few months can now be downloaded to the physician at anytime without the patient ever leaving home," said Dr. Kousik Krishnan, a cardiac electrophysiologist at Rush.

According to Krishnan, the LATITUDE system provides added peace of mind for the patient. The physician can remotely

check if the defibrillator is working correctly and assess battery life. If the patient feels the defibrillator activate, he or she can transmit the rhythm information immediately. The physician can quickly analyze the data and determine if the shock was appropriate or if the patient needs to go to the hospital.

"Now with patient information available weekly, or even daily if needed, we can better monitor our patients," said Dr. Krishnan. "We can pick up abnormalities sooner and act on those before they become serious."

Rush is one of only 18 centers in the country participating in the LATITUDE Inductive Pilot Program which offers remote monitoring for all Boston Scientific/Guidant devices. In addition, Rush is one of the leading enrollers in the DECODE Trial to determine if the LATITUDE monitoring system is resulting in decreased hospitalizations. Heart failure has an annual direct cost of more than \$26 billion in the U.S. and is the number one reason for hospitalizations.

Scientists Create Heart Muscle With Built-In Blood Supply

Researchers at the Technion-Israel Institute of Technology have created new heart muscle with its own blood supply using human embryonic stem cells.

The researchers say the newly engineered muscle could replace cardiac tissue damaged in heart attacks. Their study was published online January 11 in the journal *Circulation Research*.

According to Professor Shulamit Levenberg of the Technion Biomedical Engineering Department and Professor Lior Gepstein of the Faculty of Medicine,

this is the first time that three-dimensional human cardiac tissue complete with blood vessels have been constructed. that may have unique applications for studies of cardiac development, function and tissue replacement therapy.

Despite progress over the past two decades in treating cardiac disease, there are few good ways to fix damaged heart muscle. One possibility would be to rebuild a broken heart with a transplant of healthy heart tissue. However, scientists have been stymied in these efforts by a lack of human heart tissue to work with and the failure of transplanted tissue to thrive in its new home. The heart tissue grown by the Technion researchers is threaded throughout with a network of tiny blood vessels that would improve the tissue's survival after being transplanted in a human heart, Levenberg says.

The researchers engineered the heart muscle by seeding a sponge-like, three-dimensional plastic scaffold with heart muscle cells and blood vessel cells produced by human embryonic stem cells, along with cells called embryonic fibroblasts. Levenberg's research team used a similar technique in 2005 to grow skeletal muscle from scratch, and she says the lessons learned from that study helped in designing the heart muscle. For instance, the skeletal muscle study showed that it was important to grow all the different cell types together on the scaffold, and that fibroblasts were key to supporting the blood vessel walls as they developed.

The scientists conducted several tests to make sure the new muscle looked and behaved like heart tissue. Four to six days after being seeded on the scaffold, patches of the new muscle cells began to contract together, a movement that spread



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until the entire tissue scaffold was beating like normal heart muscle.

The researchers are preparing to transplant the tissue into living hearts in animals to study how well the heart muscle adapts to its new surroundings. Levenberg says that the technique might also prove useful in engineering tissues for other organs such as the liver.

The Technion-Israel Institute of Technology is Israel's leading science and technology university. Home to the country's winners of the Nobel Prize in science, it commands a worldwide reputation for its pioneering work in nanotechnology, computer science, biotechnology, water-resource management, materials engineering, aerospace and medicine. The majority of the founders and managers of Israel's high-tech companies are alumni. Based in New York City, the American Technion Society is the leading American organization supporting higher education in Israel, with 17 offices around the country.

EuroPCR incorporates the First European Edition of Transcatheter Valve Symposium (TVS)

Barcelona, Spain, 24th of May 2007. The first 2 days of the 2007 edition of EuroPCR taking in place in Barcelona, Spain from 22nd to 25th of May, have been hectic and filled with news, events and lively discussions.

Among the most commented sessions was the follow up of the cases that were transmitted live at last year's course due to the significant interest in both medium and long term results from some of the most critical and complicated cases that are experienced by specialists in this field.

World Leading Experts are recognised during EuroPCR 2007

Another hi-light of this year's course has been the presence of two real veterans in the recent history of cardiology: John Simpson, the "father" of the Guide Wire and Julio Palmaz, the inventor of the first stent, a device that has revolutionised cardiac care.

Dr. Simpson, known to be a perfectionist in pursuing the highest clinical standards, celebrated that a quarter of a century has passed since the standard for coronary guide wires was set, a device that was formerly known as Guidant/ACS. The year was 1982 and the product was a .018 PDT guide wire. For the first time ever it became possible to direct a guided wire to a site of coronary vascular disease.

