The Society for Heart Valve Disease

Autumn '07 Issue 2

Contents:

Compiled & Edited by:
Adrian Chester
Secretary/Treasurer
Karen Durham
Administrative Assistant

Dear Friends and Colleagues,

"Innovation: To make the Impossible Possible" – this was and still is the driving force in diagnosis and treatment of valvular heart disease. I had chosen this subject for my Presidential address at the 4th Biennial Meeting of the Society for Heart Valve Disease in New York, when I had the great honour to succeed Dr. Blase Carabello as President of this distinguished Society.

To address the issue of "Innovation" in front of the Society was a real privilege for me, because so many important predecessors had previously paved the way. These accomplished innovators exhibited the high academic and clinical standards that we currently aspire to in the diagnosis, treatment, and investigation of valvular heart disease. We must continue to pursue advancements with the same level of enthusiasm and integrity in order to further develop our important field. I was very impressed during the meeting in New York by the multitude of investigators that gathered from numerous different countries. These basic and clinical scientists clearly demonstrated that we are making continuous progress in several areas including basic research, engineering, diagnostics and imaging, and last but not least, new therapeutic approaches to treat and perhaps cure valvular heart disease.

It was particularly satisfying to note the exciting advancements in minimally invasive valve surgery, which have now become standard in many centers around the world, as well as the multitude of catheter-based valve replacement and repair techniques that are currently under investigation, all of which seemed impossible only a few short years ago.

The cooperation of young investigators from across the spectrum – engineers, basic scientists, cardiologists and surgeons – has led to the development of multiple new valve designs and technologies. Some of these nascent technologies will of course not make it to the final stages of development, but some of them will revolutionize the way valvular heart disease is currently treated. Unfortunately it is not easy or even possible to predict which technologies will succeed or fail, which underscores the importance of our continued support of heart valve research.

Many exciting new scientific contributions were displayed at our biennual meeting and some brilliant young investigators presented the results of their exciting research. It is our responsibility to continue to support these young scientists, as our innovative predecessors received support from their superiors a generation ago.

The Society for Heart Valve Disease is the only association which gathers expertise from several different fields on this essential topic. Our unique position supplies us with the opportunity to further develop cross-specialty cooperation and to make the Society for Heart Valve Disease truly flourish.

Like Dr. Carabello, it is also my belief and my number one goal as your President to bring our Society together with the Heart Valve Society of America. I believe that we will have a much stronger voice when we speak from a unified position. I would therefore ask for your open mindedness and support in pursuit of this goal. I know that our American colleagues are likeminded in the pursuit of such a unification.

We also need to maintain and further develop our global view on valvular heart disease, encouraging the participation of centers from around the world. We also need to support our own Journal of Heart Valve Disease and make it internet-accessible for readers and investigators around the globe. Such a goal may be difficult and expensive, but will be absolutely necessary for the future development of our specialty.

New council members were appointed during the meeting in New York and several councillors have recently retired. These councillors served the Society for many years and we would like to thank them for their tireless efforts and splendid work. It is now up to the younger generation to further develop and grow the Society, particularly in those parts of the world which are not yet closely involved and yet face a tremendous incidence of valvular heart disease.

The council members decided to change the venue of the 5th Biennual Meeting in 2009, which is now to be held in the center of Berlin, Germany instead of Beijing, China. It was felt that it is essential for the near future of our Society in order to rejuvenate and reorganize it step by step. If at all possible, we should also arrange a joint meeting with our American colleagues during this conference. We have made initial arrangements for the meeting to be held on June 26-29, 2009 and further details will soon follow. I can foresee a very exciting meeting because our field is growing and rapidly changing, both in regards to possible treatment options and in the number of patients that we need to treat. It is up to us to embrace innovation as our predecessors did and be ready for a time of rapid developments in the field of heart valve disease.

Regards

Friedrich Mohr
President

From The Newsletter Editor

Hopefully you will enjoy reading the latest copy of the SVHD newsletter. It was originally hoped that the newsletter would be issued every 6 months, but the work required for the Biennial meeting meant that it had to be left on hold. You will read elsewhere in this edition a request for someone to get involved in producing the newsletter, so that we can guarantee it appears on a regular basis. Please be reassured that if you wish to take up this offer you will have the support of the Secretariat to source articles and prepare the newsletter for publication.

