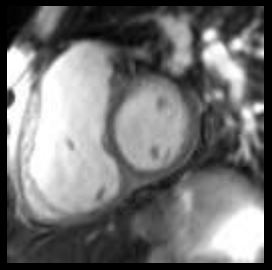
Adult Congenital Heart Disease

Improving Education and Communication Among Cardiologist



Curt J Daniels, MD, FACC

Professor, Internal Medicine and Pediatrics

Director, **COACH** Program **C**olumbus **O**hio **A**dult **C**ongenital **H**eart Disease and Pulmonary Hypertension Programs

Division of Cardiology, The Ohio State University & The Heart Center at Nationwide Children's Hospital

Nationwide Children's Hospital℠

The Ohio State University Medical Center

PATCH Program

Provider Action for Treating Congenital Hearts

PATCH
Provider Action for Treating Congenital Hearts

ACC Chapters Unite with the Adult Congenital Heart Association to Improve the Care for ACHD Patients:

Provider Action for Treating Congenital Hearts (PATCH)
Pilot Program Chapter Opportunities

The ACC/ACHA Provider Action for Treating Congenital Hearts (PATCH) Program:

ACHA and ACC are working to collaborate on the PATCH Program to address four major challenges to the provision of high quality coordinated ACHD care in the U.S.:

- **Lack of educational resources specific to the complex needs of the ACHD population**
- **Lack of awareness of ACHD care guidelines**
- **Lack of networking between ACHD specialists and general cardiologists**
- **Need for greater access to ACHD trained cardiologists and centers of excellence**

PATCH
Provider Action for Treating Congenital Hearts

PATCH Pilot Chapters

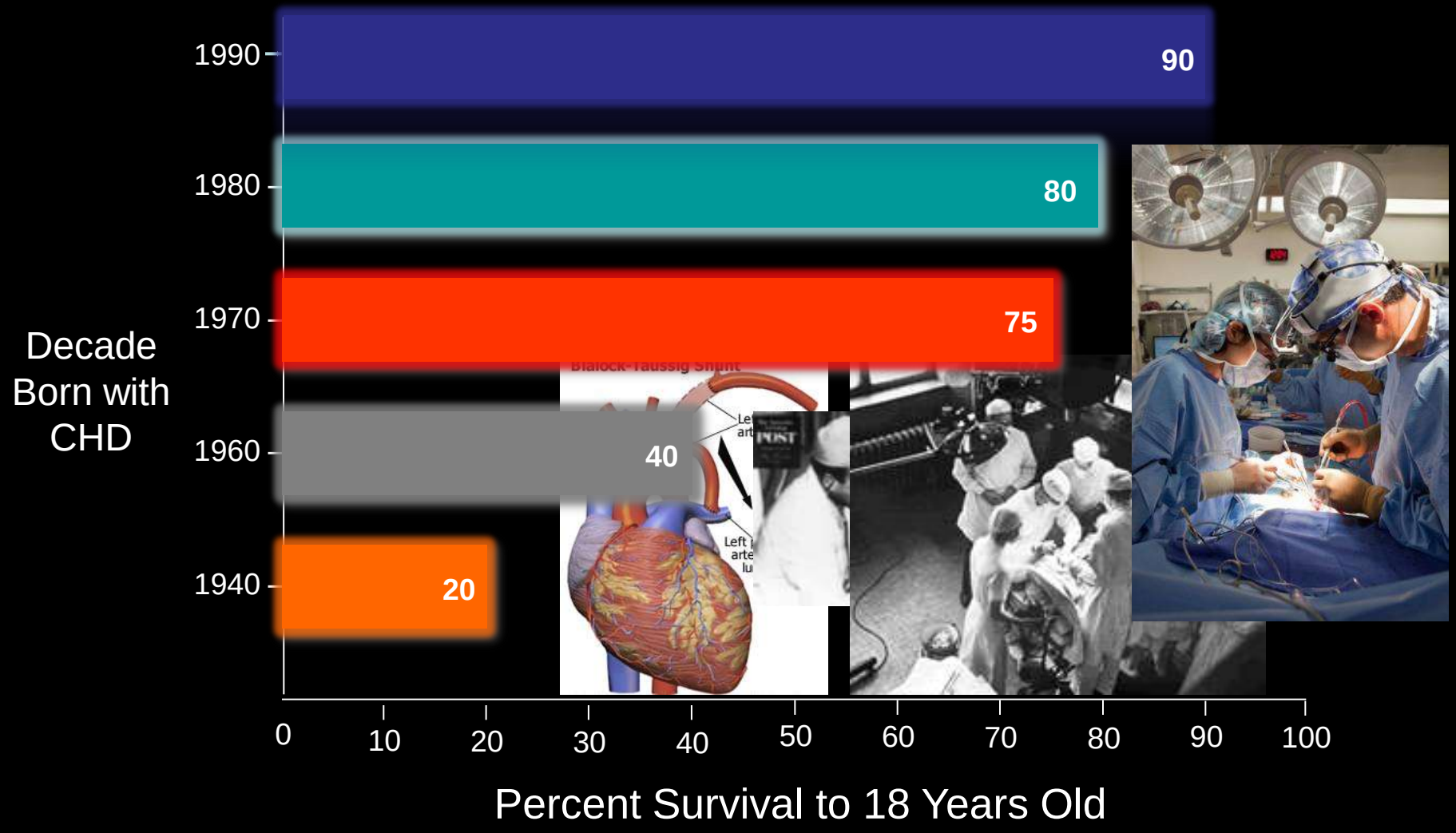
CHD POPULATION

CHD - Population

- 40,000 infants born with CHD/ year.
- THE most common birth defect
- What is successful outcome?
  - Surviving initial surgical repair
  - Surviving to 1 year of age
  - Normal childhood
  - Normal adolescence

Surviving to Adulthood

Survival to 18 yrs of age with CHD

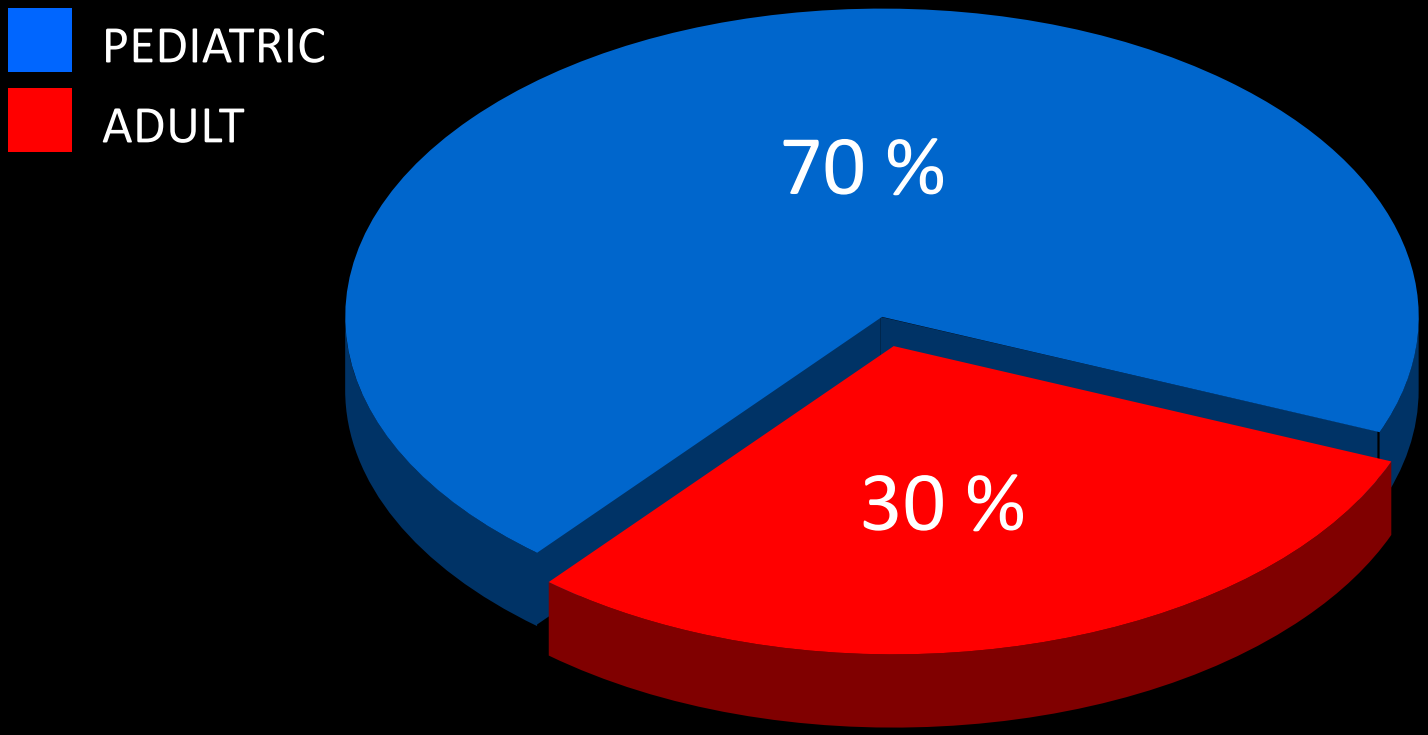


Warnes CA, et al. *J Am Coll Cardiol*. 2001;37(5):1170-1175.

ACHD - Population

Surviving to Adulthood is Now Expected

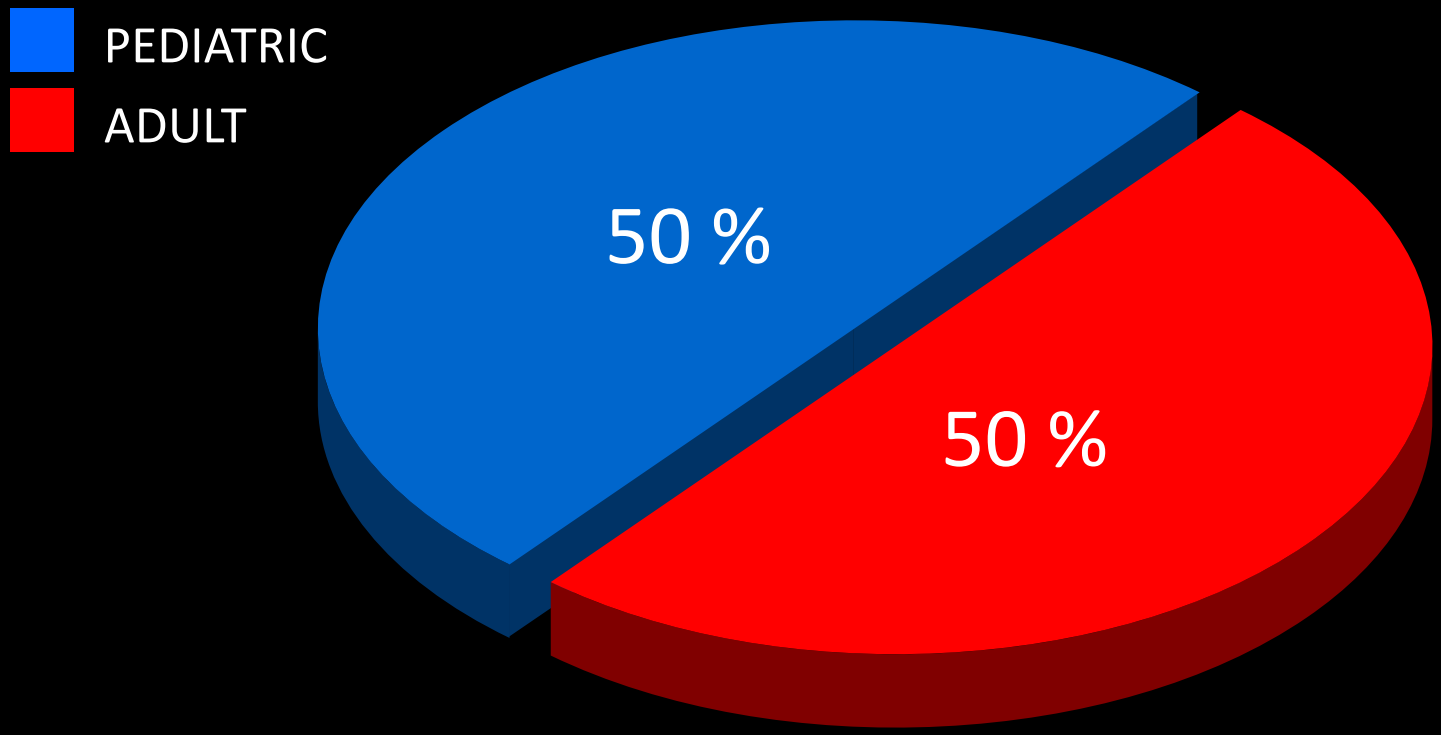
Congenital Heart Disease Population



1965

Williams RG, et al. *J Am Coll Cardiol*. 2006;47(4):701-707.

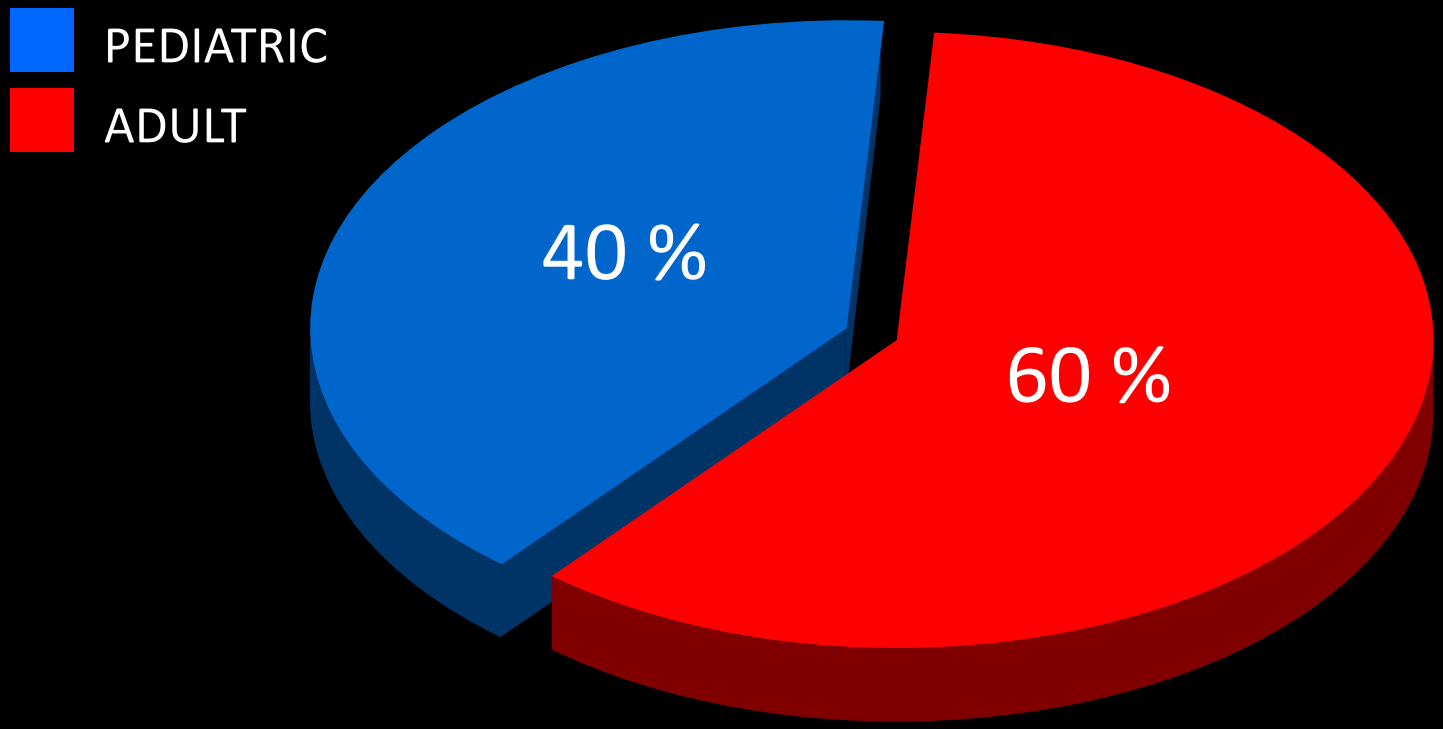
Congenital Heart Disease Population



2000

Williams RG, et al. *J Am Coll Cardiol*. 2006;47(4):701-707.

Congenital Heart Disease Population

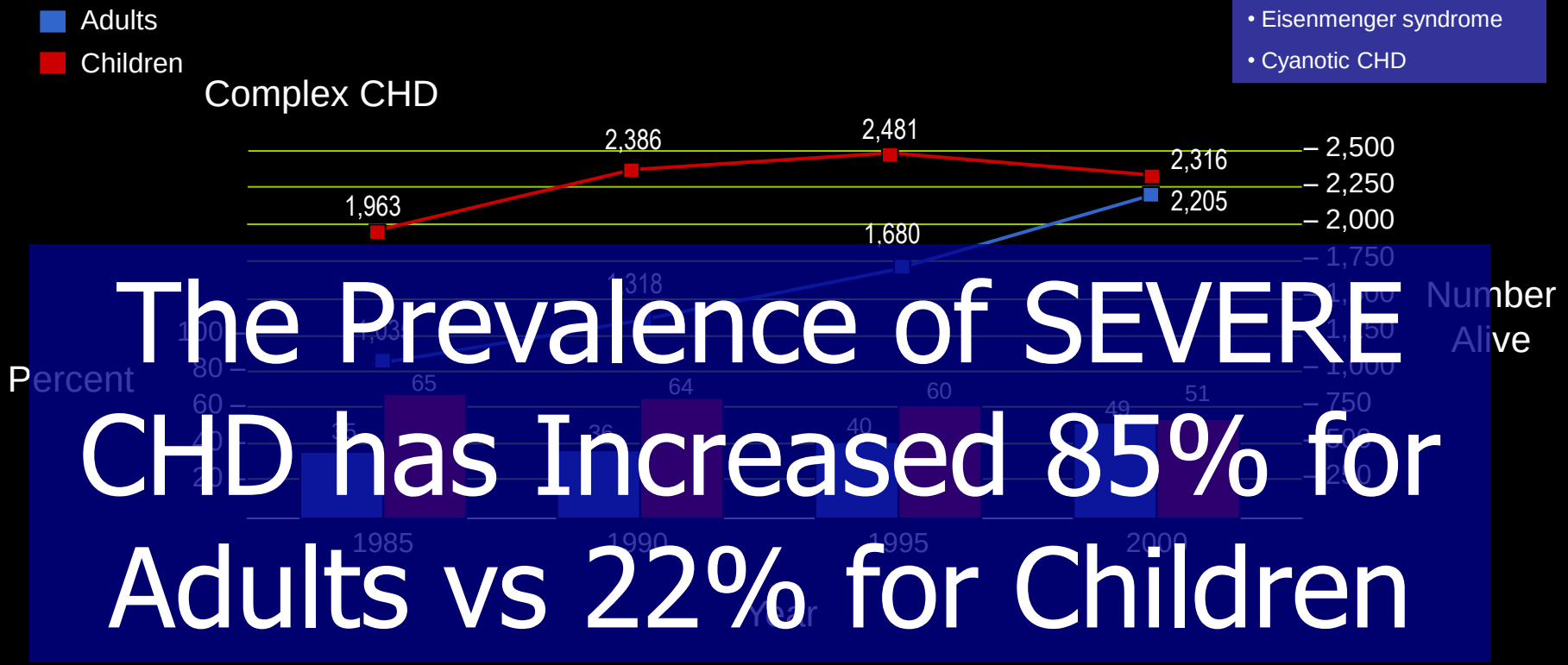


2010

Williams RG, et al. *J Am Coll Cardiol*. 2006;47(4):701-707.