Dr. Palmaz, is the highly respected inventor of what is now a very common medical device used in cardiology: the first commercially successful intravascular stent, a device that revolutionised cardiac care. Yesterday, at a surprise ceremony held during EuroPCR, he was presented with the coveted 2007 Ethica Award. Interesting he has benefited personally from the technology he invented: in 2004 he received a stent that was dilated to 4 mm to cover a lesion of 13mm. "I have had time to reflect on how good the balloon-extendable stent has been for me and millions of other people."

EuroPCR increases its focuses on Valve and non Cardiac Coronary Disease

The TVS symposium has now has been integrated into EuroPCR. The course, defined as conference about transcatheter valve technology, involves a wide variety of specialists. The symposium, founded four years ago by Phillipp Bonhoeffer and Carlos Ruiz has until now only be held in the USA, however, due to the rapid technological advances that have been seen in this field a European partner was needed, and as TVS co-founder Ruiz confirmed "EuroPCR, due to its commitment to edu-

cation and the promotion of ethical values was an obvious choice."

The TVS@EuroPCR stream follows the same format as the original US symposium however it benefits significantly from the invaluable input and contribution of the EuroPCR Board members. The TVS program focuses on 5 key areas including:

Back to Basics - the necessary basic knowledge about physiology and coronary pathology. "It is important that we really understand a human aortic valve, as opposed to that of a cow or a pig," reiterated Prof. Ruiz.

Imaging - this is currently the biggest handicapped to the advancement of valve disease treatment and emphasis is placed on new imaging technologies.

Latest technology - the TVS program includes a unique session where for the first time companies have been asked to prepare non-commercial presentations of new technology.

Team Approach - due to the vital need for collaboration of cardiologists and surgeons, many of the sessions in the program feature round table discussions involving key opinions leaders from both specialties.

Regulation - as an important aspect of this field involves how to get the valves to the public, the TVS programme will also address regulation issues (FDA and European agencies).

Additionally, as part of the Valve and Non-Coronary Cardiac Disease stream, a breakthrough technology was demonstrated for the first time by Jena Valve Technology, a German company. The company presented its two latest product developments, a transfemoral and a transapical aortic valve replacement (AVR) system during a session held today at EuroPCR. The systems integrate three state-of-the-art-components -a catheter



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Male Heart/Female Heart - It Makes a Difference

There's more that's different about women's and men's hearts than the way they deal with love. It turns out that men and women develop, have symptoms of, are diagnosed with and are treated for heart disease very differently.

The GENESIS project, funded by the Canadian Institutes of Health Research in partnership with the Heart and Stroke Foundation of Canada, is a multidisciplinary project that is bringing together researchers from across Canada to examine how sex and gender play a role in heart disease.

Their research has resulted in some fascinating findings:

- Teenaged boys develop higher blood pressure than teenage girls - something that may be due to puberty, or could be tied to the higher blood pressure seen in adult men. (Women don't catch up until after menopause, when their blood pressure tends to increase.)
- Women do not tend to experience the "chest-crushing" pain traditionally associated with heart attacks that men do. They (and many men with atypical symptoms) tend to experience fatigue and nausea instead.

- Angiograms, the tool used to diagnose heart problems when patients show up in hospitals with chest pains, tend to deliver a "normal" verdict for many women.
- While most drugs used to treat heart failure work in both women in men, some work better than others. For instance, while both are antihypertensive medications, ACE (angiotensin converting enzyme) inhibitors tend to work better for men, while ARBs (angiotensin receptor blockers) tend to work better for women.

What it all adds up to, says Louise Pilote, the lead investigator of GENESIS, is an increasing need to look as deeply at what divides us as at what we have in common when it comes to heart disease.

"It could be that, in the future, you choose a drug based on the sex of the patient," she says. "And maybe an angiogram isn't such a good test for diagnosing coronary disease in women."

As well, Dr. Pilote underscores the importance of women recognizing signs they could be having a heart attack, even if they are not the "typical" signs we read about, and get themselves to a hospital as quickly as possible.

Other studies now taking place as part of the GENESIS project are looking at alternative ways of testing for heart disease, tests that would recognize the disease in women equally as well as men. They are also examining whether genetic markers for hypertension and obesity, both of which can lead to heart disease, are different in women and men.

Internet: www.cihr-irsc.gc.ca/e/193.html

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(ISSN 1554-7787-print; ISSN 1554-0499-online)
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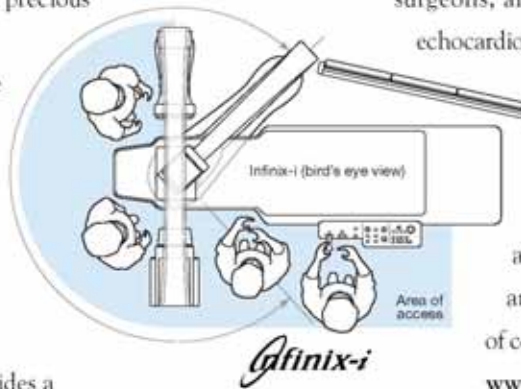
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