I am happy to welcome over 35 new members, many of who joined during the New York meeting. In addition, a further 40 surgeons and scientists joined at the recent East European Postgraduate Course on Valve Surgery. In order to retain and attract new members we are aware that the Society needs to enhance its activities and communication with its membership.

Since the New York meeting we have been busy in trying to revamp many aspects of the Society. In this light two important initiatives have started. The first of these is to review and revamp the working groups. You will be able to read about the plans for the Working Group on Epidemiology in this newsletter and a meeting being organised by the Working Group on Tissue Engineering. In the months ahead the Council will review all the current working groups and be encouraging members to sign-up and participate in specific groups.

The second activity is the re-design of the Society's website. This will result in a clearer, easy to navigate format and allow the Society to add and remove content from the website much more easily that we are currently able. For example, we expect each Working Group will be able to have their own webpage and the homepage will be up-dated with the latest news and meetings of interest.

Adrian Chester

Membership

Membership fees remain at $100 per year and will be payable in January 2008. At the AGM, held during the New York meeting, a motion was passed that allows Students and Trainees to join the Society for the reduced fee of $50.

All current members will shortly receive their renewal forms. Prompt payment will be greatly appreciated.

The Society would like to welcome the following new members, all of whom have joined during 2007:-

Dr Payam Akhyari	University of Heidelberg	Dr Marc Laskar	Univ Hospital Dupuytren, Limoges
Dr Alexander Albert	Heart Institute, Lahr	Mr Sven Lehmann	Heart Center Leipzig
Dr Joseph Arcidi	Good Samaritan Hospital, Los Angeles	Mr Sergey Leontyev	Heart Center, Leipzig
Ms Catalin Badiu	German Heart Centre, Munich	Dr Artur Lichtenberg	University of Heidelberg
Dr Cristina Basso	University of Padova	Dr Dan Loberman	T.A.S.M.C. Tel Aviv
Dr Joseph Bavaria	Univ of Pennsylvania, Philadelphia	Dr Benjamin Medalion	Rabin Medical Center, Petach-Tiqua
Dr Jonathan Butcher	Cornell University, Ithaca	Dr Katayama Minako	Kobe City Medical Center
Dr Christos Charitos	Evangelismos Med Center, Athens	Dr Angelo Nobre	Hospital de Santa Maria, Lisbon
Dr Faisal Cheema	Columbia University Med Center, NY	Dr Akinwumi Ogunrombi	University of Cape Town
Dr Francisco Costa	Santa Case de Curitiba, Curitiba	Dr Kenji Okada	Kobe Univ School of Medicine
Dr Vadim Dalinin	Sokolniki Cardiac Center, Moscow	Dr Jane Olin	Edwards Lifesciences, Irvine
Dr Jim Davidson	Edwards Lifesciences, Irvine	Dr Robert Padera	Brigham & Women's Hospital, Boston
Dr Javier Ferrari Ayarragaray	Sanatorio Mitre, Beunos Aires	Dr Alessandro Piccardo	San Martino Hospital Univ, Genova
Dr Michael Grossman	University of Tennessee, Memphis	Dr Deepak Puri	Fortis Hospital, Mohali
Dr Kazuhiro Hashimoto	Kikei Univ School of Medicine, Tokyo	Dr Giulio Rizzolo	VHI Padova
Dr Kyoko Hayashida	Ohashi Hospital, Tokyo	Dr Pablo Roura	Favaloro Foundation, Beunos Aires
Dr Zhaoming He	Texas Tech University, Lubbock	Dr Daniel Ruzicka	German Heart Center, Munich
Dr ShengShou Hu	Fu Wai Hospital, Beijing	Dr Yoshimasa Sakamoto	Jikei Univ School of Medicine, Tokyo
Dr Ramadan Jashari	European Homograft Bank, Brussels	Dr Yu Shomura	Kobe General Hospital
Dr Bent Moller Jensen	Odense University Hospital	Dr Shuli Silberman	Shaare Zedek Med Center, Jerusalem
Dr Hanjoong Jo	Emory University, Atlanta	Ms Reetu Singh	University of S Florida, Tampa
Dr Yamaguchi Kazuto	Kobe City Medical Center	Dr Pasquale Totaro	Civic Hospital Brescia, Milan
Dr Loes Klieverik	Erasmus Univ Med Center, Rotterdam	Professor Dr Herbert Vetter	Helios Heart Center, Wuppertal
Dr Thierry Langanay	Centre Hospitalier Univ, Rennes		