Adult vs Pediatric Complex CHD Populations in Canada

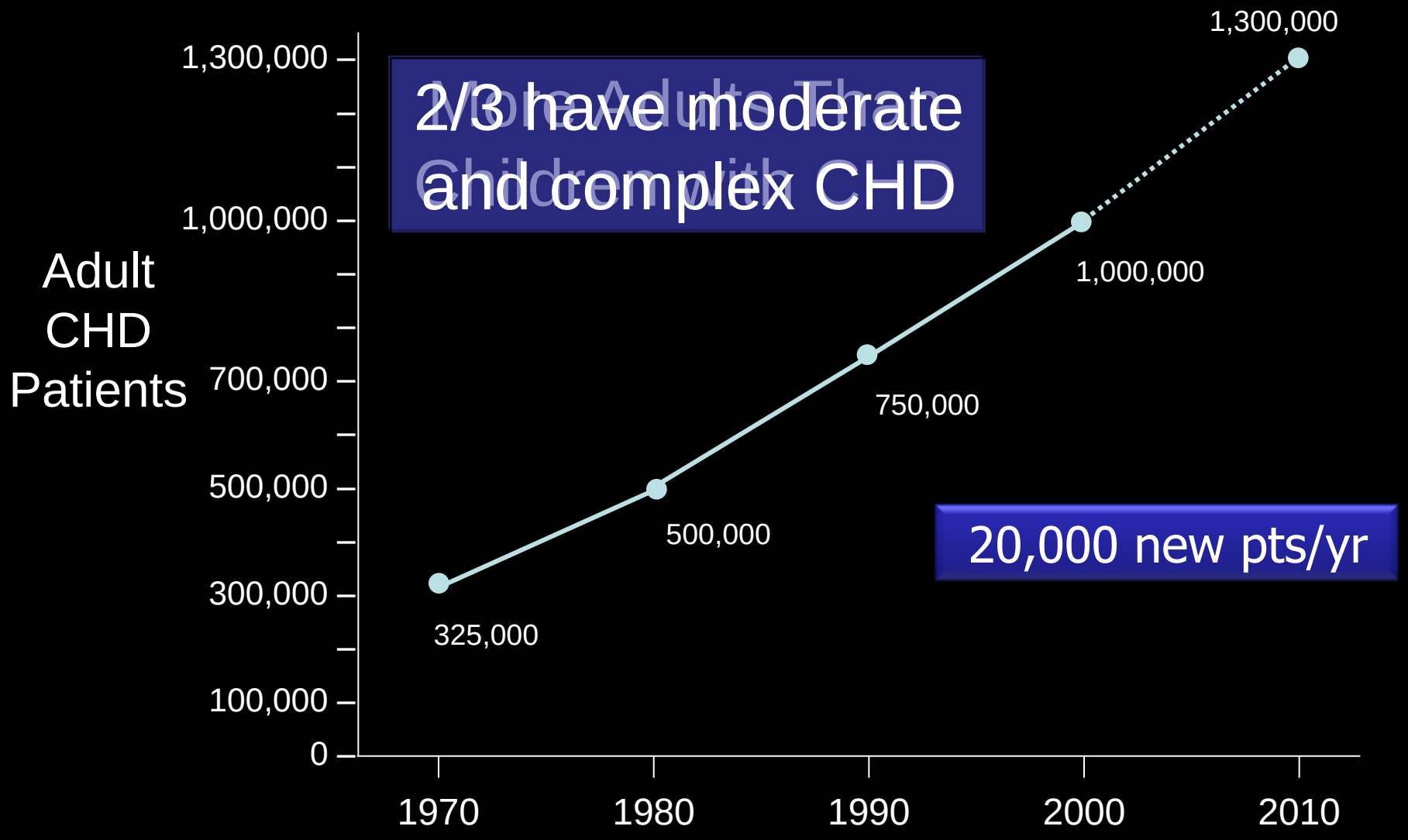
- Single Ventricle
- Pulmonary Atresia
- Transposition Complexes
- Eisenmenger syndrome
- Cyanotic CHD



The Prevalence of SEVERE CHD has Increased 85% for Adults vs 22% for Children

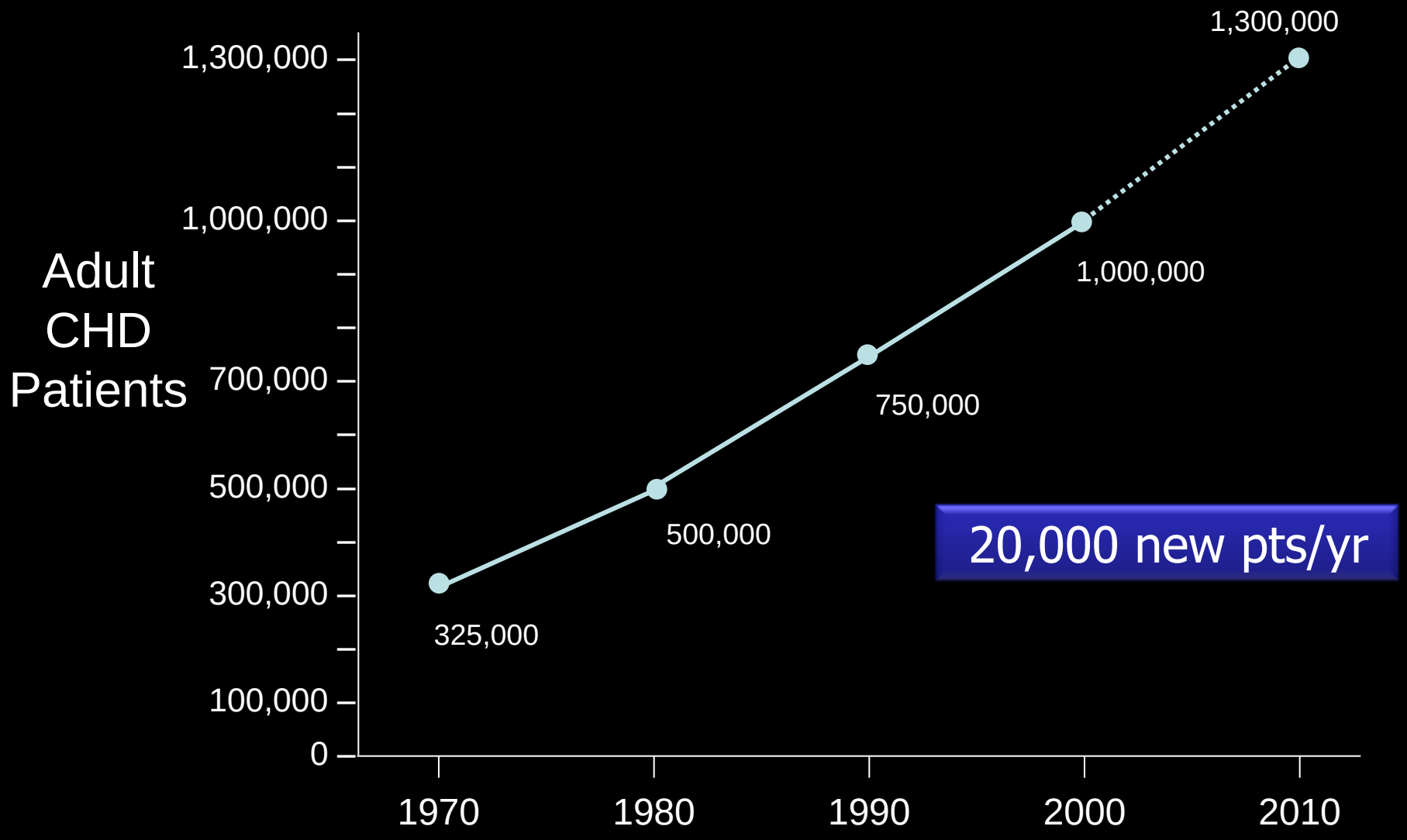
Marelli AJ,et al. *Circulation* 2007; 115: 163-72.

Patients Reaching Adulthood with CHD

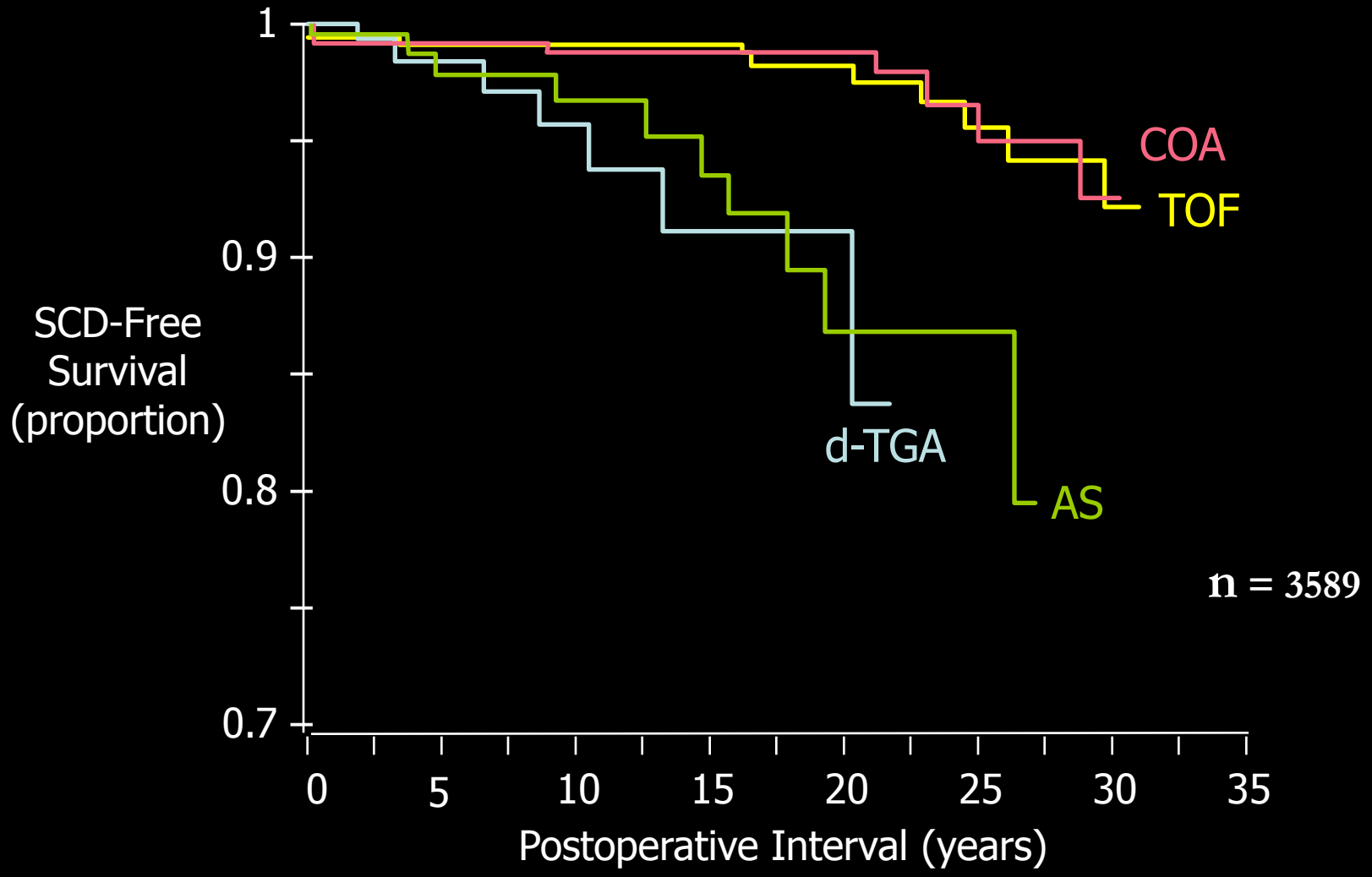


PROBLEM

Patients Reaching Adulthood with CHD



Actuarial Probability of SCD-Free Survival After Surgical Treatment

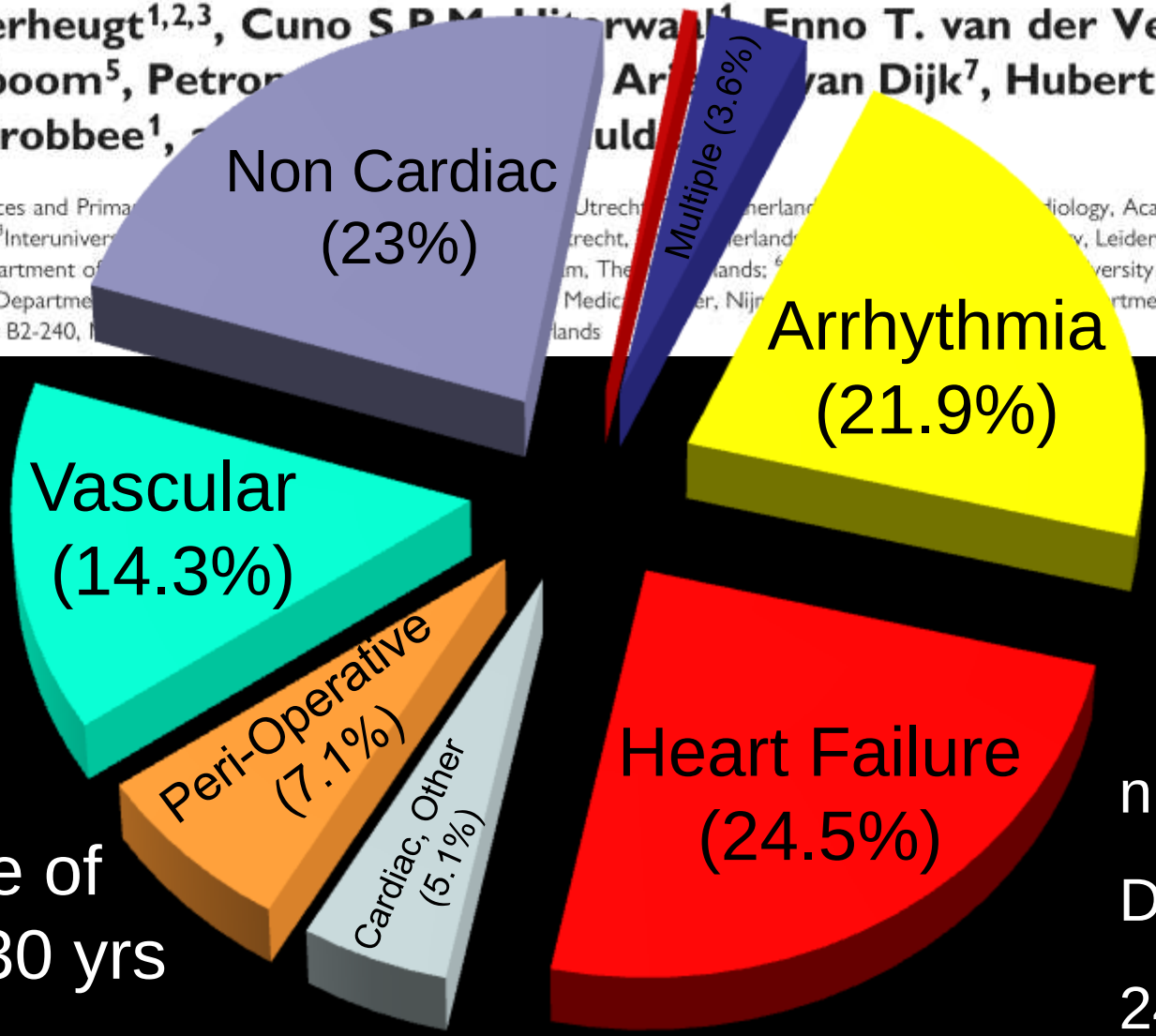


Silka et al. *JACC.* 1998; 32: 245-251.

Mortality in adult congenital heart disease

Carianne L. Verheugt[1,2,3], Cuno S.P.M. [illegible]rwa[illegible][1], Enno T. van der Velde[4], Folkert J. Meijboom[5], Petro[illegible] Ar[illegible]van Dijk[7], Hubert W. Vliegen[4], Diederick E. Grobbee[1], [illegible]uld

[1]Julius Center for Health Sciences and Prima[illegible] Utrech[illegible]herland[illegible]diology, Academic Medical Center, Amsterdam, The Netherlands; [3]Interuniver[illegible]recht, [illegible]erland[illegible]y, Leiden University Medical Center, Leiden, The Netherlands; [5]Department of[illegible]m, The[illegible]lands; [6][illegible]versity Medical Center Groningen, Groningen, The Netherlands; [7]Departme[illegible] Medic[illegible]er, Nijr[illegible]rtment of Cardiology, University Medical Center Utrecht, Room B2-240, [illegible]lands



Mean Age of Death < 30 yrs

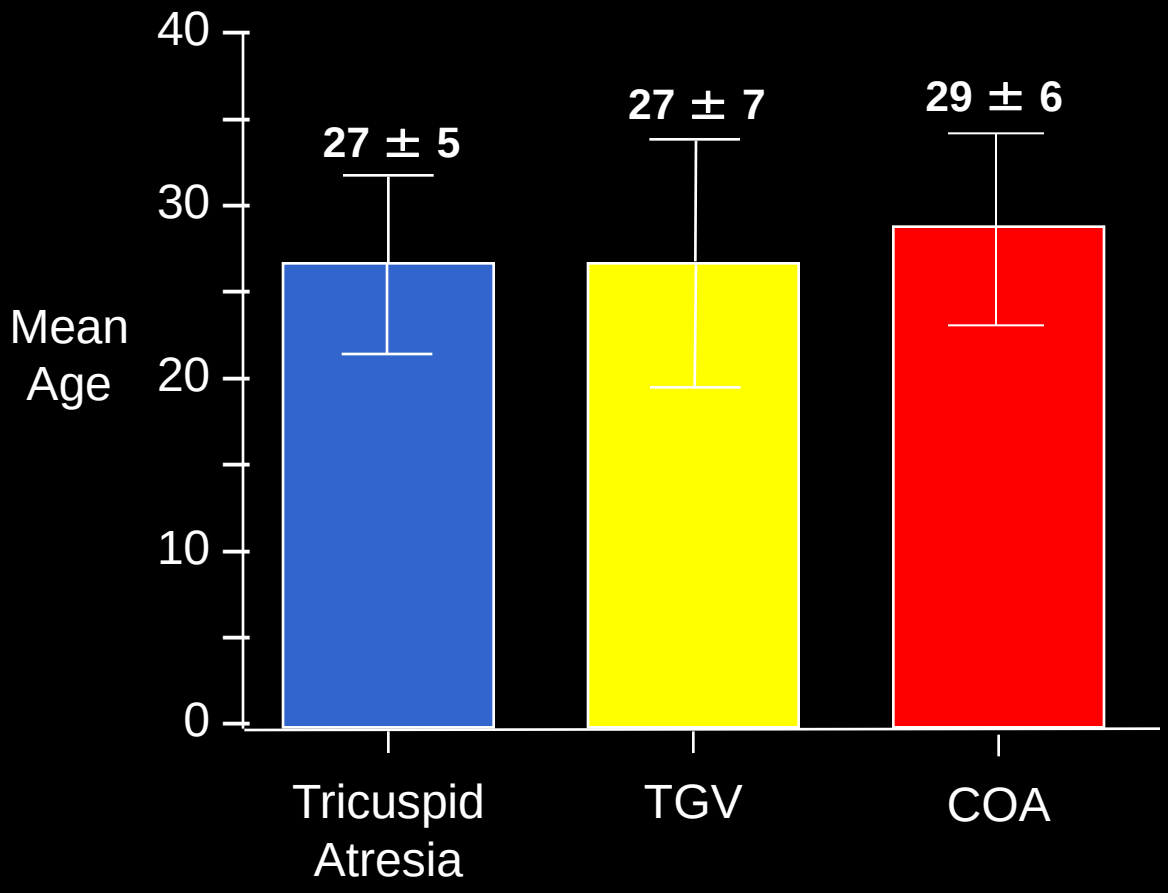
n = 6,933

Died 197

24,865 pt yrs

Verheugt CL et al.EHJ 2010.31:1220-29.

Age at Death for Adults with CHD



n = 2609 patients

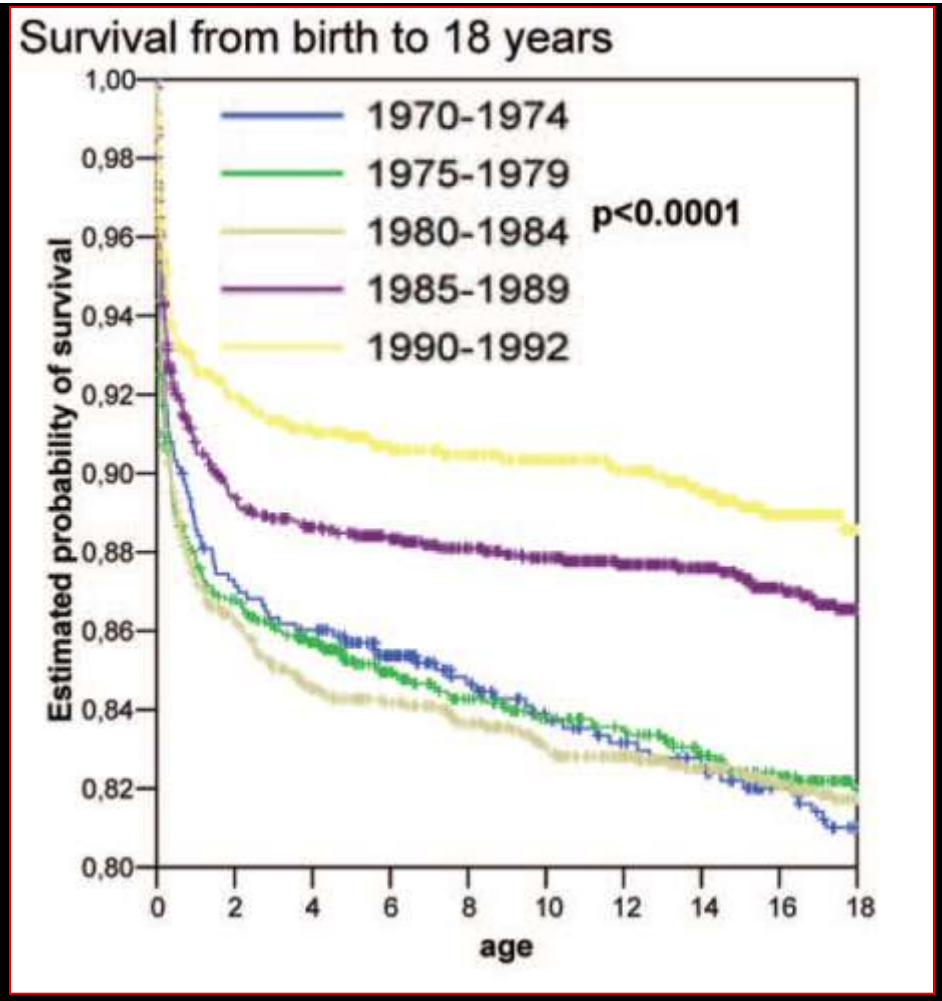
199 died

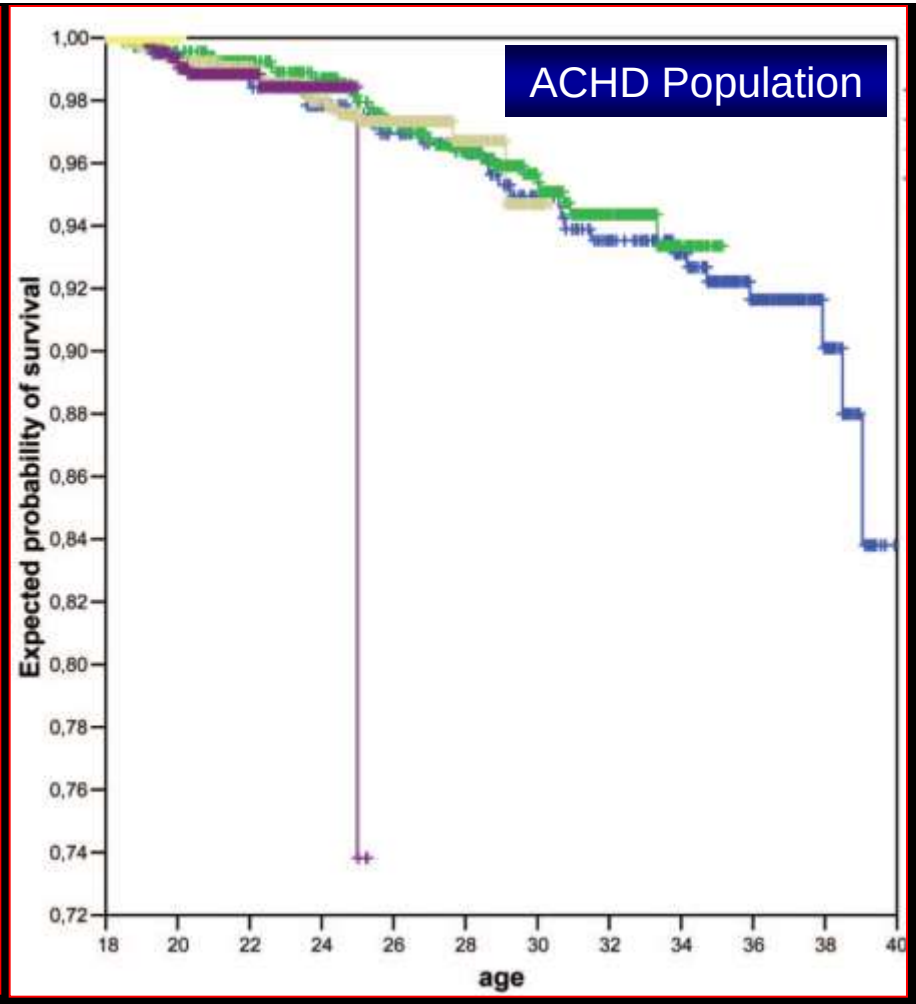
Mean age for all dx
37 ± 15 years

Oechslin EN et al AJC 2000.86:1111-1116.

Temporal Trends in Survival to Adulthood Among Patients Born With Congenital Heart Disease From 1970 to 1992 in Belgium

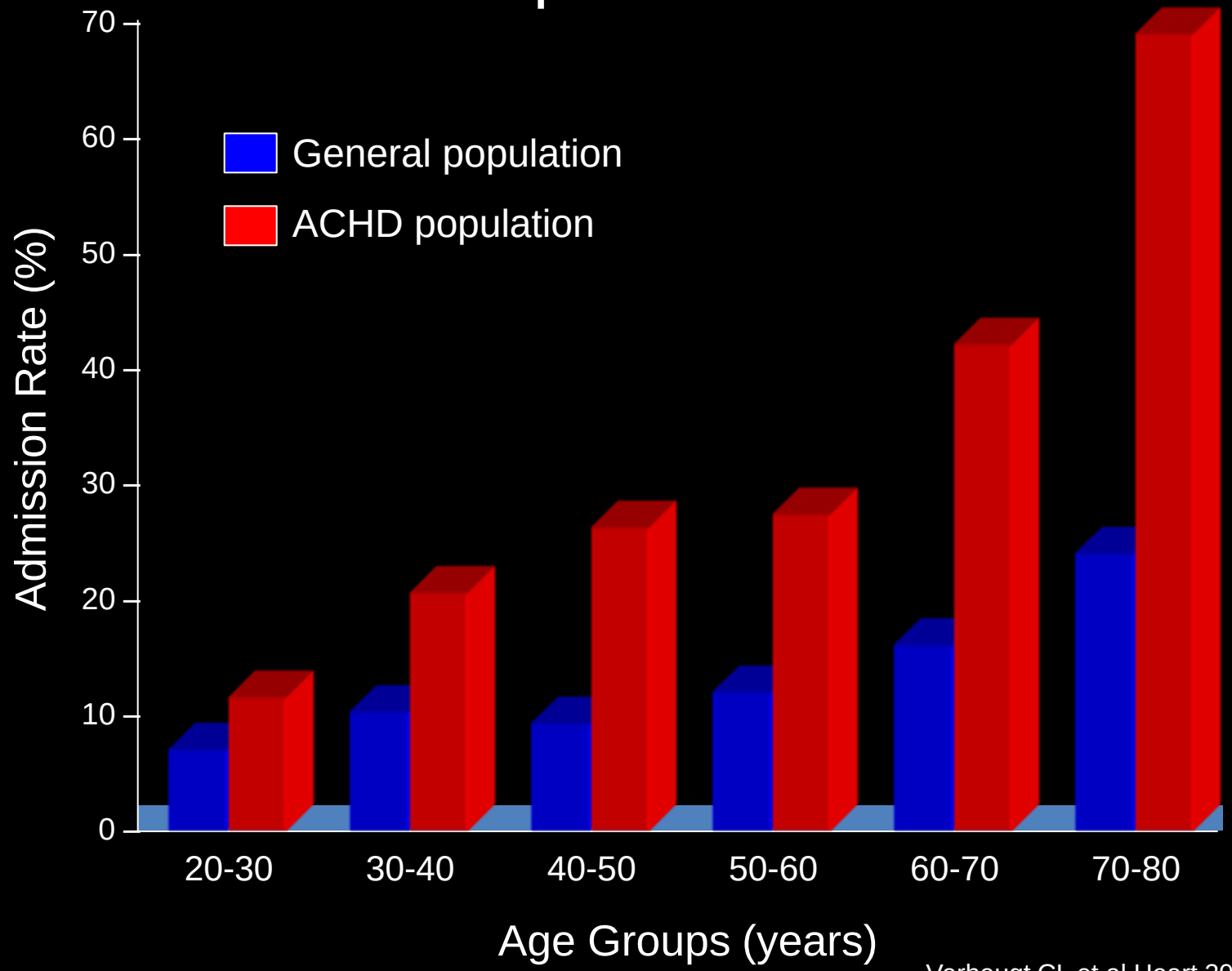
Philip Moons, PhD, RN; Lore Bovijn, MSc, RN; Werner Budts, MD, PhD;
Ann Belmans, MSc; Marc Gewillig, MD, PhD





Moons P et al.Circulation 2010.122:2264-2272

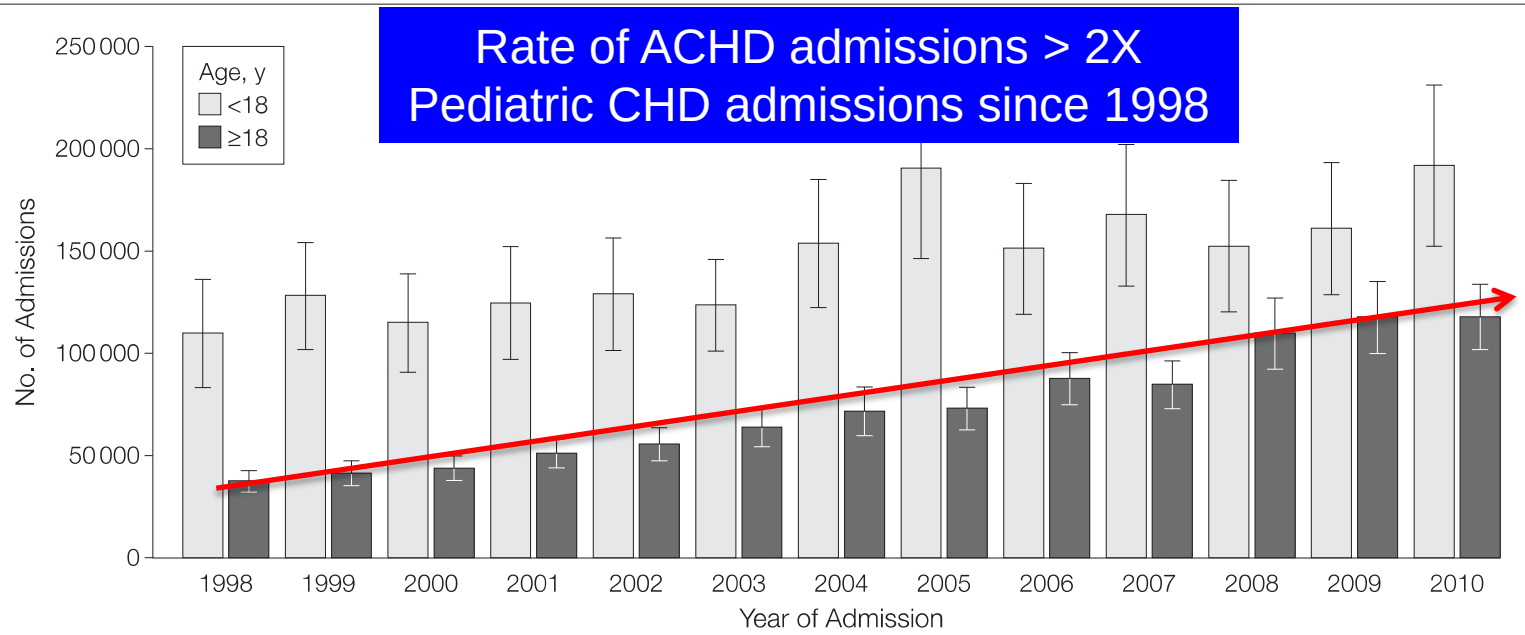
Hospital Admission Rate
General Population vs ACHD



Verheugt CL et al.Heart 2010.96:872-78

MORBIDITY

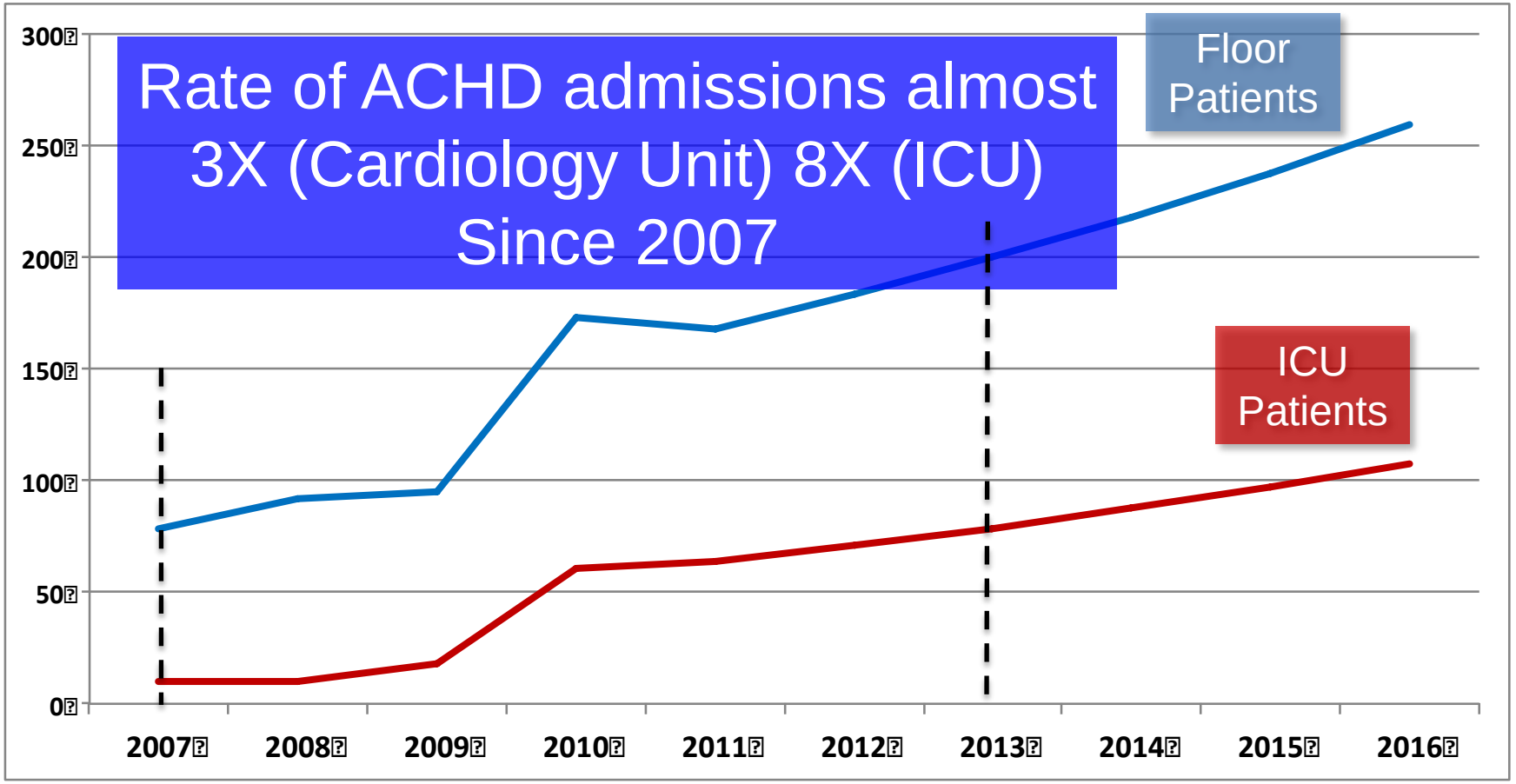
Figure. Annual Pediatric and Adult Congenital Heart Disease Admissions in the United States



Error bars represent 95% CIs.

O'Leary JM, et al 2013.JAMA;309:10:984-6.

COACH ACHD Inpatient Projections



Patients Reaching Adulthood with CHD

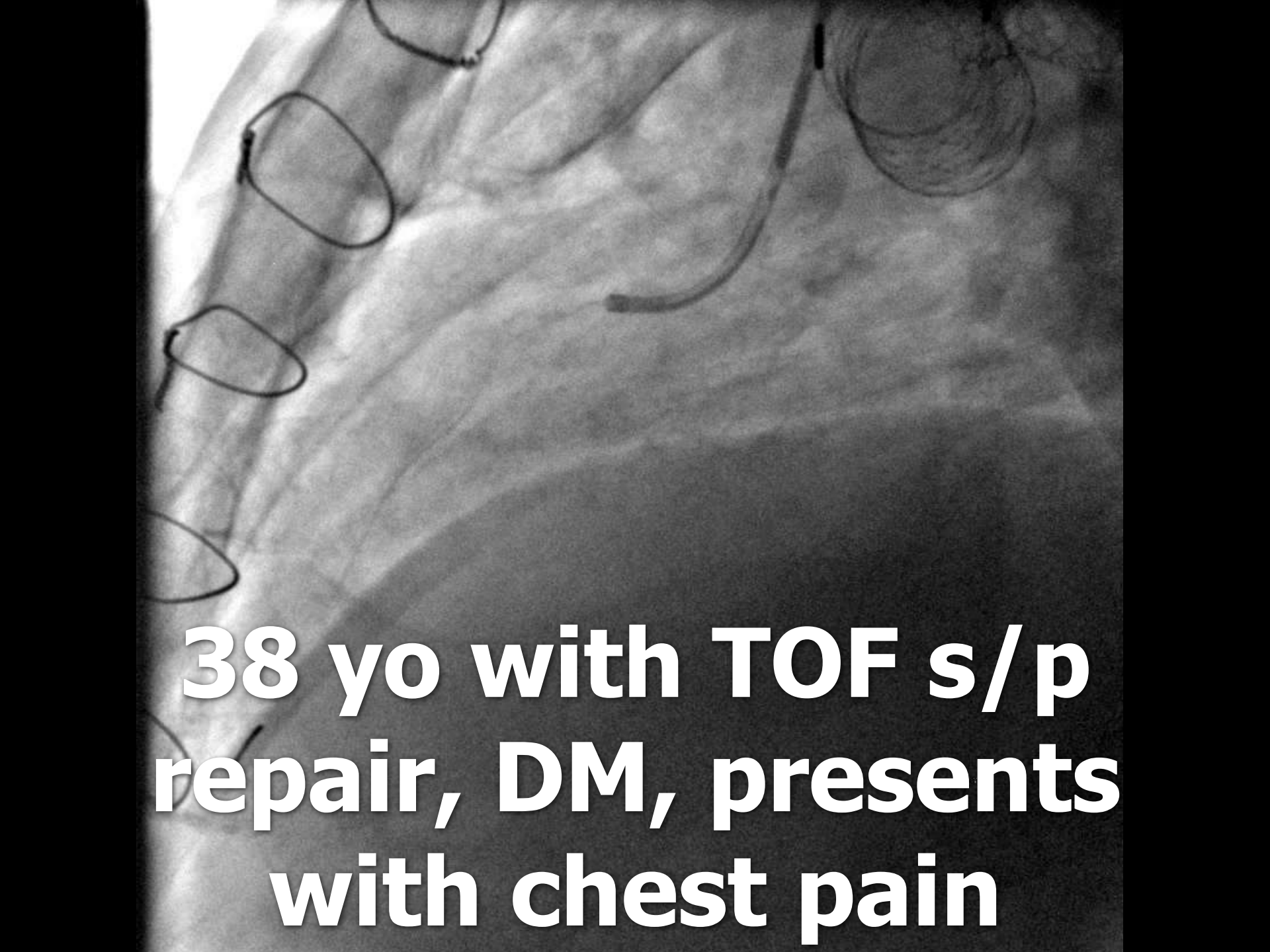
Once Reaching ACHD

- Survival is not as expected
- HF and arrhythmia (~45%)
- Morbidity is substantial

Long –Term Complications

Adult Co-Morbidities

- CAD, PVD
- DM
- OSA, COPD
- Renal and Hepatic Insufficiency


38 yo with TOF s/p repair, DM, presents with chest pain


Heart Failure
Acquired Heart Disease
ACHD
Pulmonary Hypertension
Arrhythmias
Liver Disease
Re-operation
Aortic Disease
Valve Disease
Vascular Disease
High Risk Pregnancy
PEDIATRIC EP
HF/TXPL
PEDIATRIC CARDIOLOGY
INTERNAL MEDICINE CARDIOLOGY
INTERNAL MEDICINE EP
ACHD
CHD PATIENTS
CT Surgery

Long –Term Complications

Adults with Congenital Heart Disease

Arrhythmias

- Atrial
- Ventricular
- Sudden Death

Heart Failure

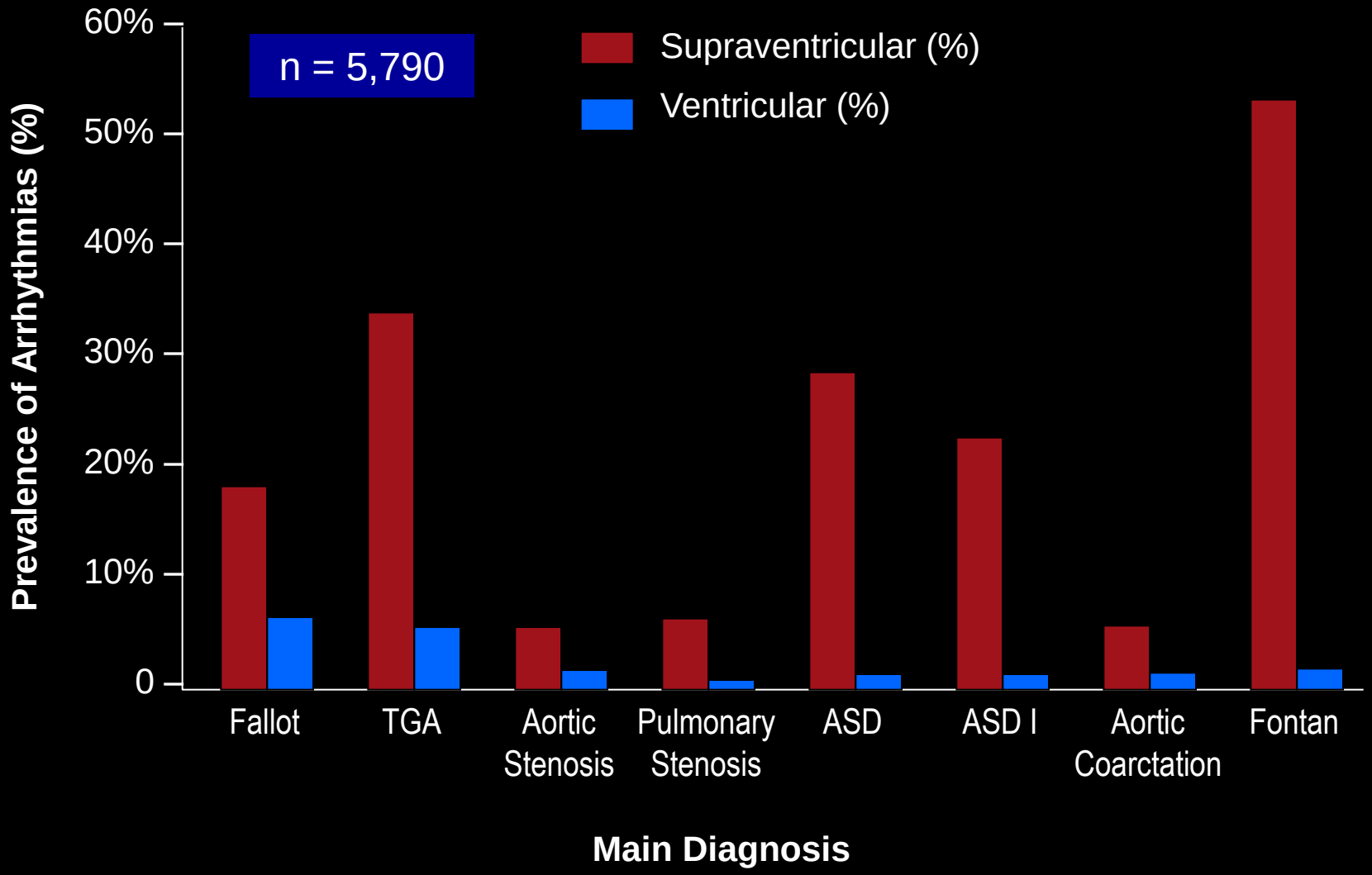
- Right Heart Failure
- Left Heart Failure
  - Systolic
  - Diastolic
- Pulmonary Hypertension