Farewell Message from Blase Carabello
President (2005 – 2007)

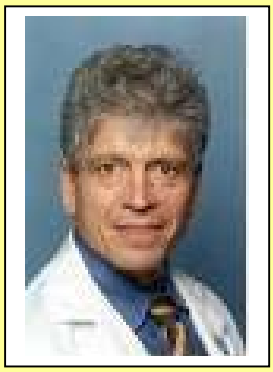
Friends and Colleagues,

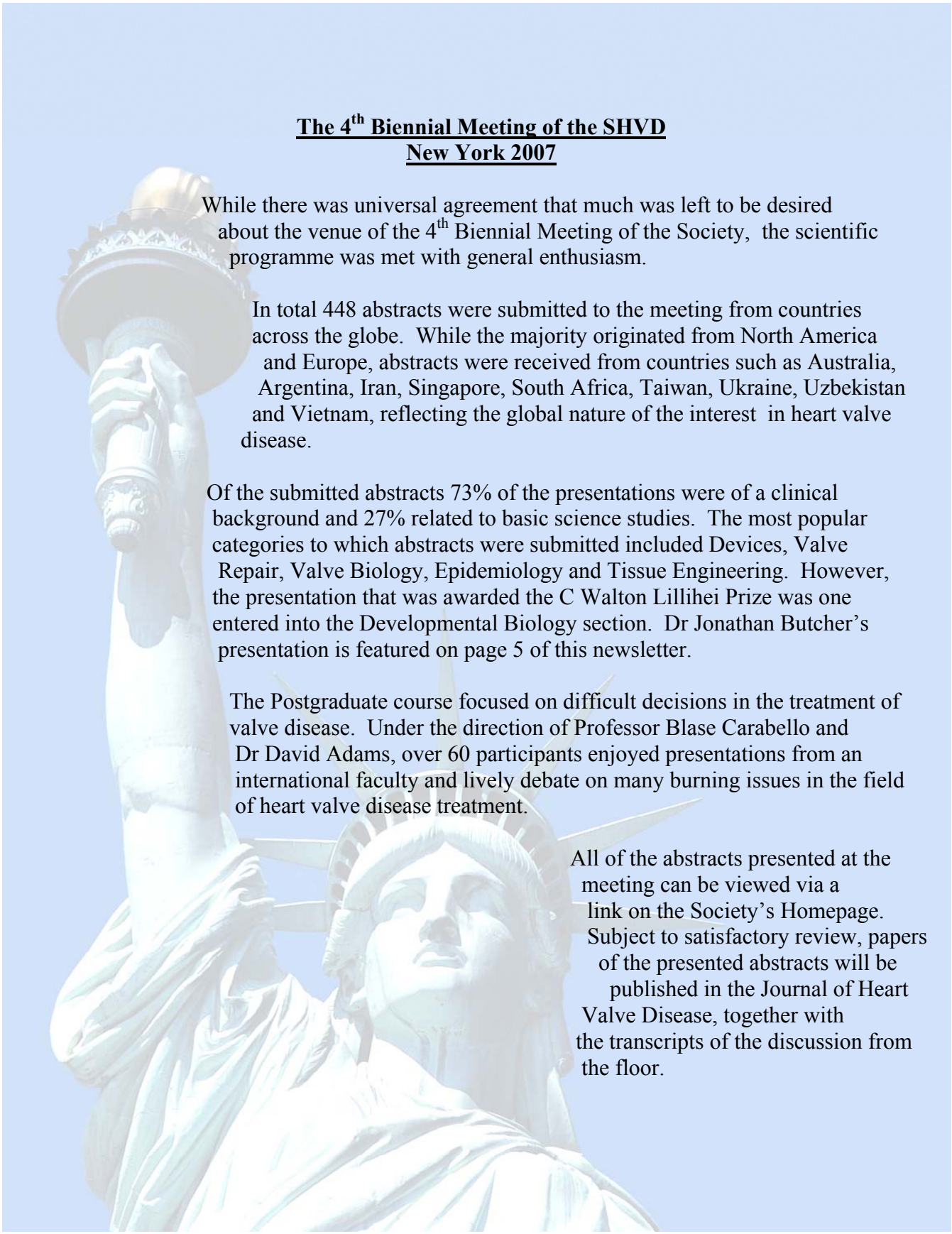
June marked the end of my term as President of our Society. The past two years have seen a worldwide increase in interest in valvular heart disease with well-attended courses occurring, it seems, almost everywhere. Experience with percutaneous approaches has gone from a handful of case reports to over 400 aortic implants and over 100 edge to edge mitral valve procedures. In the US, the NIH has formally requested input regarding valve disease for strategic planning purposes. What they will do with the information is unclear but at least they asked, by itself an important positive change. Randomized trials on the use of statins in aortic stenosis have been reported and more are underway and the use of percutaneous devices will also yield important randomization of mechanical procedures for the treatment of valve disease. And, the Journal of Heart Valve Disease continues to be the finest Journal focused on this topic. Our Society is financially solvent and continues to grow. That's the good news. Here's the bad news.