Vascular Lesions

Valvular Disease

Residual Shunts

Prevalence of Arrhythmias in ACHD Patients



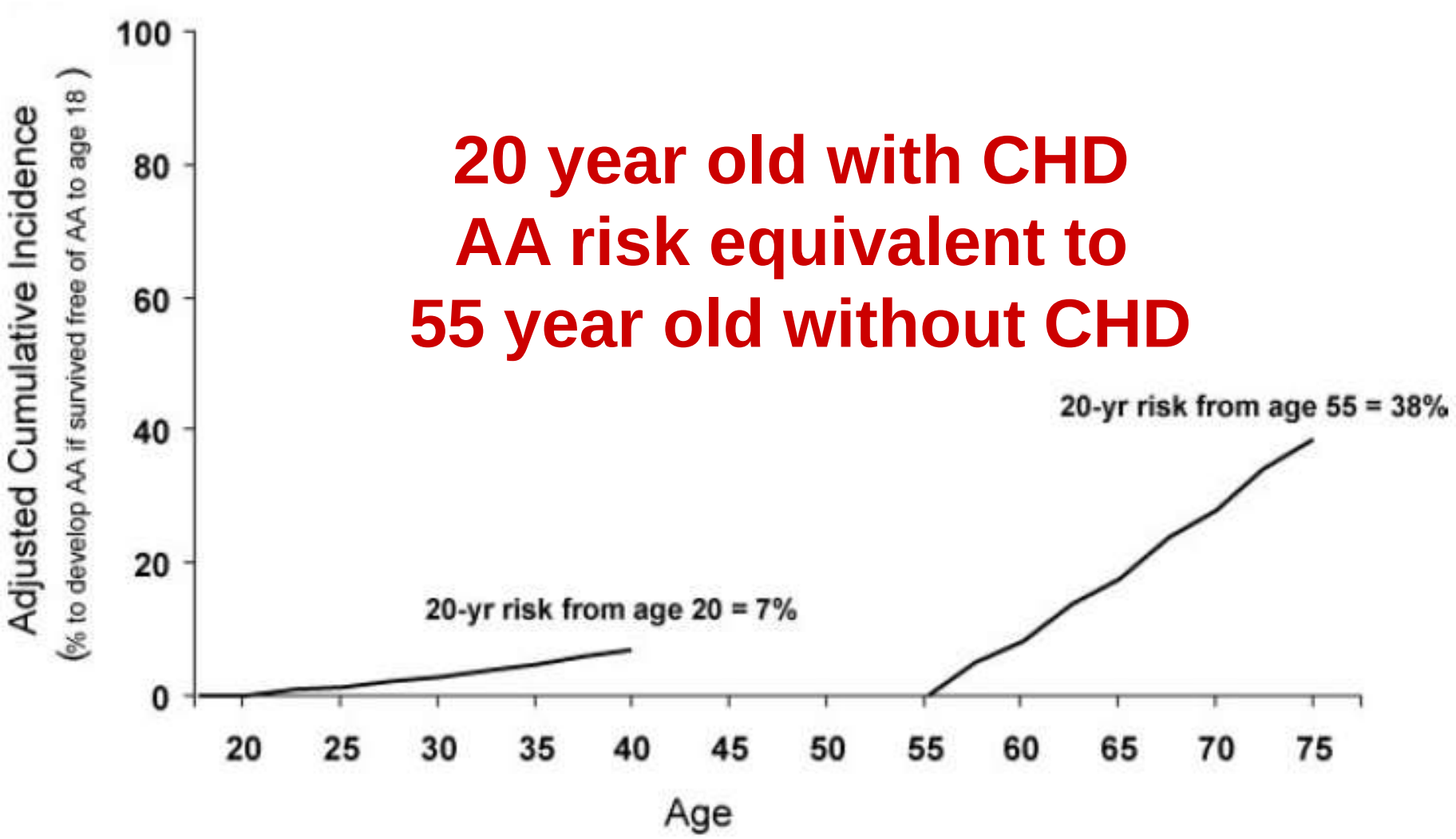
Vander Velde, et a.. *Eur J Epidemiol* 2005;20;549-557

Cumulative Risk of Atrial Arrhythmia in ACHD

	Period Risk in 5-Year Intervals, %										
Age, y	5	10	15	20	25	30	35	40	45	50	Lifetime Risk* (95% CI)
Severe CHD											
20	3.7	8.4	12.8	18.0	22.7	30.5	37.0	43.3	50.4	57.1	63.0 (58.8–67.2)
25	4.9	9.5	15.1	20.1	28.3	35.1	41.8	49.2	56.3		62.6 (58.1–67.0)
30	5.0	10.9	16.3	25.1	32.3	39.5	47.5	55.1			61.8 (57.1–66.5)
35	6.3	12.0	21.3	29.1	36.7	45.2	53.2				60.3 (55.3–65.2)
40	6.2	16.4	24.9	33.2	42.5	51.3					59.0 (53.8–64.3)
45	11.1	20.3	29.4	39.5	49.1						57.5 (51.8–63.3)
50	11.0	21.8	33.8	45.2							55.2 (48.6–61.9)
55	12.5	26.5	39.7								51.3 (44.3–58.5)
60	16.6	32.4									46.3 (38.3–54.3)
65	19.6										36.9 (28.3–45.5)
70											22.7 (14.2–31.2)
Other CHD											
20	1.0	2.0	3.4	5.4	8.6	12.9	17.8	23.9	31.0	38.8	46.7 (45.8–67.6)
25	1.0	2.5	[illegible]	7.8	12.2	17.1	23.4	30.5	38.4		46.5 (45.6–47.4)
30	1.5	3.6	6.9	11.4	16.4	22.7	30.0	38.1			46.2 (45.3–47.2)
35	2.1	5.5	10.1	15.2	21.7	29.1	37.4				45.7 (44.8–46.6)
40	[illegible]	8.2	13.4	20.1	27.8	36.2					44.8 (43.9–45.8)
45	4.9	10.4	17.4	25.5	34.3						43.3 (42.4–44.3)
50	5.9	13.4	21.9	31.4							41.0 (40.1–42.0)
55	8.1	17.4	27.7								38.2 (27.2–39.2)
60	10.4	21.9									33.6 (32.6–34.6)

Bouchardy et al. Circulation 2009; 120:1679-1686

Atrial Arrhythmia Risk



20 year old with CHD
AA risk equivalent to
55 year old without CHD

Bouchardy et al. Circulation 2009; 120:1679-1686

Adverse Events and Survival with CHD and Atrial Arrhythmias

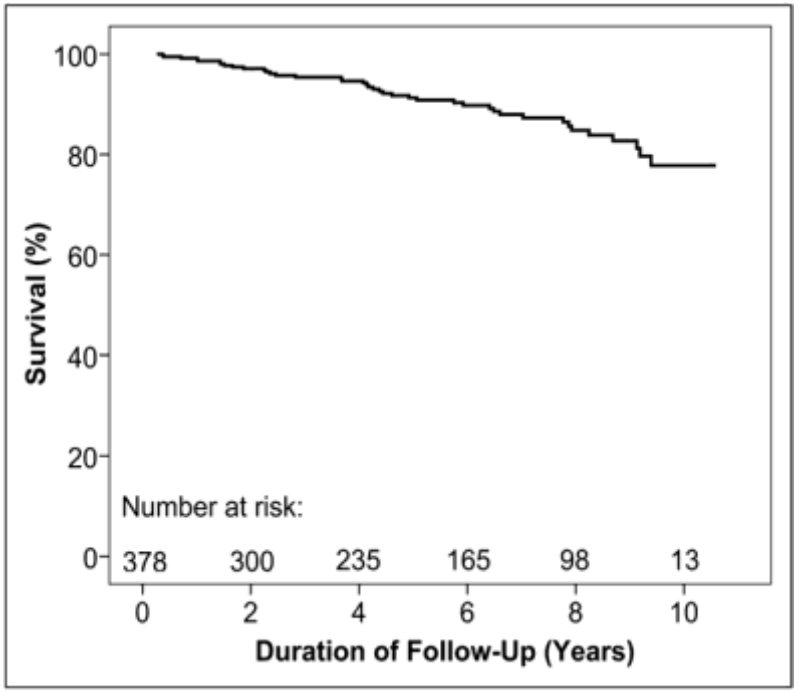
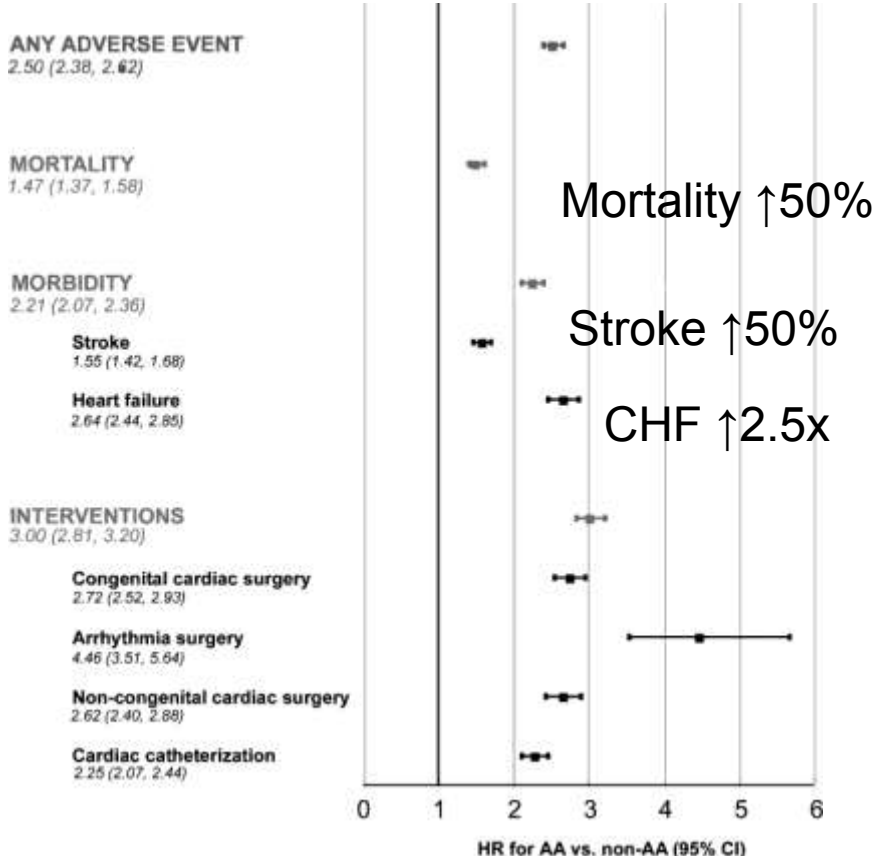


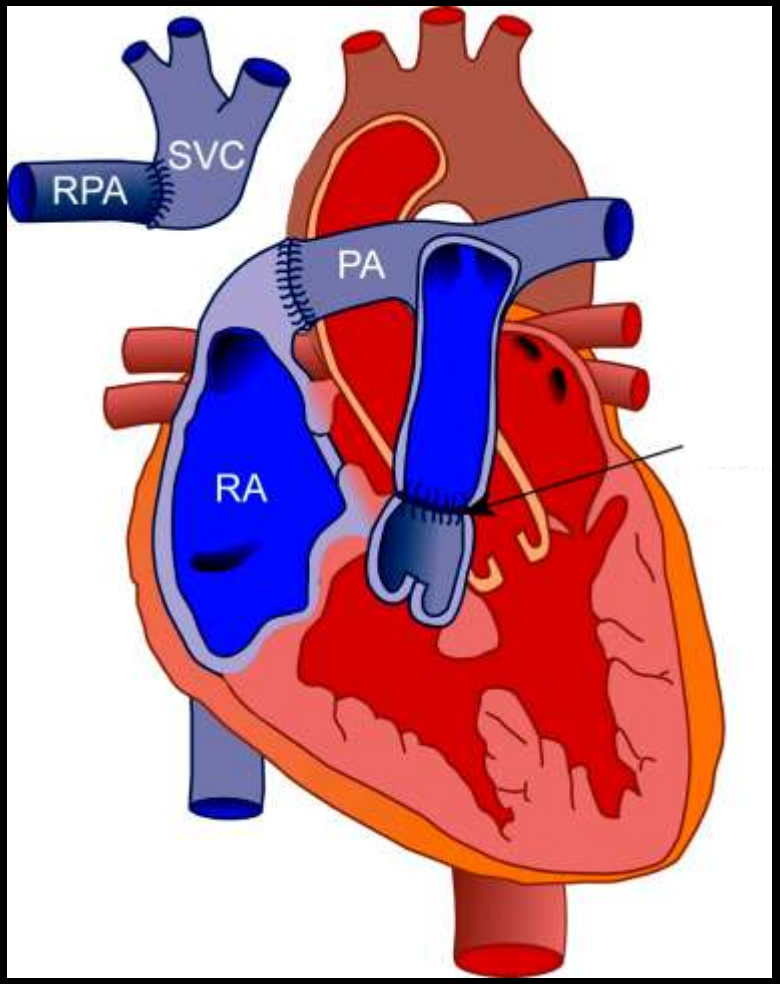
Figure 1. Kaplan–Meier survival curve for all-cause mortality in adults with congenital heart disease and atrial arrhythmias after the index visit.

Yap et al. AJC 2011; 108;723-728

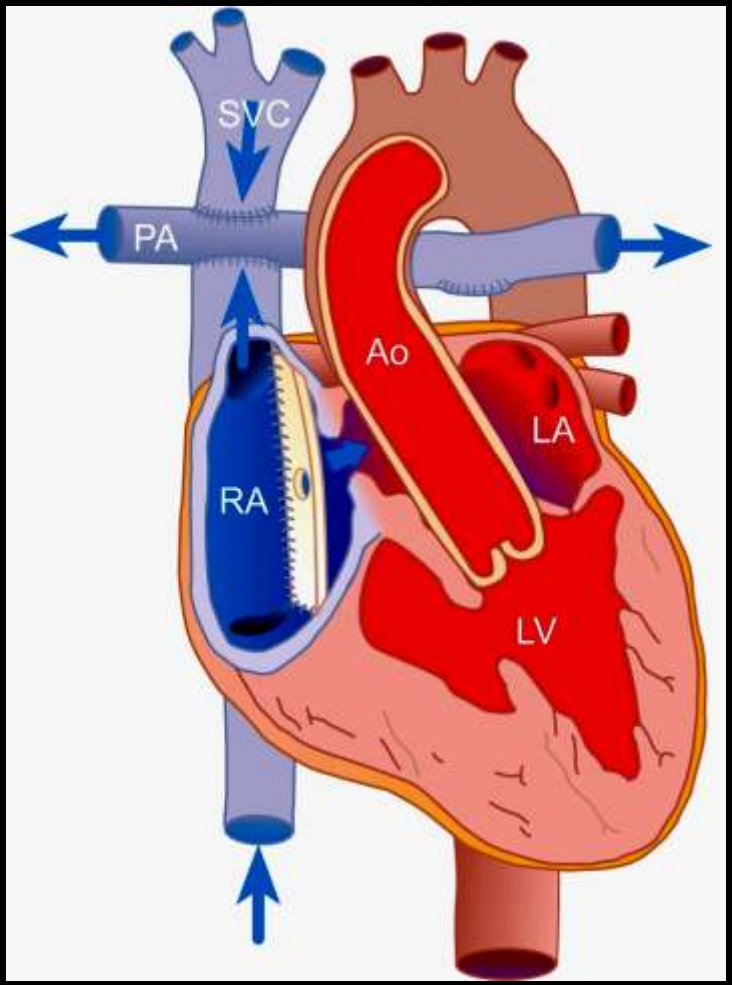


Bouchardy et al. Circulation 2009; 120:1679-1686

Single Ventricle/Fontan

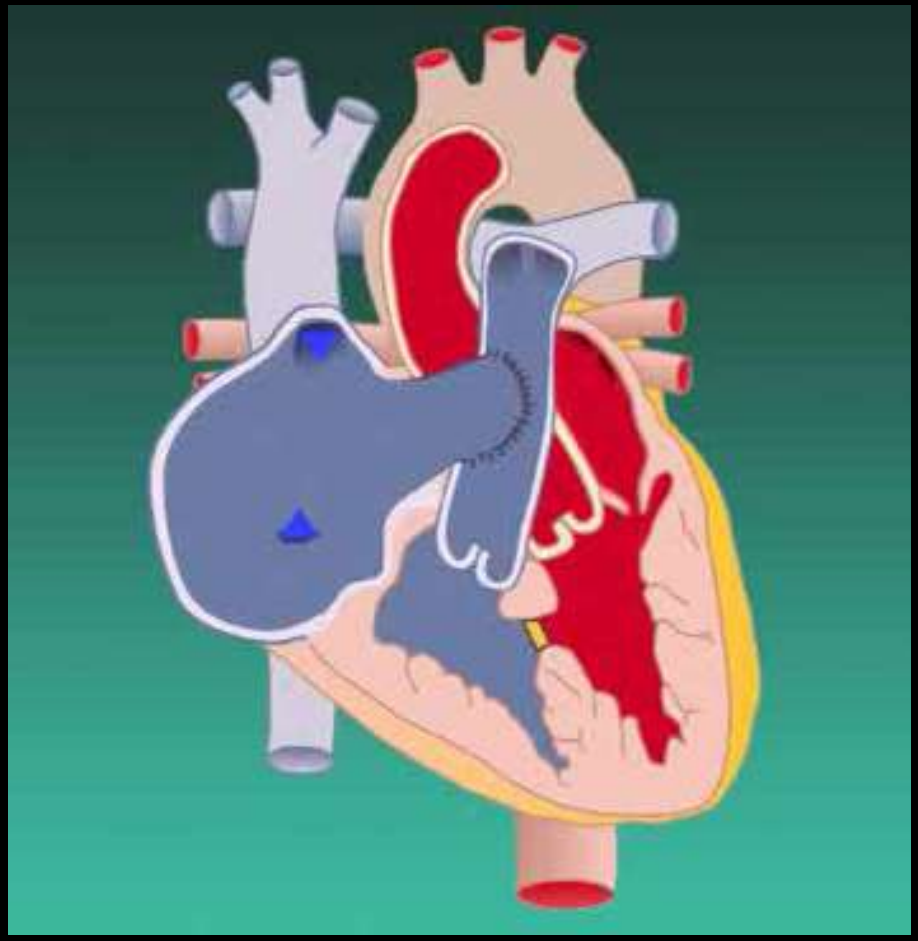


Modified Fontan



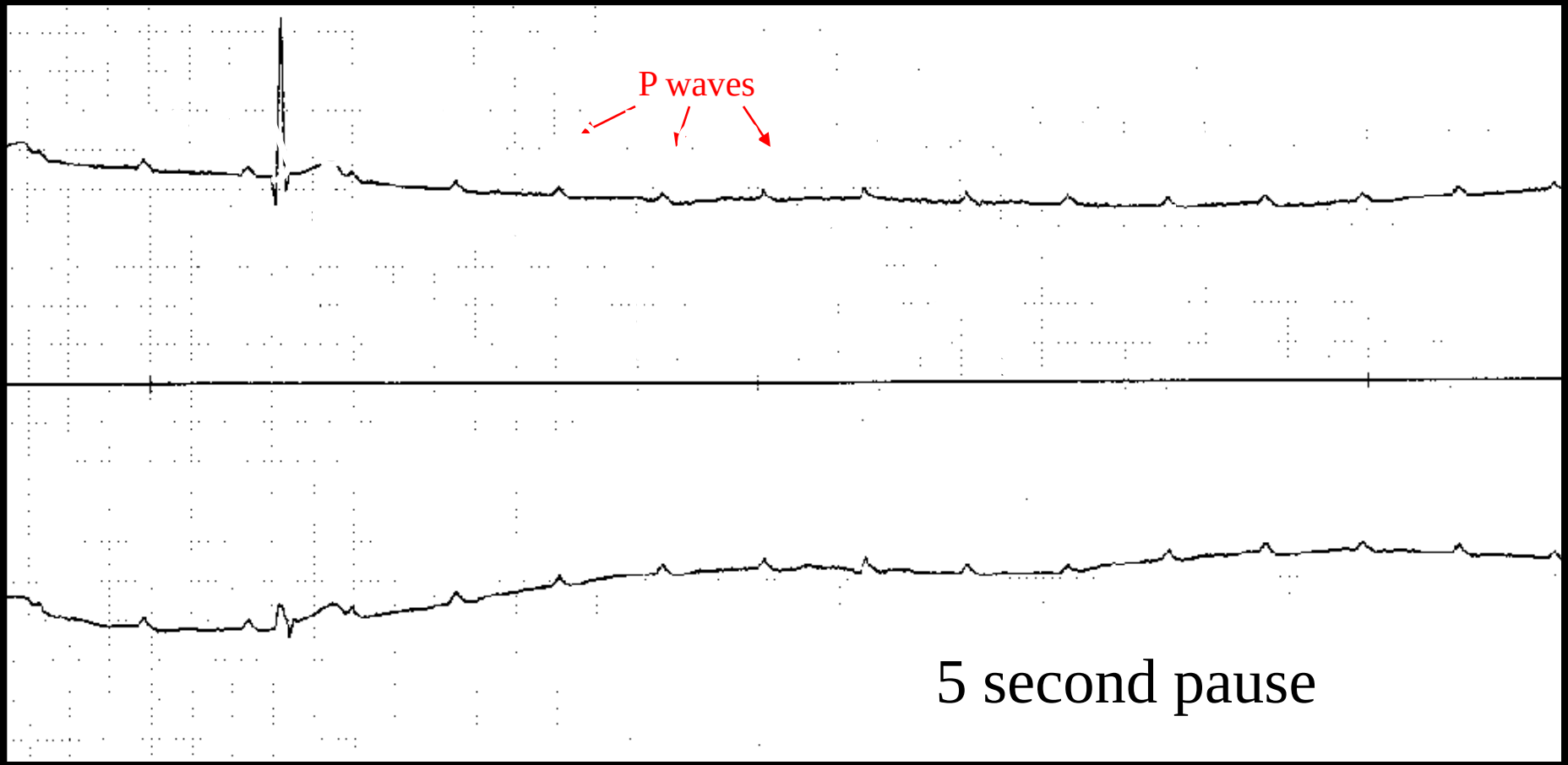
Lateral Tunnel

Single Ventricle/Fontan



Single Ventricle/Fontan

Holter monitor



Mary Rutan Hospital

Bellefontaine, Ohio

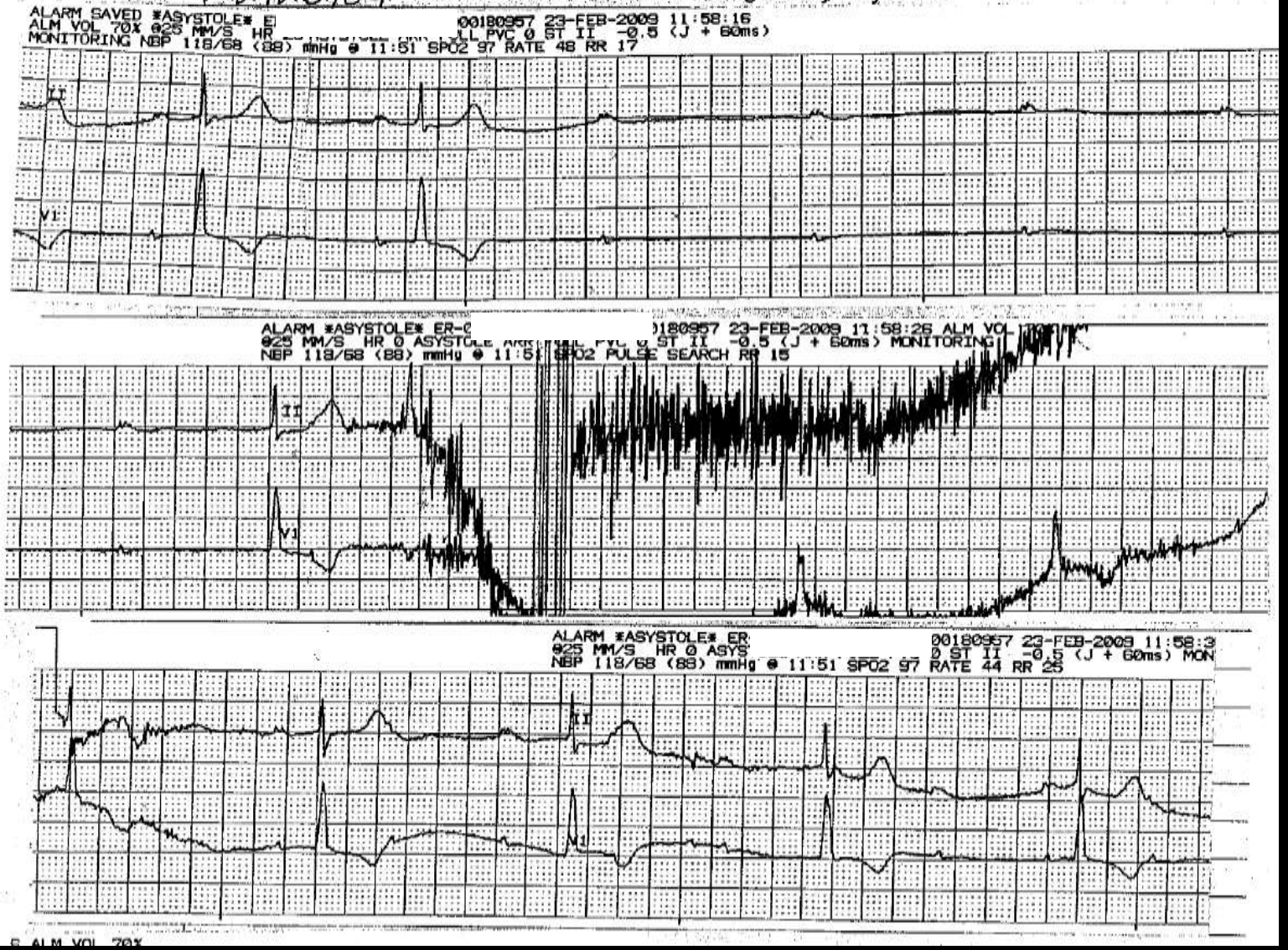
PATIENT PROGRESS NOTES

EMR
180957

025Y M
A.
J.

02/23/09

Date 2/23/09 Notes Should Be Signed by Physician



10-DEC-1976 (35 yr)
Male Caucasian

Room:RE14
Loc:88

Vent. rate	127	BPM
PR interval	*	ms
QRS duration	108	ms
QT/QTc	336/488	ms
P-R-T axes	* 191	11

ABNORMAL RHYTHM-TYPE UNDETERMINED
PROBABLE SLOW SVT
ACCELERATED JUNCTIONAL RHYTHM WITH RETROGRADE CONDUCTION CANNOT BE EXCLUDED
ASSUMING THAT ELECTRODES ARE PROPERLY PLACED, SUSPECT MESOCARDIA WITH HYPERTROPHY OF THE SYSTEMIC VENTRICLE

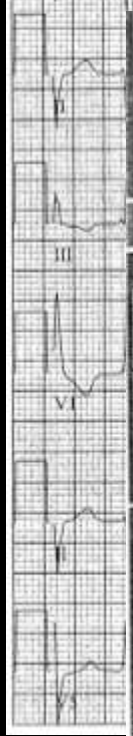
Reconfirmed by LEIER, MD (13), C.V. (7) on 10/15/2012 2:51:15 PM

Technician:
Test ind:95

Referred by:

Confirmed By: C.V. LEIER, MD (13)

Comments:



Patient ID	Gender	Date of Birth	Phone	Monitor
907123024	Male	12/10/1976 (36 years)	734-604-2751	Braemar ER920W

Physician: CURTIS J DANIELS
Practice: OHIO STATE UNIVERSITY-ROSS
Diagnosis: Paroxysmal supraventricular tachycardia

Period (30 Days)
06/01/2013 - 06/30/2013

Event Counts

Critical: 1	Total: 4
Serious: 0	Patient: 3
Stable: 3	Auto: 1

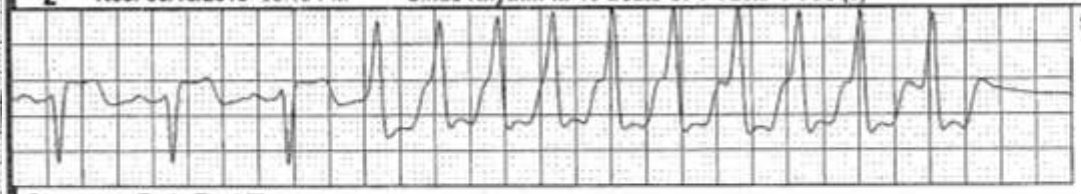
Event Summary

1 Rec: 06/01/2013 02:32 PM — Sinus Rhythm w/ PVC(1)/Lead Loss — Stable

Symptom: Baseline
Activity: Wireless Event
Trans: 06/01/2013 02:34 PM
Type: Patient-Activated
HR: 93.2 BPM

Comments: Tech: Toye Mason, CCT

2 Rec: 06/15/2013 09:19 PM — Sinus Rhythm w/ 10 Beats Of V-Tach/ PVCs (5) — Critical



Symptom: Auto Detect- Racing Hear
Activity: Sitting
Trans: 06/15/2013 09:33 PM
Type: Auto-Detected
HR: 175.7 BPM
Dr. Notified - See Event Report

Comments: Tech: Tim Miller

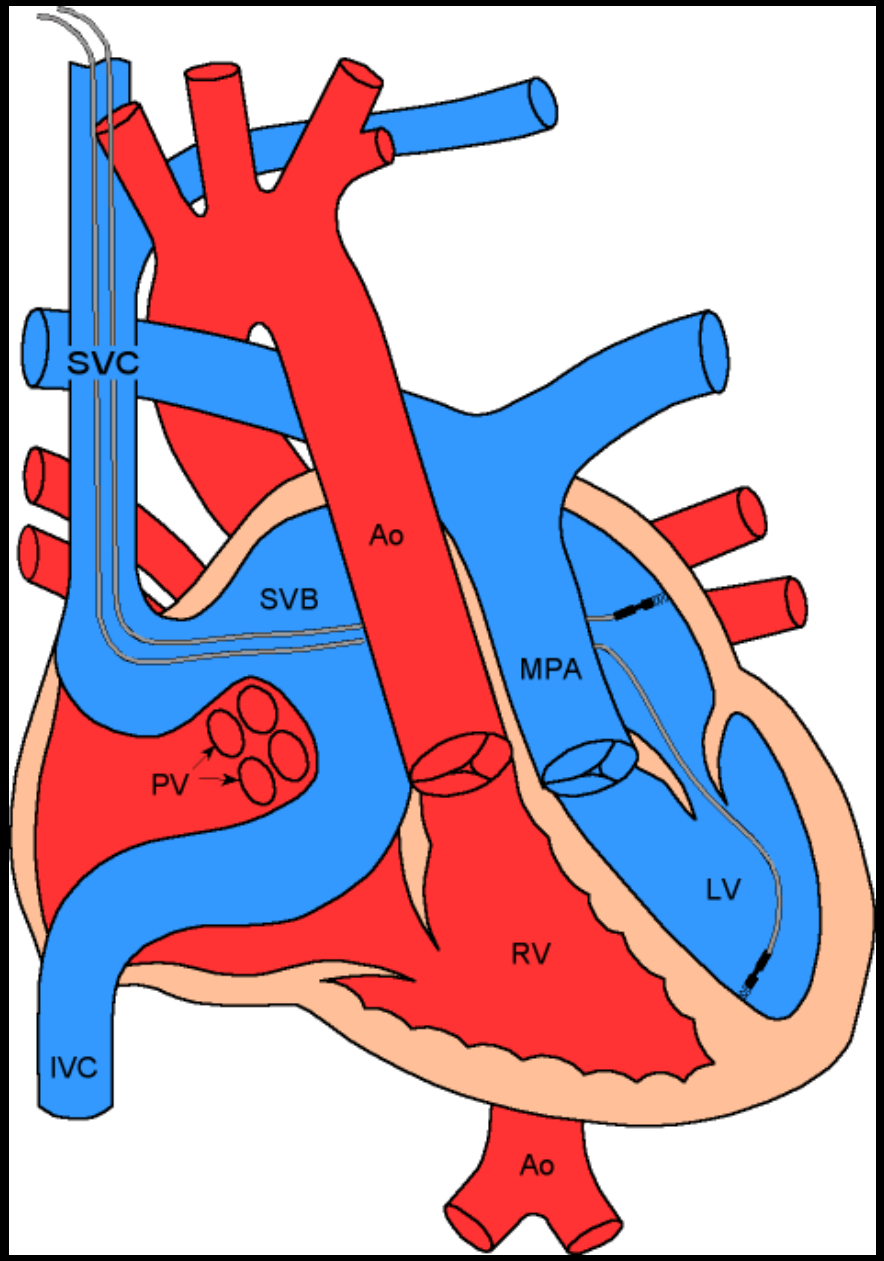
3 Rec: 06/15/2013 10:00 PM — Sinus Rhythm -Sinus Tachycardia w/PAC — Stable

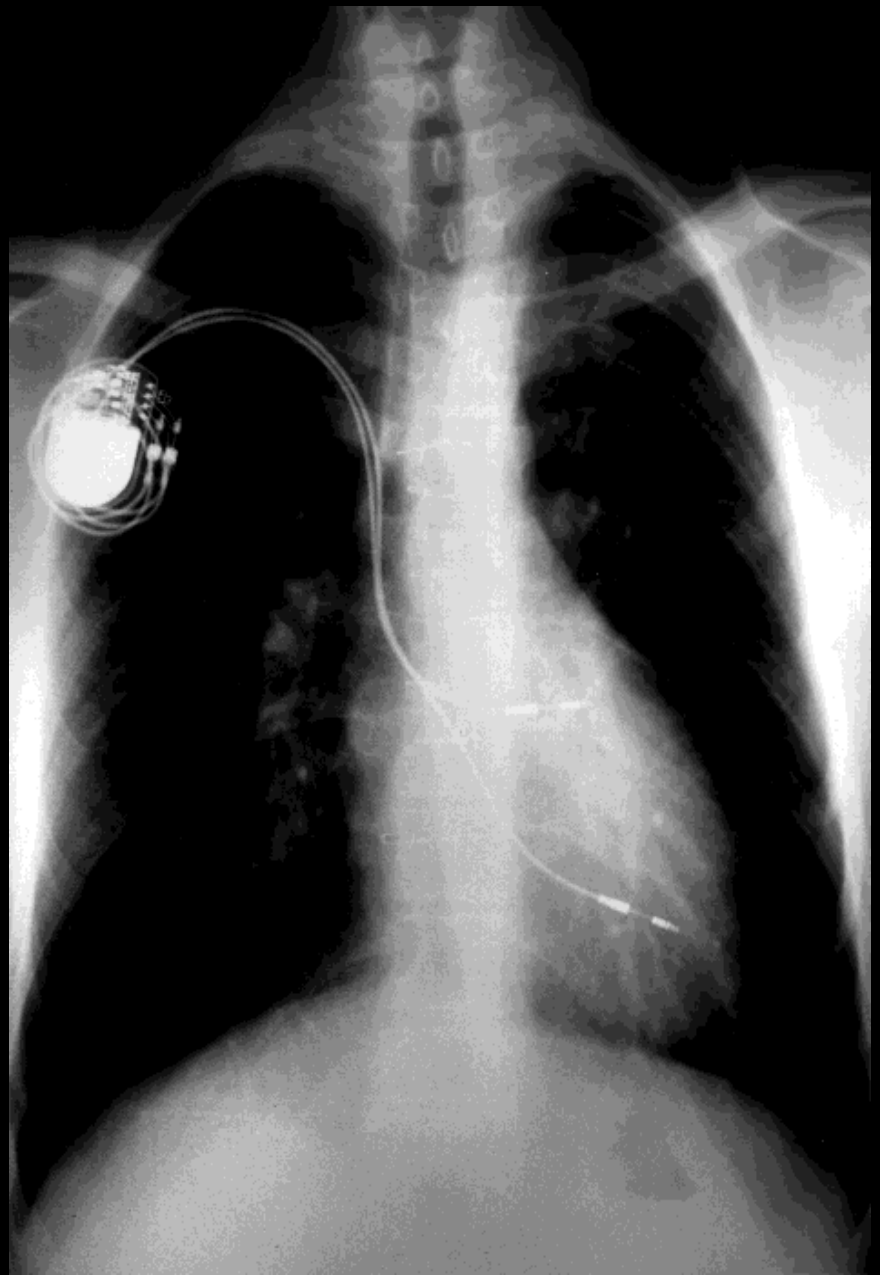
Symptom
Follow Up:Critical - Tired, Headache
Activity
Standing
Comments
Tech: Jose John

Type
Patient-Activated
Transmitted
06/15/2013 10:07 PM
HR
98.8-102.2 BPM

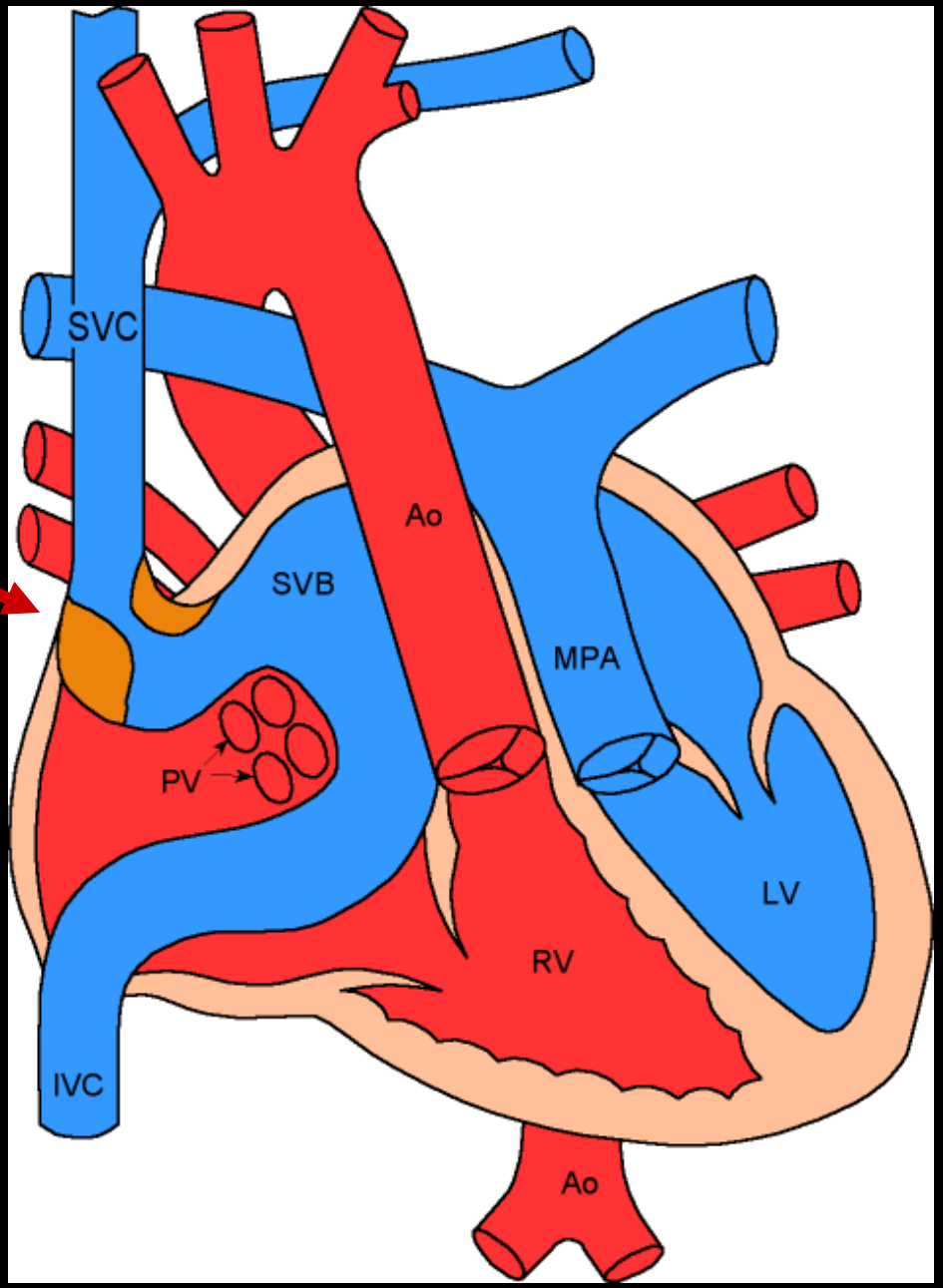
4 Rec: 06/24/2013 12:51 PM — Junctional Tachycardia — Stable