I had hoped as President to get our Working Groups working but little action has occurred primarily because I had not tasked them with specific targets for achievement. I have left that as unfinished business for Dr. Friedrich Mohr our new President to complete. I had hoped to enroll more Cardiologists in the Society but haven't. I had also hoped to bring the Society for Heart Valve Disease and Heart Valve Society of America closer together. While I have engendered a spirit of cooperation between the two entities, more formal ties have yet to be forged.

Still, we can be proud of what our Society has accomplished. We hold the largest meeting for valve disease in the world and present the largest number of original scientific contributions to valvular heart disease. With your support for Dr. Mohr we will continue to grow and prosper.

Blase Carabello





The 4th Biennial Meeting of the SHVD
New York 2007

While there was universal agreement that much was left to be desired about the venue of the 4th Biennial Meeting of the Society, the scientific programme was met with general enthusiasm.

In total 448 abstracts were submitted to the meeting from countries across the globe. While the majority originated from North America and Europe, abstracts were received from countries such as Australia, Argentina, Iran, Singapore, South Africa, Taiwan, Ukraine, Uzbekistan and Vietnam, reflecting the global nature of the interest in heart valve disease.

Of the submitted abstracts 73% of the presentations were of a clinical background and 27% related to basic science studies. The most popular categories to which abstracts were submitted included Devices, Valve Repair, Valve Biology, Epidemiology and Tissue Engineering. However, the presentation that was awarded the C Walton Lillihei Prize was one entered into the Developmental Biology section. Dr Jonathan Butcher's presentation is featured on page 5 of this newsletter.

The Postgraduate course focused on difficult decisions in the treatment of valve disease. Under the direction of Professor Blase Carabello and Dr David Adams, over 60 participants enjoyed presentations from an international faculty and lively debate on many burning issues in the field of heart valve disease treatment.

All of the abstracts presented at the meeting can be viewed via a link on the Society's Homepage. Subject to satisfactory review, papers of the presented abstracts will be published in the Journal of Heart Valve Disease, together with the transcripts of the discussion from the floor.

Dr Jonathan Butcher won the C. Walton Lillihei Prize at the New York meeting for his presentation entitled "Estimating the hemodynamic environment of the developing avian mitral valve."

This work was carried out in conjunction with Dr Tim McQuinn and Professor Roger R. Markwald from *Cornell University, Ithaca, NY, and the Medical University of South Carolina, Charleston, SC.* Below is a summary of his presentation.

Since the meeting Jonathan has accepted and commenced a new position, Assistant Professor in the Department of Biomedical Engineering at Cornell University.

L to R – Dr Jonathan Butcher, Prof Sir Magdi Yacoub, Prof Friedrich Mohr

Estimating the hemodynamic environment of the developing avian mitral valve

The atrioventricular (AV) valves originate as a single layer of endocardial cells that undergo a mesenchymal transformation and migrate into an amorphous matrix called the cardiac jelly. These cells then proliferate and remodel the matrix into swellings dubbed cushions by their appearance. The two AV cushions then fuse medially, with the lateral portions of each cushion forming the medial leaflets of the mitral (MV), and tricuspid valves (TV). At the same time, separate lateral cushions form in the AV, which are then remodeled into the lateral leaflets. MV formation in the chick mirrors closely that of the human, while the TV deviates significantly, muscularizing into a single flap with no medial leaflet.

Embryonic valves continually maintain unidirectional flow under considerable increases in blood pressure and velocity as they elongate and condense into thin fibrous valves. Defects in valve formation account for up to 30% of all congenital heart defects, which occur in 1-2% of all live births but up to 50% of fetal deaths. Research over the past 30 years have elucidated many of the genetic cues responsible for valve formation, but an understanding of the coordination of this signaling within the hemodynamic environment is lacking. Mechanical signaling may play a role in valvular morphogenesis, but quantifying the hemodynamic environment has been limited by the extreme speed, small size, and constantly changing shape of the developing cushions/leaflets.

Recent developments with Micro-computed tomography (Micro-CT) have enabled reconstruction of complex 3D geometries at high resolution. We therefore used Micro-CT (VivaCT, Scanco, inc.) in combination with vascular perfusion of a polymerizing CT-dense contrast agent to render 3D volumes of the avian heart. The AV canal and/or mitral annulus during the valvulogenic period (HH17-HH30) were reconstructed at 10 μm voxel resolution, followed by volumetric meshing by Gambit (T-Grid, 500,000 elements, Fluent, Inc.). Steady flow analysis through the 3D geometries was accomplished by Fluent v6.2 (Fluent, Inc.) with a non-newtonian shear and hematocrit dependent viscosity. Initial conditions were gathered from in vivo AV flow measurements using 55 MHz Doppler ultrasound (Vevo660, Visualsonics, Inc.) and averaged over the cardiac cycle. Computations were iterated at least 400 steps after convergence criteria were met to ensure stability of secondary flows. A minimum of two hearts were imaged and analyzed per embryonic stage.
Micro-CT generated AV volumes showed over 10-fold growth of the region, concomitant with a 10-fold increase in peak blood velocity. Computational analysis estimated extremely low peak Reynolds numbers (0.013 at HH17 to 25.13 at HH30), with considerably high peak AV shear stress levels (27.5 dynes/cm2 at HH17 to 1300 dynes/cm2 at HH30). Peak shear stresses were on the inflow portion of the cushions/leaflets, accompanied with strong unidirectional flow, while strong vortices with zero mean shear stress developed on the outflow side of the cushions as they condensed into leaflets. The strong correlations between hemodynamic forces and morphological changes suggest that hemodynamics play a significant role in shaping the developing valves, which has important implications for the diagnosis and repair of congenital valve defects and for the mechanical conditioning of living engineered valvular replacements.

Contrary to the advertisement on the back of the New York abstract book, the 5th Biennial meeting will now not be held in Beijing. While the venue was greeted with enthusiasm by the delegates in New York, the Council of the Society took the decision to change the venue of the 2009 meeting. This is now planned to be held in Berlin, Germany.

Once the dates and venue are confirmed full details will be circulated and publicised on the Website.

WANTED

Newsletter Editor (part-time position)
$grateful thanks per annun

Society seeks energetic and enthusiastic person to select articles for, and to compile, Society newsletter on a twice yearly, or quarterly, basis.

If you feel able to become involved in this way, and would like to find out more about this position, please email secretariat@shvd.org.

Working Group on Valve Biology

The working group on valve biology are organising a meeting entitled "Advances in Tissue Engineering and Biology of Heart Valves" at the Royal Society in London from 4th-7th May 2008.

The first day of the meeting will be dedicated to a Postgraduate Course on Percutaneous Valve Replacement. This is the third in a series of meetings and follows the success of conferences held in Florence, Italy (2004) and Hilton Head Island, South Carolina, USA.

Full details of the meeting can be found on www.londonheartvalve.uk.org or via the Society's homepage. Members of the Society are entitled to a discount on the registration fee.