D-TGA/Atrial Switch



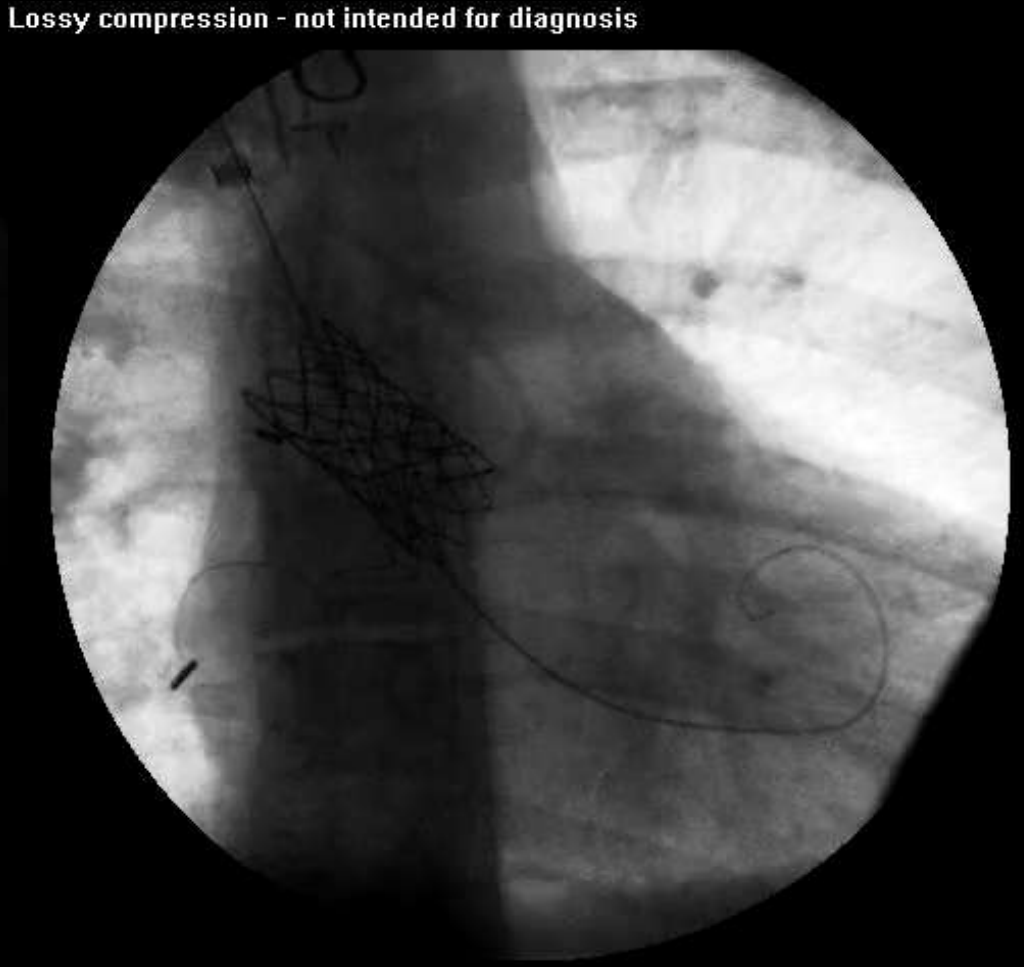


SVC Baffle Obstruction

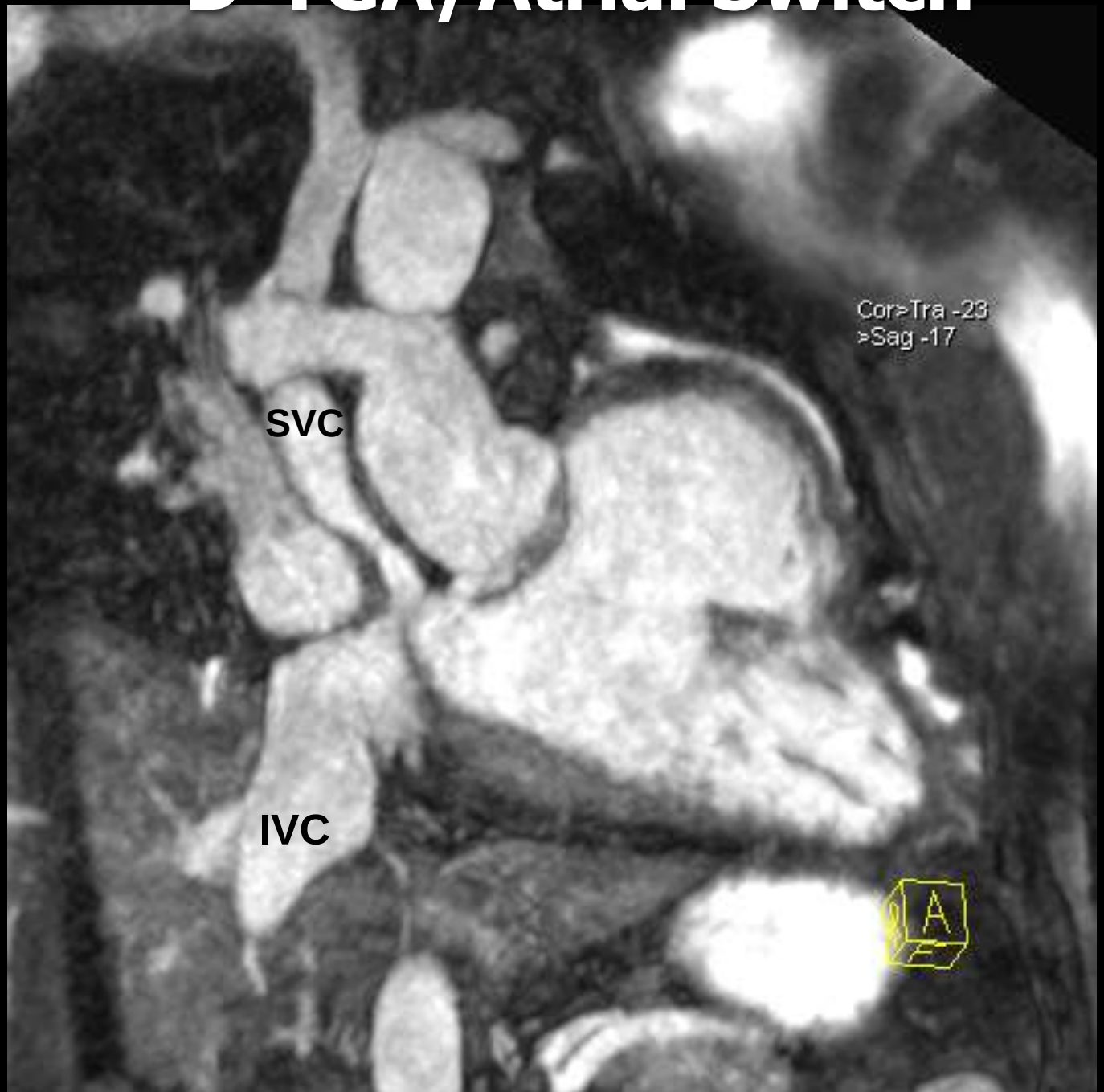


24 yo D-TGA/Mustard referred after unable to place pacer wire

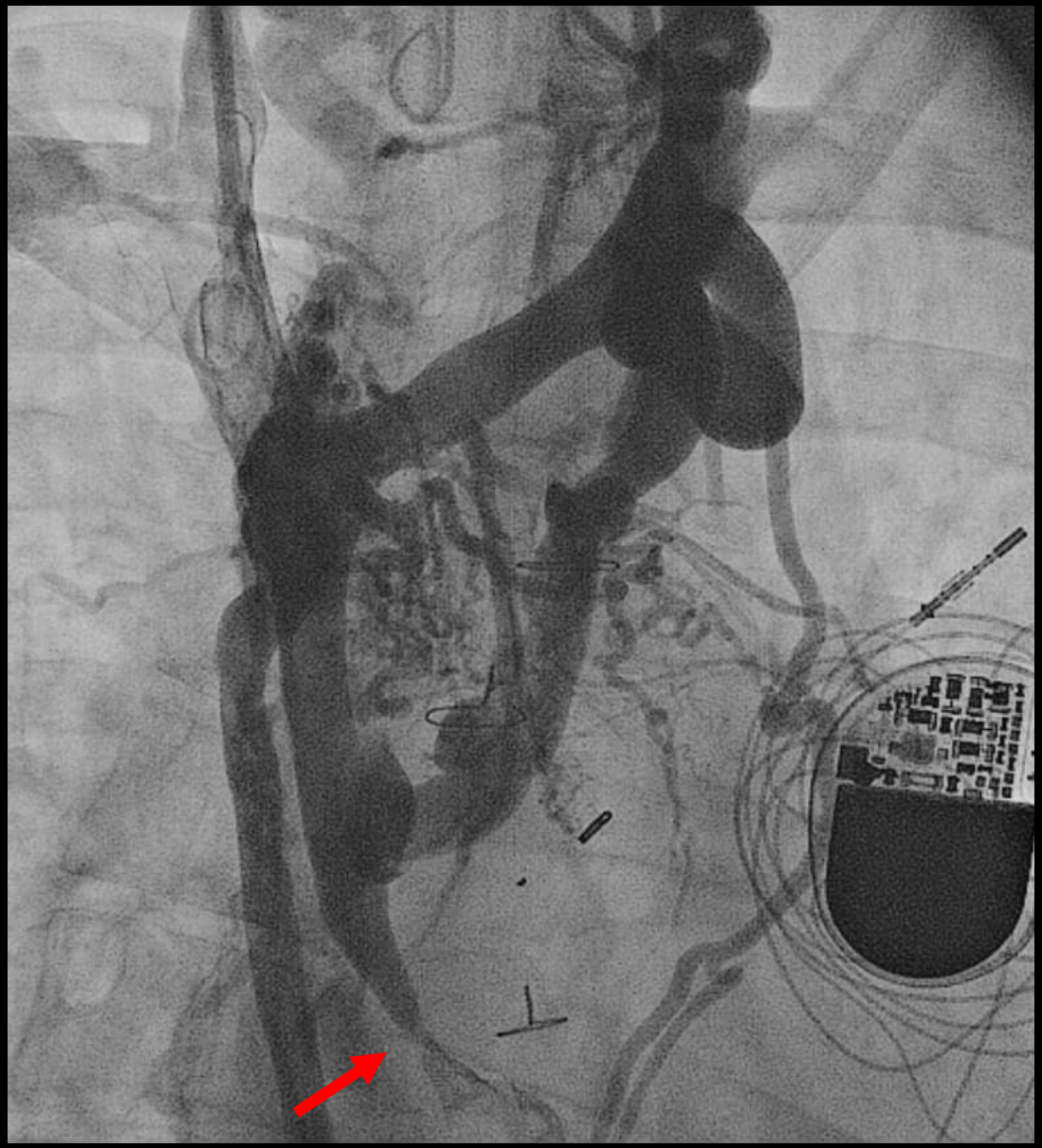
24 yo D-TGA – Mustard

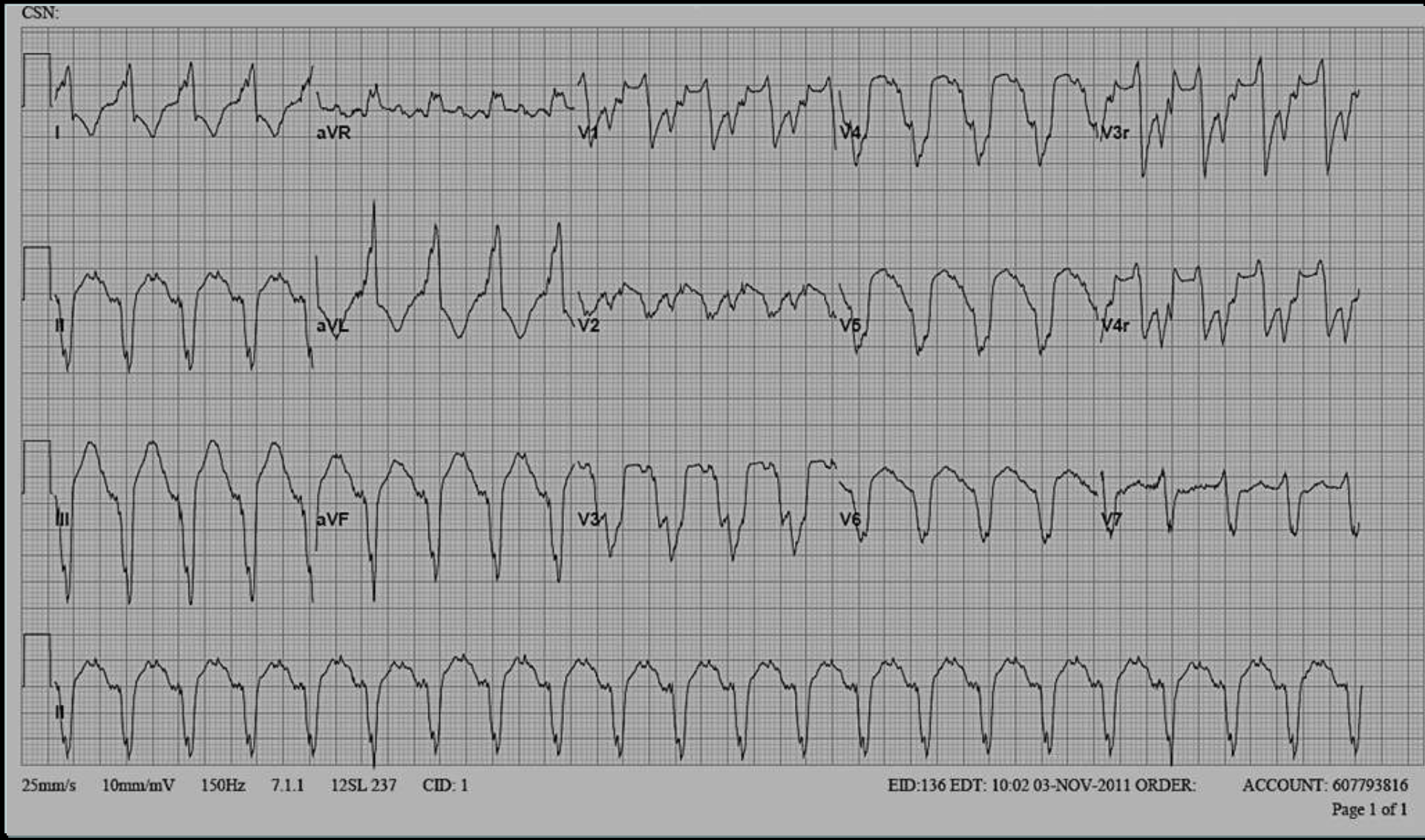


D-TGA/Atrial Switch



24 yo D-TGA/Atrial Switch with SVC Obstruction




CSN:
I
aVR
V1
V4
V3r
II
aVL
V2
V5
V4r
III
aVF
V3
V6
V7
II
25mm/s
10mm/mV
150Hz
7.1.1
12SL 237
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EID:136 EDT: 10:02 03-NOV-2011 ORDER:
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Page 1 of 1

Rate of Inducible Ventricular Arrhythmia in Adults With Congenital Heart Disease

Shane F. Tsai, MD[a,b,c,*], David P. Chan, MD[a,b], Pamela S. Ro, MD[a,b], Bethany Boettner, MA[a], and Curt J. Daniels, MD[a,b,c]

Patients with adult congenital heart disease are at increased risk of ventricular arrhythmia (VA) and sudden cardiac death, although no clear predictors have been found. Ventricular programmed stimulation has been shown to predict clinical ventricular tachycardia and sudden death events, but the role of screening electrophysiology studies (S-EPSs) in this population remains poorly defined. Therefore, we sought to determine the prevalence of inducible VA and to evaluate the clinical predictors in a heterogeneous group of patients with adult congenital heart disease (≥18 years old) undergoing S-EPSs at preoperative or interventional cardiac catheterization. Studies for the primary evaluation of clinical VA were excluded. The demographic, clinical, and diagnostic findings were compared between the patients with positive and negative findings. From 2005 to 2009, 80 patients (mean age 30 ± 9 years) underwent S-EPSs, and 23 had inducible VA. The diagnoses for those with studies positive for VA included tetralogy of Fallot (n = 12), d-transposition of the great arteries (n = 6), pulmonary stenosis (n = 2), double outlet right ventricle (n = 1), double inlet left ventricle (n = 1), and Ebstein's anomaly (n = 1). Men were significantly more likely to have a S-EPS positive for VA ($p = 0.015$). Increasing QRS duration, decreasing peak oxygen uptake (percentage of predicted), and ventricular fibrosis with cardiovascular magnetic resonance imaging were significantly associated with studies positive for VA ($p < 0.05$). Combined fibrosis and a peak oxygen uptake <80% of predicted had 100% sensitivity for positive VA findings. In conclusion, almost 30% of those with adult congenital heart disease undergoing S-EPSs had inducible VA. A prolonged QRS duration, diminished exercise capacity, and the presence of ventricular fibrosis were significantly associated with findings positive for VA and might improve patient selection for screening evaluations. (Am J Cardiol 2010;106:730–736)

Long –Term Complications

Adults with Congenital Heart Disease

Arrhythmias

- Atrial
- Ventricular
- Sudden Death

Heart Failure

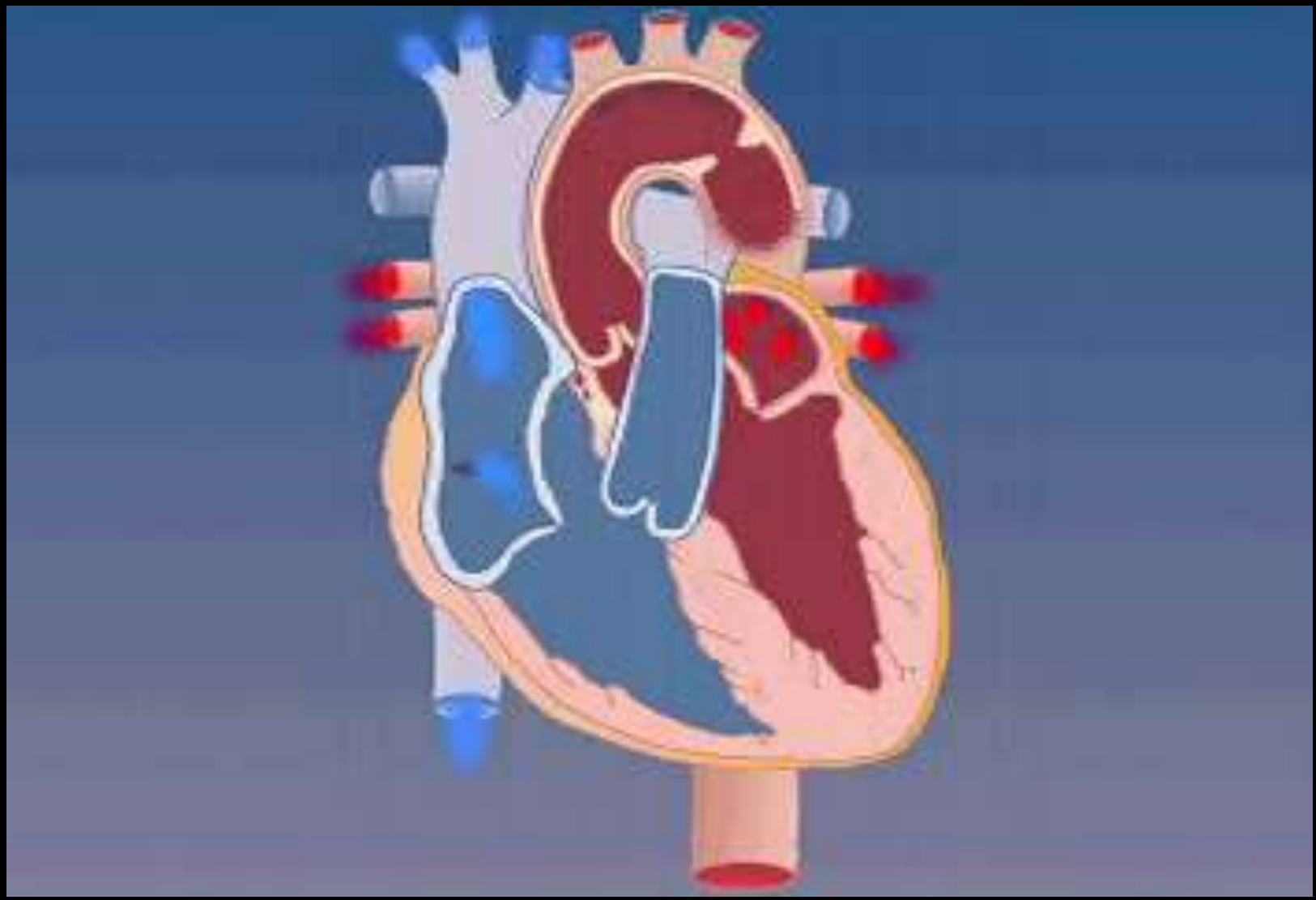
- Right Heart Failure
- Left Heart Failure
  - Systolic
  - Diastolic
- Pulmonary Hypertension

Vascular Lesions

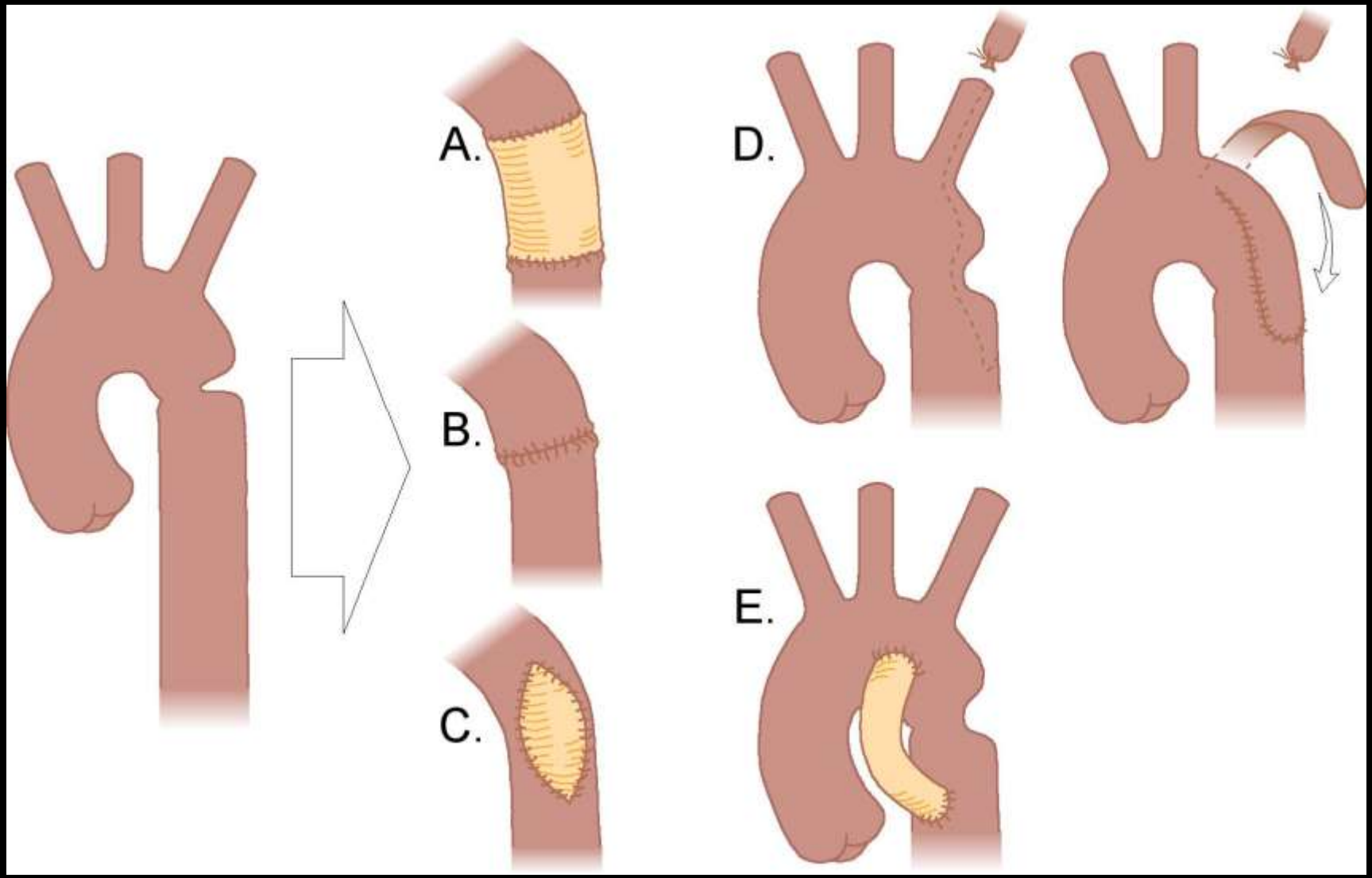
Valvular Disease

Residual Shunts

COA



Coarctation of the Aorta - Surgery



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PRACTICE GUIDELINE: FULL TEXT

ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines on the Management of Adults With Congenital Heart Disease)

Developed in Collaboration With the American Society of Echocardiography, Heart Rhythm Society, International Society for Adult Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons

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6.12.3. Recommendations for Clinical Evaluation and Follow-Up

CLASS I

3. Every patient with coarctation (repaired or not) should have at least 1 cardiovascular MRI or CT scan for complete evaluation of the thoracic aorta and intracranial vessels. (*Level of Evidence: B*)

6.14.3. Recommendations for Key Issues to Evaluate and Follow-Up

CLASS I

5. Evaluation of the coarctation repair site by MRI/CT should be performed at intervals of 5 years or less, depending on the specific anatomic findings before and after repair. (*Level of Evidence: C*)

Usefulness of Screening Cardiovascular Magnetic Resonance Imaging to Detect Aortic Abnormalities After Repair of Coarctation of the Aorta

Shane F. Tsai, MD[a,b,*], Mira Trivedi[b], Bethany Boettner, MA[c], and Curt J. Daniels, MD[a,b]