The Need for a Global Perspective On Heart Valve Disease Epidemiology: The SHVD Epidemiology Working Group

The Society for Heart valve Disease was founded in 1999 with the mission to advance the practice, science and art of treating heart valve disease, through a multi-disciplinary approach with the ultimate aim of reducing the global burden of the disease. Within the Society several working groups were initiated to achieve this goal. However, thus far no specific attention was paid to advance the knowledge on the epidemiology of heart valve disease.

Given the increase in the burden of heart valve disease that is expected in the following decades, and the growing inequality when it comes to access to health care, it is time for a global initiative to improve insight into heart valve disease epidemiology.

The proposed working group on epidemiology of heart valve disease is aimed at both clinical epidemiology and population epidemiology, primary and secondary prevention, and studying determinants of therapy selection and outcome in patients with heart valve disease. The main goals of the working group are (1) to improve insight into the occurrence of heart valve disease worldwide and determinants of outcome, (2) connect professionals involved in the subject and (3) put this important health burden on the agenda of health care policy makers.

These 3 goals will be achieved by:

1. Facilitating easy access information (through the SHVD website) on heart valve epidemiology including guidelines for conducting epidemiological studies in the field of heart valve disease, guidelines for data management (in collaboration with the SHVD working group on data management), guidelines for reporting morbidity after cardiac valvular operations (STS/AATS/EACTS), and guidelines for the treatment of heart valve disease (AHA/ACC and ESC). Also, links to other organizations and programs that address heart valve disease epidemiology (for example the World Heart Federation, WHO and NIH) will be provided through the SHVD website. Finally, a special website section for the general public will be developed, with general information on heart valve disease epidemiology and useful links for patients with heart valve disease.

2. Creating a dynamic network of researchers in the field of heart valve disease epidemiology that will address specific epidemiologic topics that deserve special attention. The first projects will focus on rheumatic heart disease (economic analysis of prevention strategies), global assessment of the access to health care for heart valve disease, and studies on characteristics, treatment and outcome of patients with aortic stenosis, patients with mitral regurgitation, and patients who undergo aortic valve replacement worldwide. The results of these projects will be communicated to the public through scientific publications and the SHVD website.
3. Communicating the results of the working group efforts to the relevant health care authorities through presentations, reports and publications. In order to optimally reach health care authorities, we will link with heart valve diseases initiatives of other organizations, in particular those aimed to reduce inequalities related to access to health care, and those aimed at optimizing strategies to reduce the burden of rheumatic heart disease. By combining forces with other successful programs we should be able to make a difference and put this important health burden on the agenda of health care policy makers.

The founding statement of the Epidemiology working group is in preparation and will discuss the details of the first projects that will be launched soon. We invite colleagues who are involved in heart valve disease research and who are interested and committed, to join the working group, help to address the above-mentioned topics and propose new topics and projects that will further improve insight into heart valve disease epidemiology.

Founding members of the working group are:

Jonathan R. Carapetis, Darwin, Australia
Arkalgud S Kumar, New Delhi, India
Nalini M. Rajamannan, Chicago, USA
Raphael Rosenhek, Vienna, Austria
Johanna J.M. Takkenberg, Rotterdam, The Netherlands (chair)
Magdi H. Yacoub., Harefield, United Kingdom

For more information: j.j.m.takkenberg@erasmusmc.nl

Valve Meetings Worldwide

International Valve Symposium 2007
17 - 21 October 2007
Huntington Beach, CA United States
http://www.hoaghospital.org

Heart Lab 2007 - (Focus on Valved Stents for Surgeons)
17 - 21 October 2007
Zurich, Switzerland
http://www.heartlab.org

Vanderbilt Heart Valve Symposium
25 - 26 October 2007
Nashville, TN, United States
http://www.vanderbiltheart.com

The Heartland Series: Aortic Valve and Root Symposium I
26 - 27 October 2007
Lincoln, NE, United States
http://www.promedicacme.com

The Aortic Root: Infection and Dissection
5 November 2007
The Institute of Child Health, London, United Kingdom
http://www.ichevents.com

Florida Valve 2008
7 - 9 March 2008
St. Petersburg, FL, United States
http://www.floridavalvesymposium.com

World Congress of Cardiology
18 – 21 May 2008
Beunos Aires, Argentina
www.worldheart.org

Bioengineering the Heart

An issue of the Philosophical Transactions of the Royal Society has been published that focuses on heart valve biology and tissue engineering of heart valves and myocardium. Contributions from a group of experts representing a range of specialities describe how the heart was formed in the foetus and how it can be tissue engineered. Full details about the issue can be found at www.publishing.royalsoc.ac.uk/tissue-engineering.

Members of the Society can purchase this issue of the Philosophical Transactions at a discounted rate either by contacting Debbie Vaughan at the Royal Society (debbie.vaughan@royalsoc.ac.uk) or Portland Customer Services (sales@portland-services.com) quoting reference TB 1484. Please note that the discounted rate is not available via the Royal Society Website.

Articles in the issue include:

Tissue engineering of heart valves using decellularized xenogeneic or polymeric starter matrices
by Dörthe Schmidt, Ulrich A. Stock, Simon P. Hoerstrup

The heart-forming fields: one or multiple?
by Antoon F.M. Moorman, Vincent M. Christoffels, Robert H. Anderson, Maurice J.B. van den Hoff

Biomimetic approach to cardiac tissue engineering
by M. Radisic, H. Park, S. Gerecht, C. Cannizzaro, R. Langer, G. Vunjak-Novakovic

Extracellular matrix, mechanotransduction and structural hierarchies in heart tissue engineering
by Kevin K. Parker, Donald E. Ingber

Biological matrices and bionanotechnology
by Patricia M. Taylor

Cell-bionics: tools for real-time sensor processing
by Chris Toumazou, Tony Cass

Heart valve function: a biomechanical perspective
by Michael S. Sacks, Ajit P. Yoganathan

Fluid–structure interaction models of the mitral valve: function in normal and pathological states
by K.S. Kunzelman, D.R. Einstein, R.P. Cochran

The shear stress of it all: the cell membrane and mechanochemical transduction
by Charles R. White, John A. Frangos

Valvulogenesis: the moving target
by Jonathan T. Butcher, Roger R. Markwald

Council Members

In line with the Society's constitution the following Councillors have recently retired:-

W Randolph Chitwood, Reiner Koerfer, Daniel Loisance, Hikaru Matsuda, Gaetano Thiene, Magdi Yacoub, Ajit Yoganathan

We are sure you will join us in expressing our sincere thanks and gratitude for their invaluable contribution and we hope the Society will continue to enjoy their support, experience and expertise in the future.

President	Friedrich W Mohr	
President Elect	Robert O Bonow	*Northwestern University Feinberg School of Medicine, Chicago*
Secretary/Treasurer	Adrian Chester	
Editor	Endre Bodnar	
Councillors	David H Adams	*Mount Sinai Hospital, New York*
	Blase A Carabello	
	Gino Gerosa	*University of Padova, Italy*
	Dieter Horstkotte	
	ShengShou Hu	*Fu Wai Hospital, Beijing*
	W R Eric Jamieson	
	Karyn Kunzelman	*Central Maine Medical Center, Lewiston*
	Yutaka Okita	
	Hanneke Takkenberg	*Erasmus University Medical Center, Rotterdam*

Working Groups

Applied computer science	Karyn Kunzelman PhD
Calcification	Robert Levy MD
Cavitation	Ned Hwang PhD
Data Management	R W Eric Jamieson MD
Developmental anatomy & cardiovascular pathology	Gaetano Thiene MD
Echocardiography	John Chambers MD
Epidemiology	Hanneke Takkenberg MD
In vitro testing	John Fisher PhD
Materials science	Frederick J Schoen MD
Minimally invasive & robotic surgery	Friedrich W Mohr MD
Mitral valve repair	David Adams MD
Percutaneous valve technologies	Phillip Bonhoeffer MD
Stentless bioprostheses, Ross procedure & homografts	Tirone E David MD
Thrombosis, embolism & bleeding	Dieter Horstkotte MD
Tissue bio-mechanics	Ivan Vesely PhD
Tissue engineering & molecular biology	Magdi H Yacoub FRS