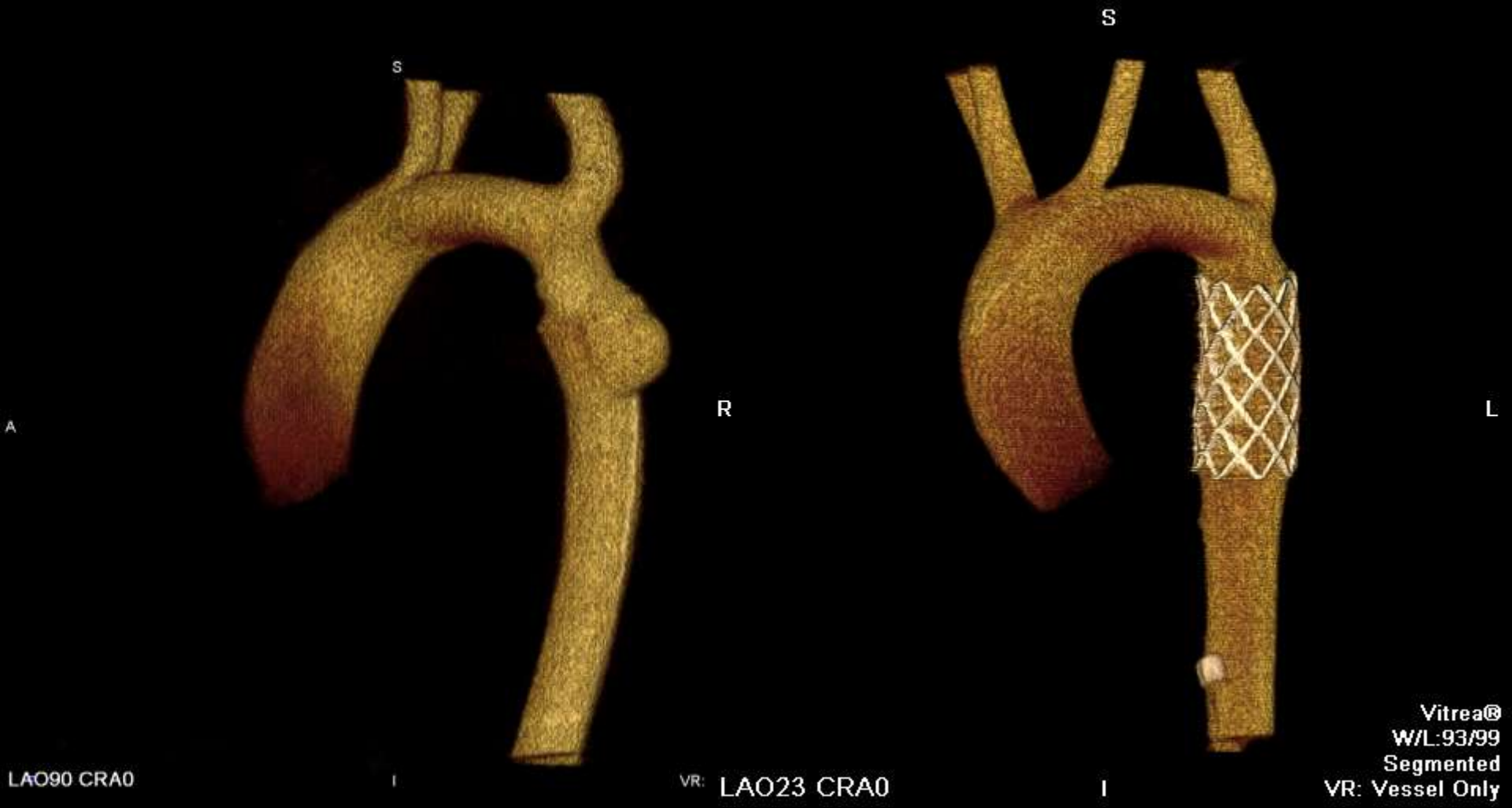
Guidelines recommend screening cardiovascular magnetic resonance (Sc-CMR) imaging for all patients after coarctation of the aorta repair, although there are limited data verifying its clinical utility. Therefore, we sought to assess the value of Sc-CMR in detecting aortic complications and at-risk abnormalities after coarctation of the aorta repair and to identify significant risk factors. We reviewed 76 patients (mean age 31 ± 10 years), including 40 with symptomatically indicated CMR (Sx-CMR) and 36 with Sc-CMR studies. CMR angiograms were evaluated for aortic abnormalities. Recoarctation was defined as residual narrowing/descending aorta at the diaphragm ≤0.5 (at risk ≤0.75), ascending aorta aneurysm as maximum ascending cross-sectional area/height ≥10 (at risk ≥5), and descending aorta aneurysm as maximum descending diameter/descending aorta at the diaphragm ≥1.5 (at risk ≥1.25). Aortic complications or abnormalities were found in 45 patients (59%). No patient met criteria for recoarctation (at risk 10 Sx-CMR vs 5 Sc-CMR). Significant risk factors included heart failure symptoms and female gender ($p < 0.05$). One patient (Sc-CMR) had ascending aneurysm (at risk 17 Sx-CMR vs 8 Sc-CMR). Time from repair was a significant predictor ($p < 0.05$). There were 10 patients (6 Sx-CMR vs 4 Sc-CMR) with descending aneurysm (at risk 8 Sx-CMR vs 7 Sc-CMR). Cardiovascular symptoms, hypertension, and echocardiogram were not predictive. In conclusion, >50% of patients undergoing Sc-CMR had aortic abnormalities, which was not significantly different from those undergoing Sx-CMR. In particular, Sc-CMR identified descending aorta aneurysms that were not predicted by clinical parameters or echocardiogram. (Am J Cardiol 2011;107:297–301)

28 yo s/p rCOA asymptomatic surveillance

e-PTFE Covered NuMED CP Stent & BIB Catheter

Non-FDA approved

28 yo s/p rCOA asymptomatic surveillance



Long –Term Complications

Adults with Congenital Heart Disease

Arrhythmias

- Atrial
- Ventricular
- Sudden Death

Heart Failure

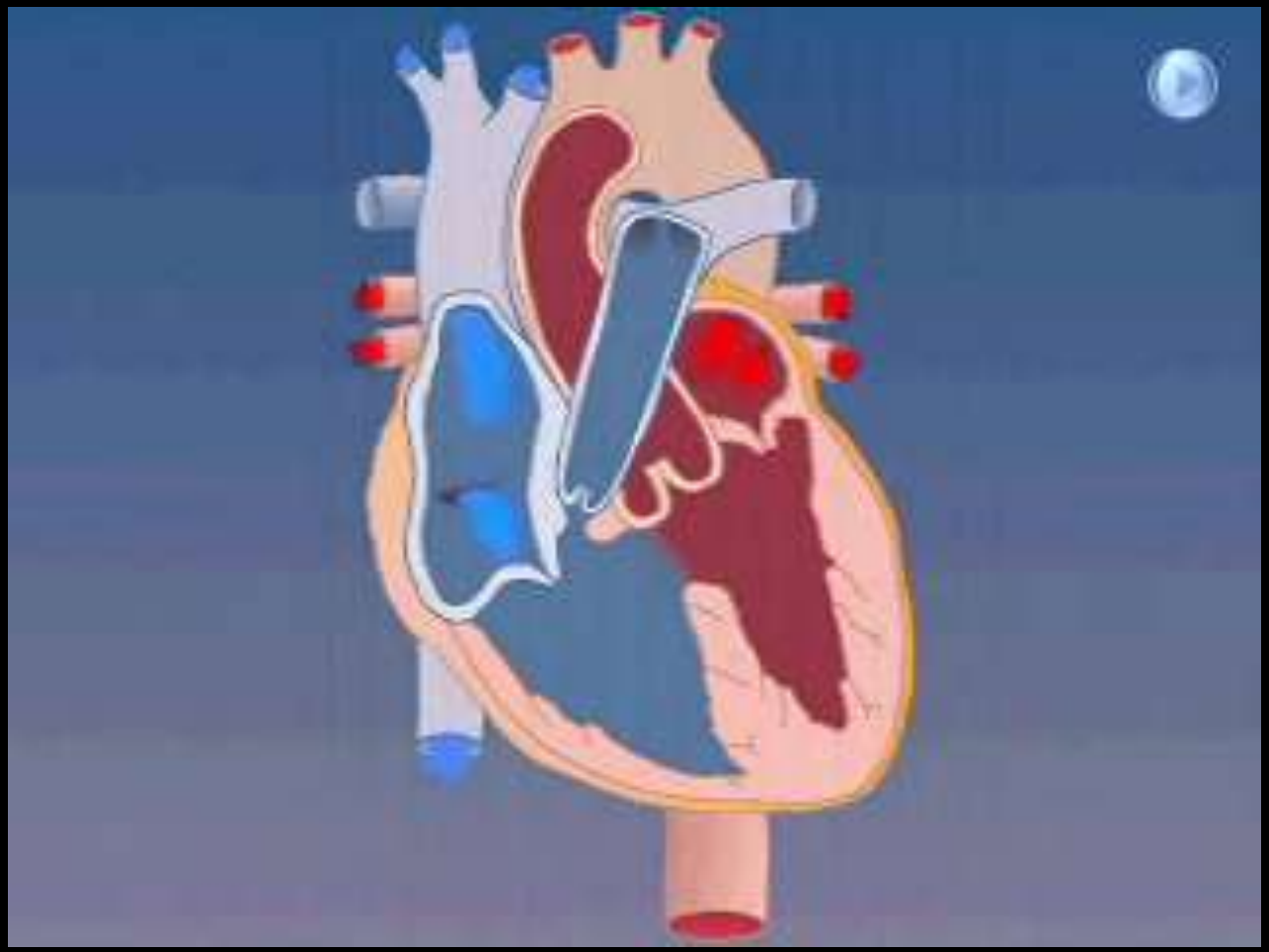
- Right Heart Failure
- Left Heart Failure
  - Systolic
  - Diastolic
- Pulmonary Hypertension

Vascular Lesions

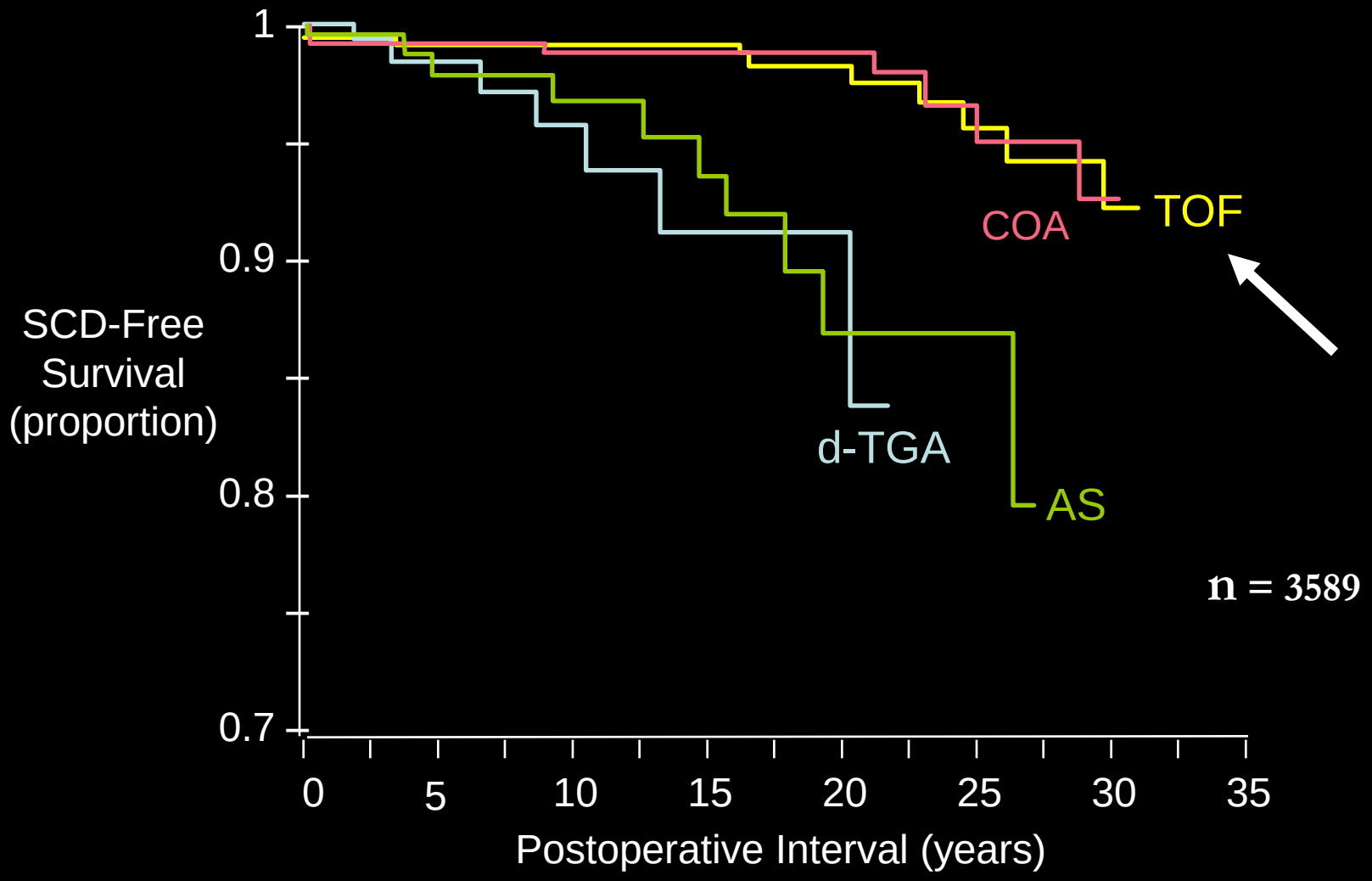
Valvular Disease

Residual Shunts

rTOF



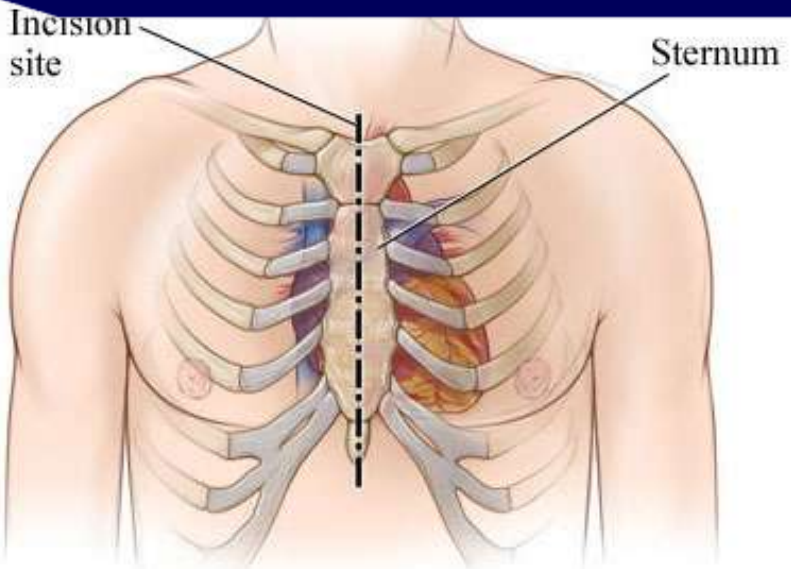
Actuarial Probability of SCD-Free Survival After Surgical Treatment

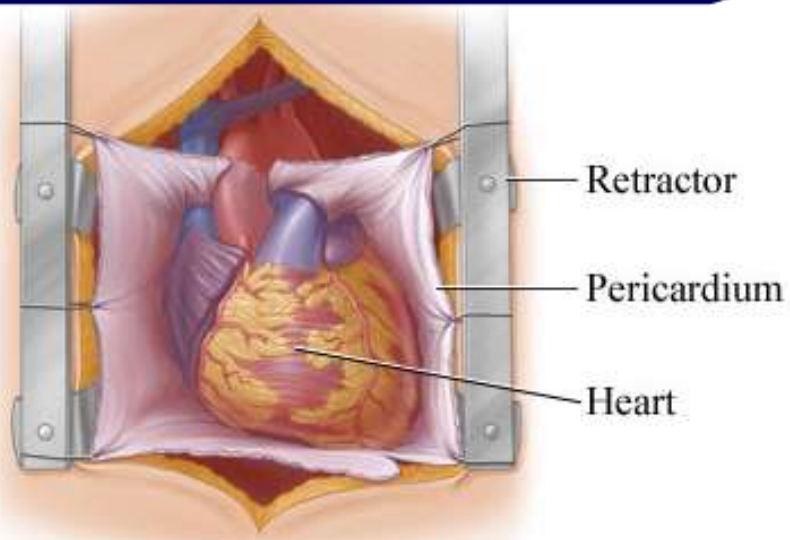


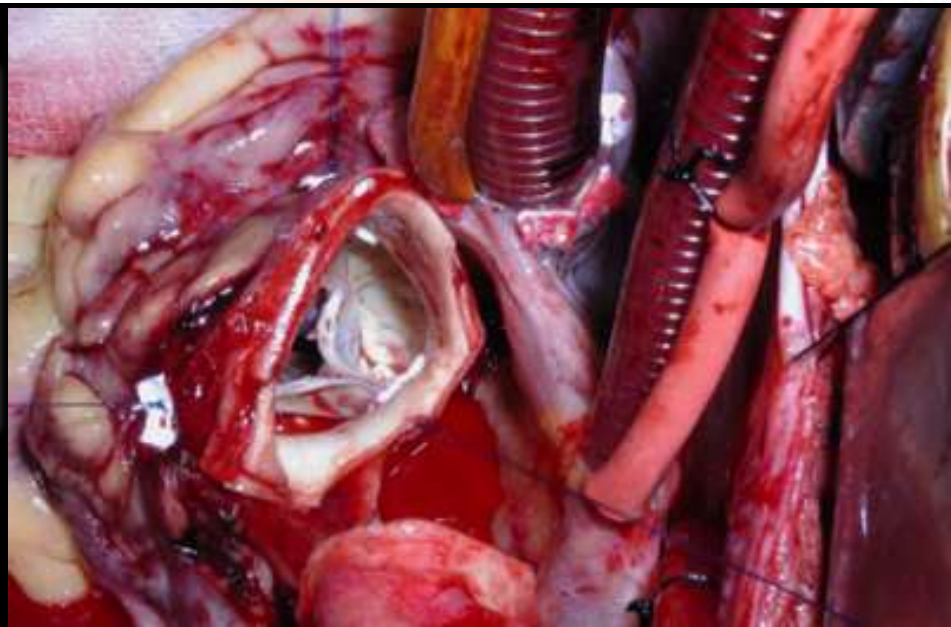
Silka et al. *JACC.* 1998; 32: 245-251.

rTOF with Severe PI

OPEN HEART SURGERY



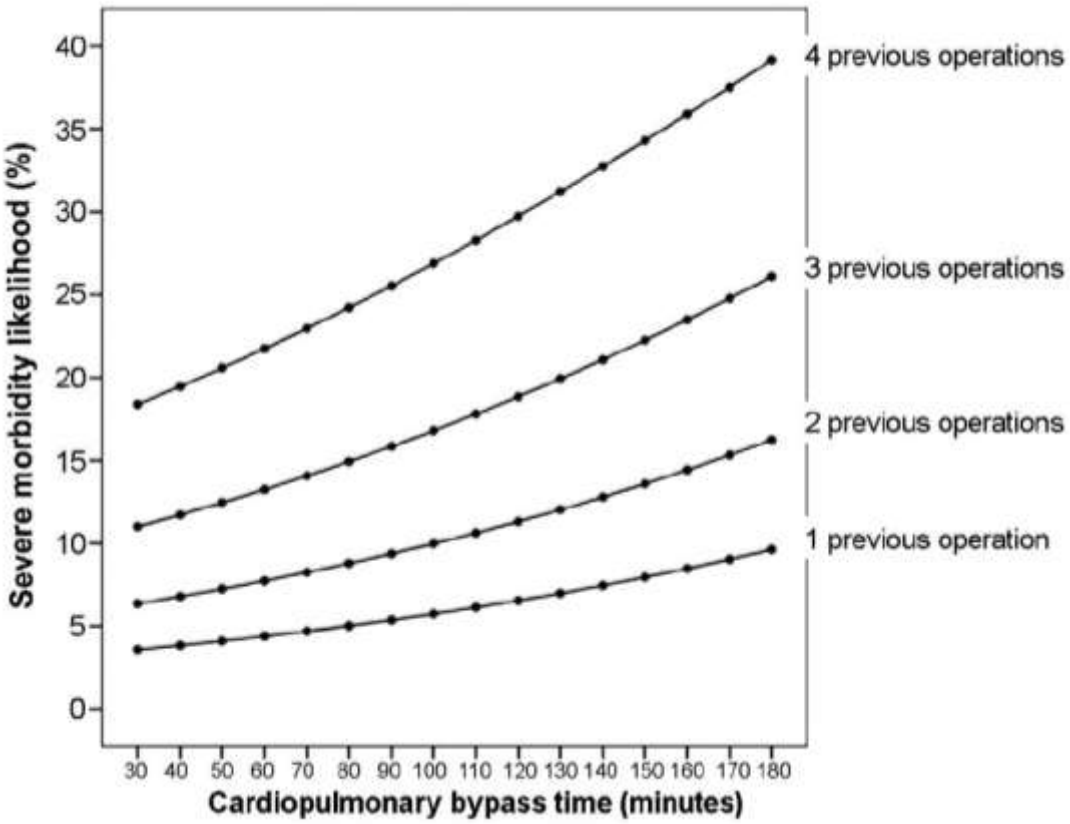




Morbidity and Mortality Risk Factors in Adults With Congenital Heart Disease Undergoing Cardiac Reoperations

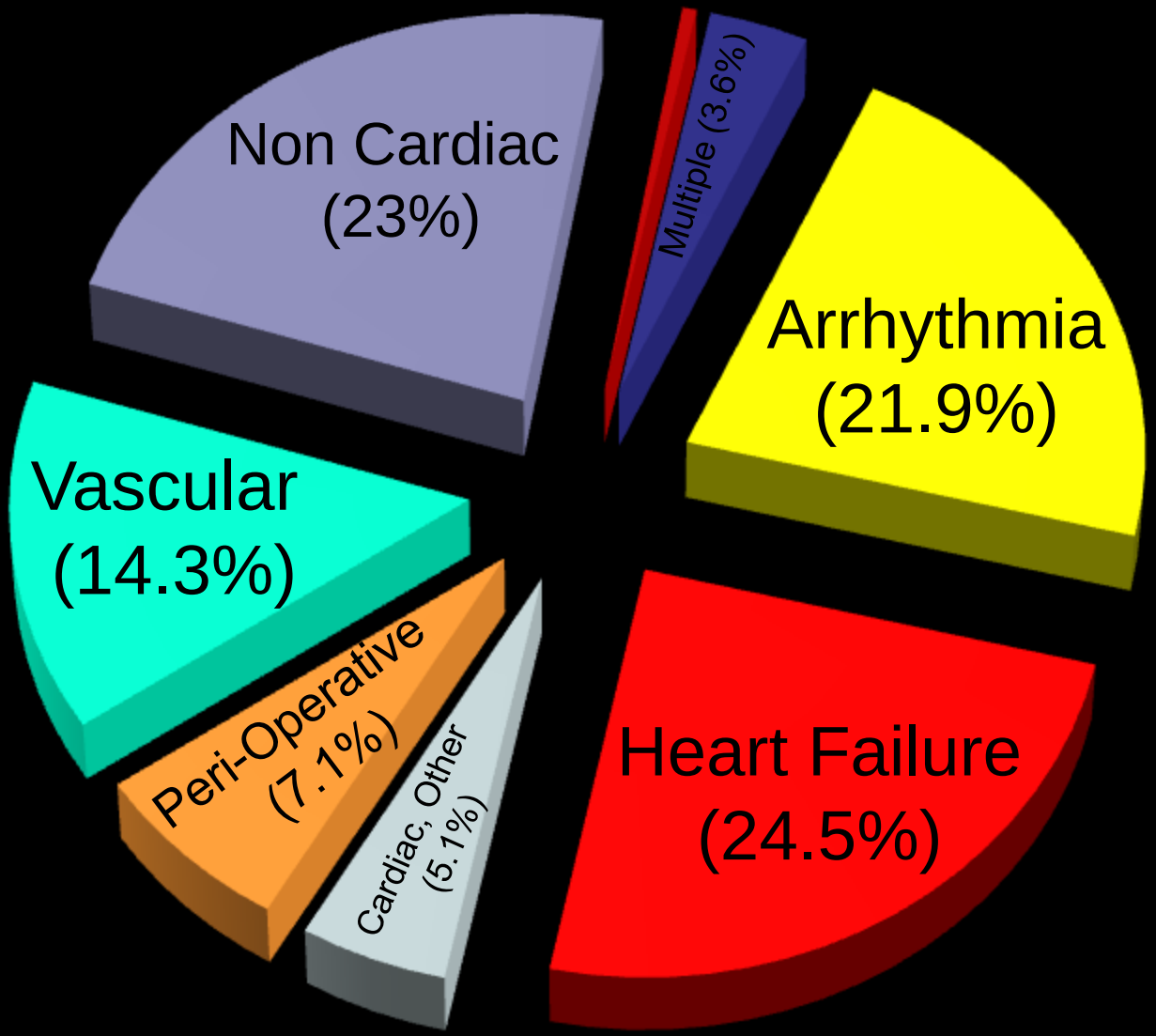
Alessandro Giamberti, MD, Massimo Chessa, MD, PhD, Raul Abella, MD, Gianfranco Butera, MD, Concetta Carlucci, MD, Halkawt Nuri, MD, Alessandro Frigiola, MD, and Marco Ranucci, MD

Department of Cardiac Surgery and Grown Up Congenital Heart Unit and Department of Cardiothoracic-Vascular Anesthesia and Intensive Care Unit, Istituto di Ricovero e Cura a Carattere Scientifico, Policlinico San Donato, San Donato Milanese, Milan, Italy



- 165 ACHD pts
- Morbidity/Mortality
- Severe Morbidity
  - Re-explore
  - Sternal wound infection
  - CVA
  - ARF
  - Prolonged Vent

Cause of ACHD Mortality

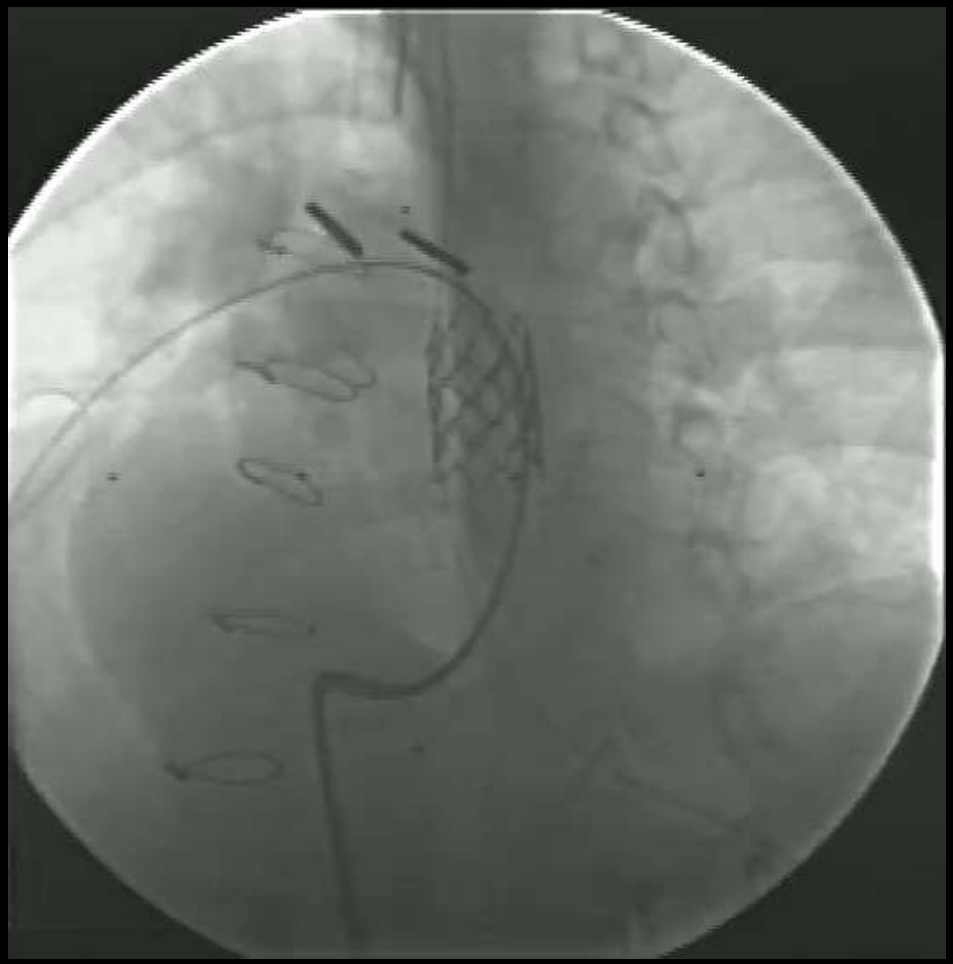


Verheugt CL et al.EHJ 2010.31:1220-29.

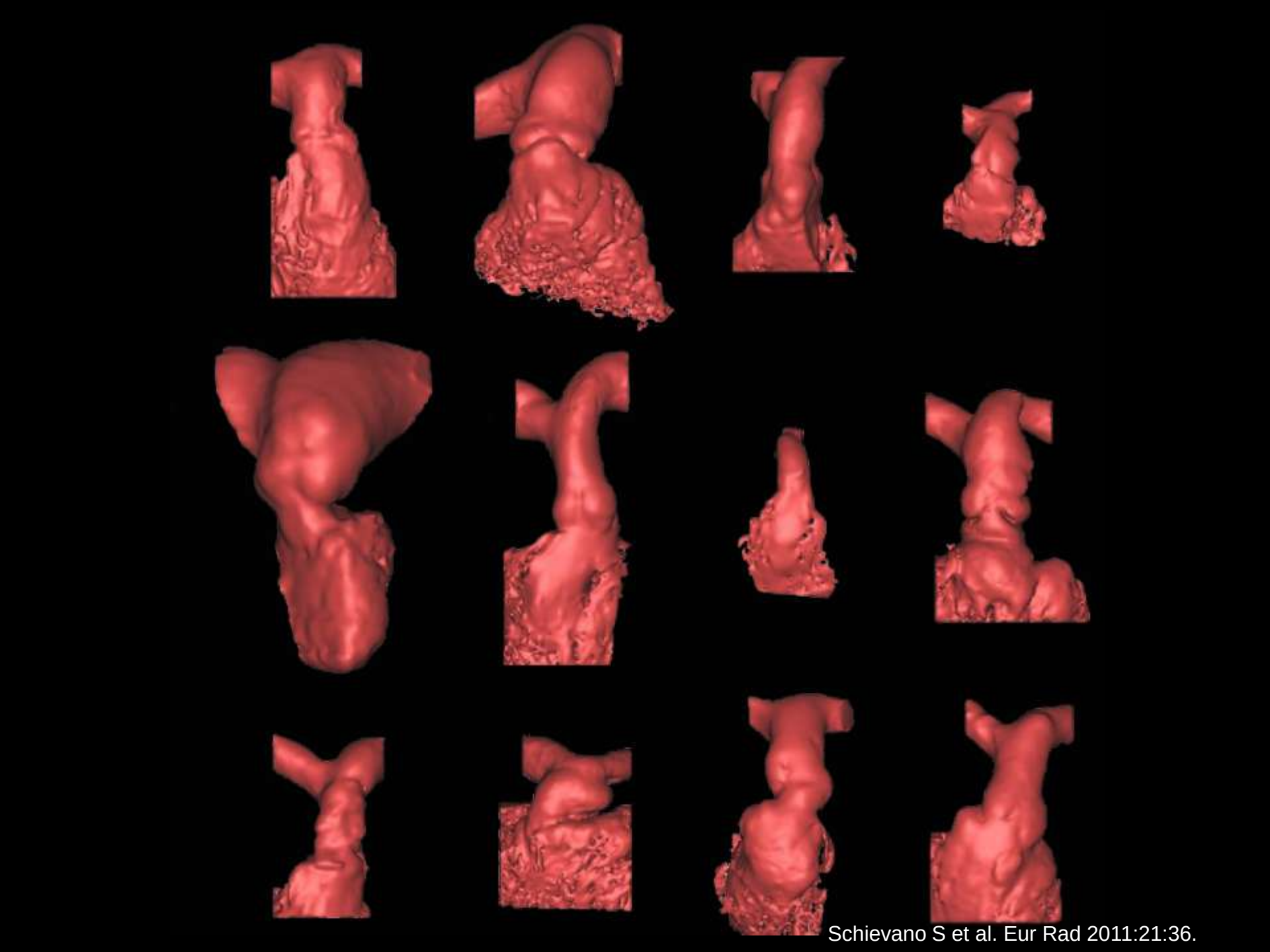
Melody Valve

- Bovine jugular venous valve segment
- Platinum-Iridium stent

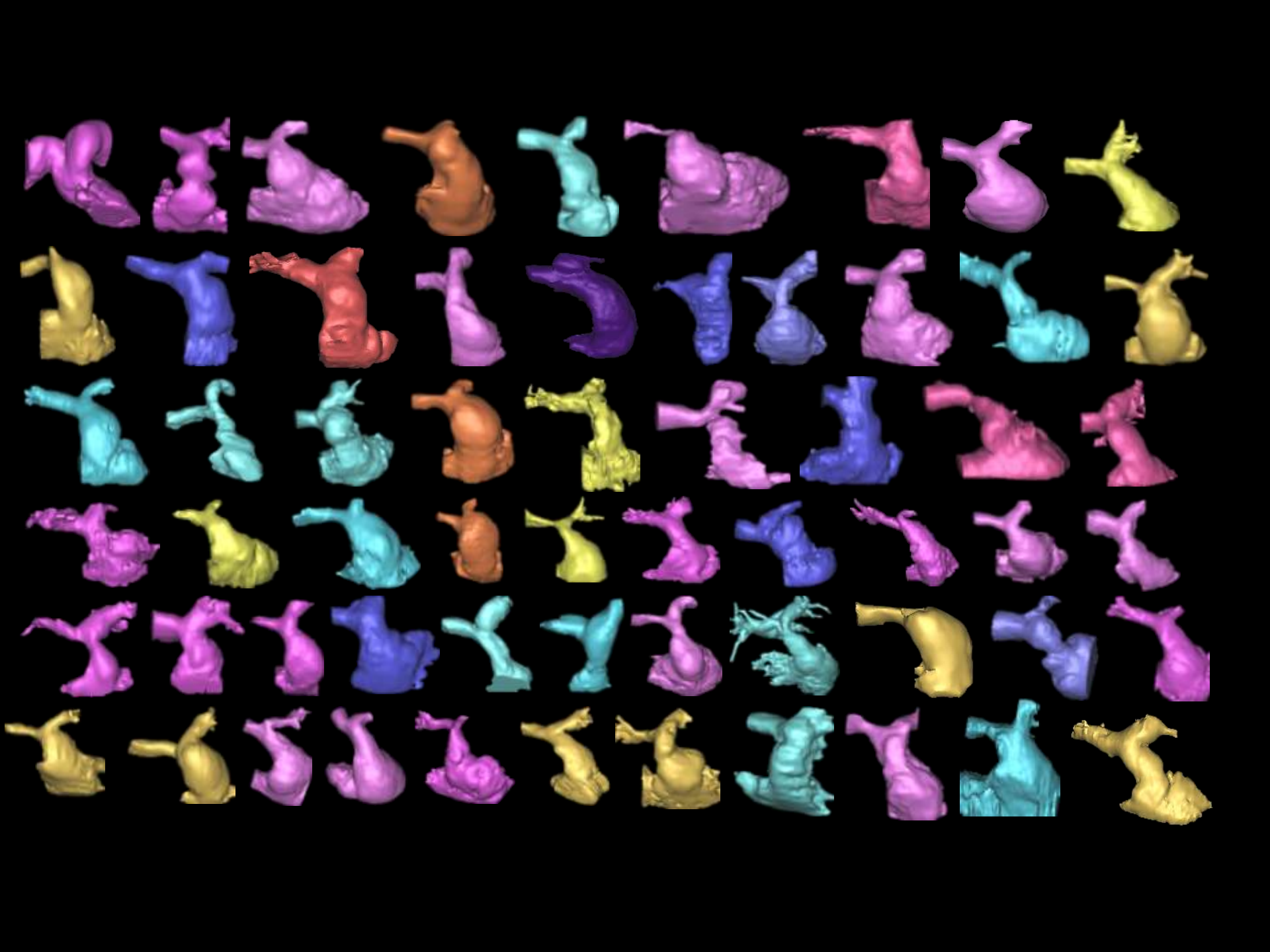
8 Zig- 34 mm Melody for PI



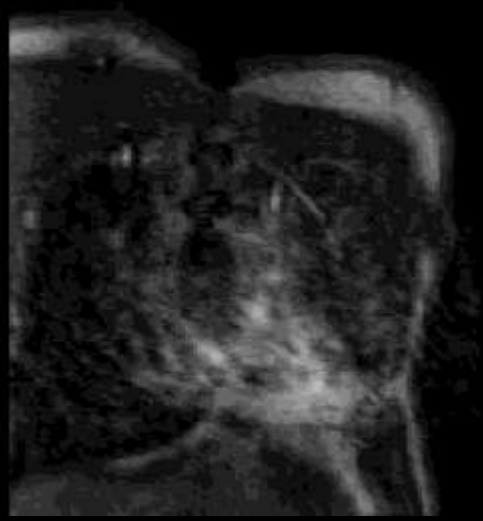
TOF with Native RVOT Morphologic Variations

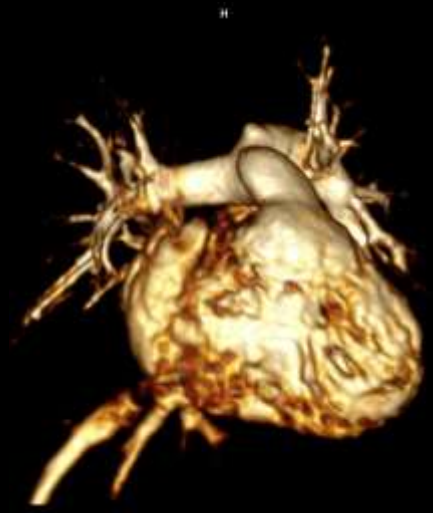


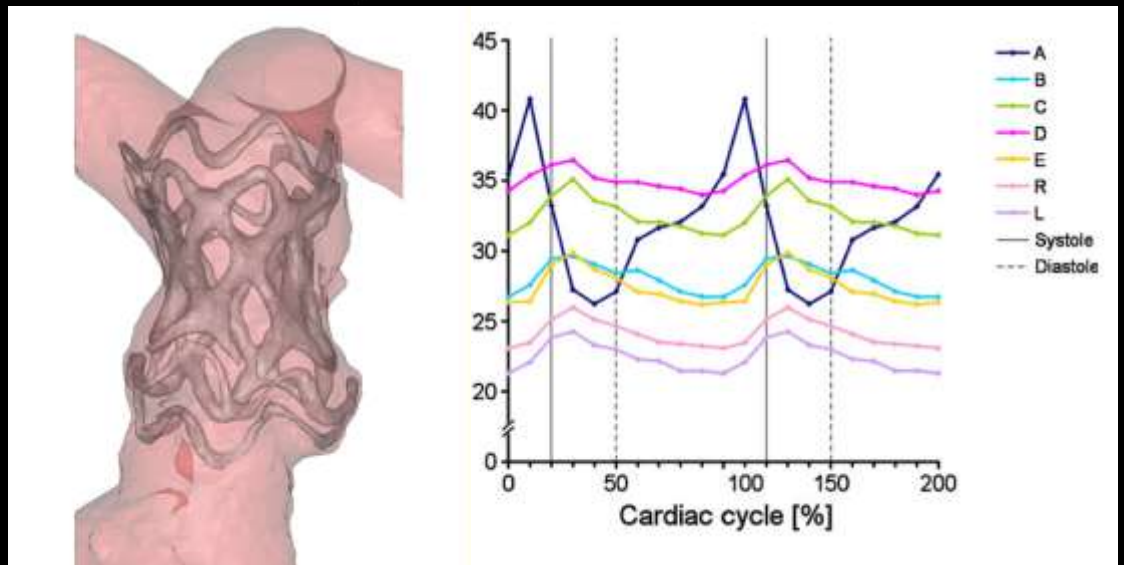
Schievano S et al. Eur Rad 2011:21:36.



Future of Valve Replacement







Long –Term Complications

Adults with Congenital Heart Disease

Arrhythmias

- Atrial
- Ventricular
- Sudden Death

Heart Failure

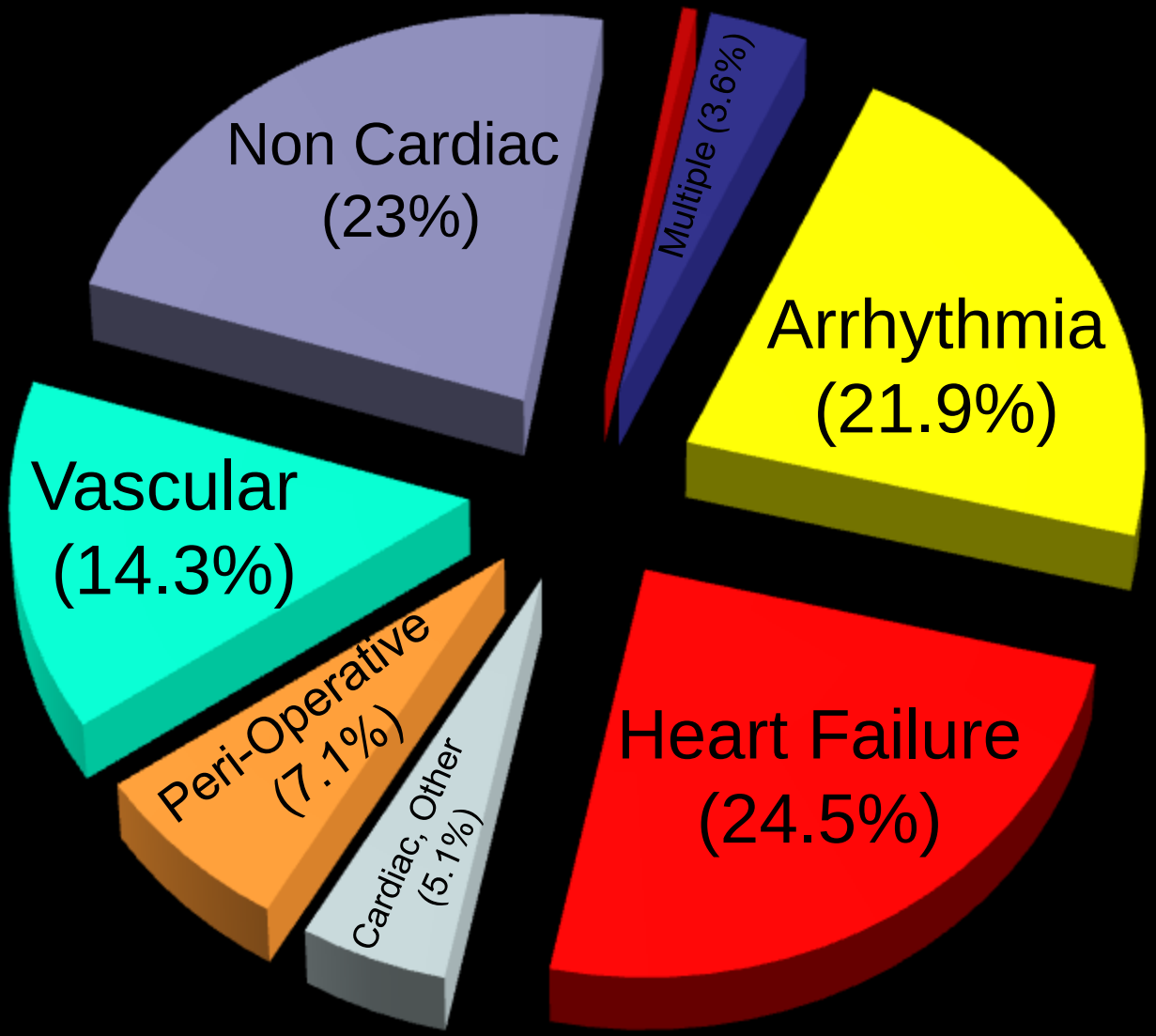
- Right Heart Failure
- Left Heart Failure
  - Systolic
  - Diastolic
- Pulmonary Hypertension

Vascular Lesions

Valvular Disease

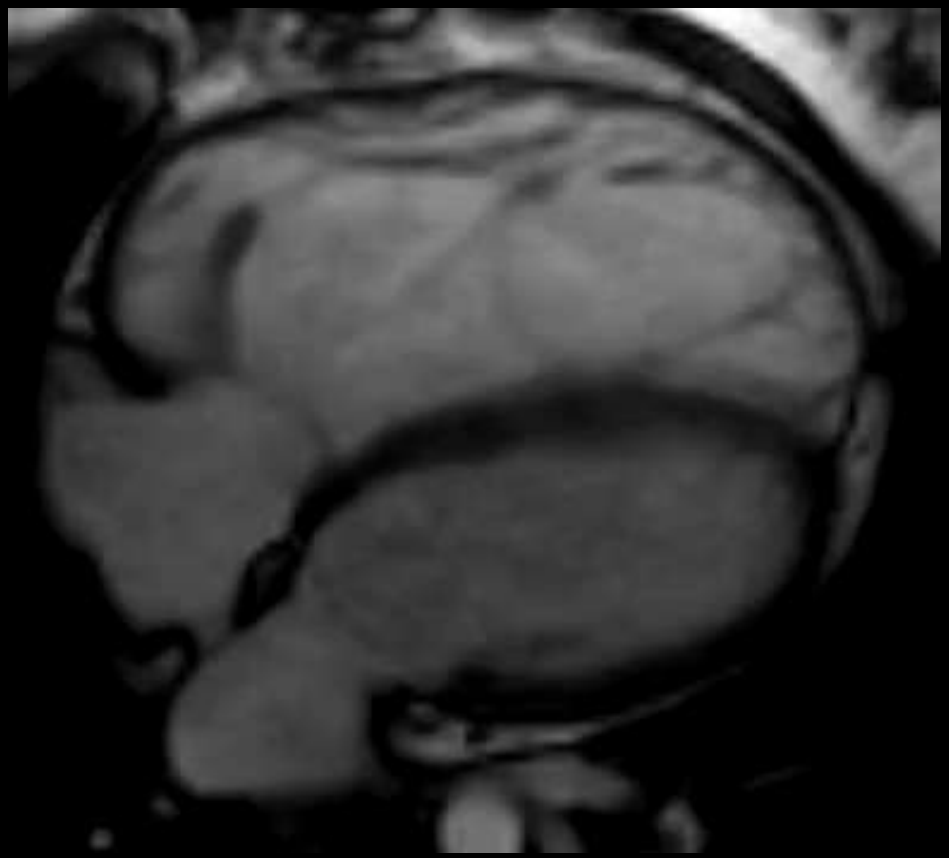
Residual Shunts

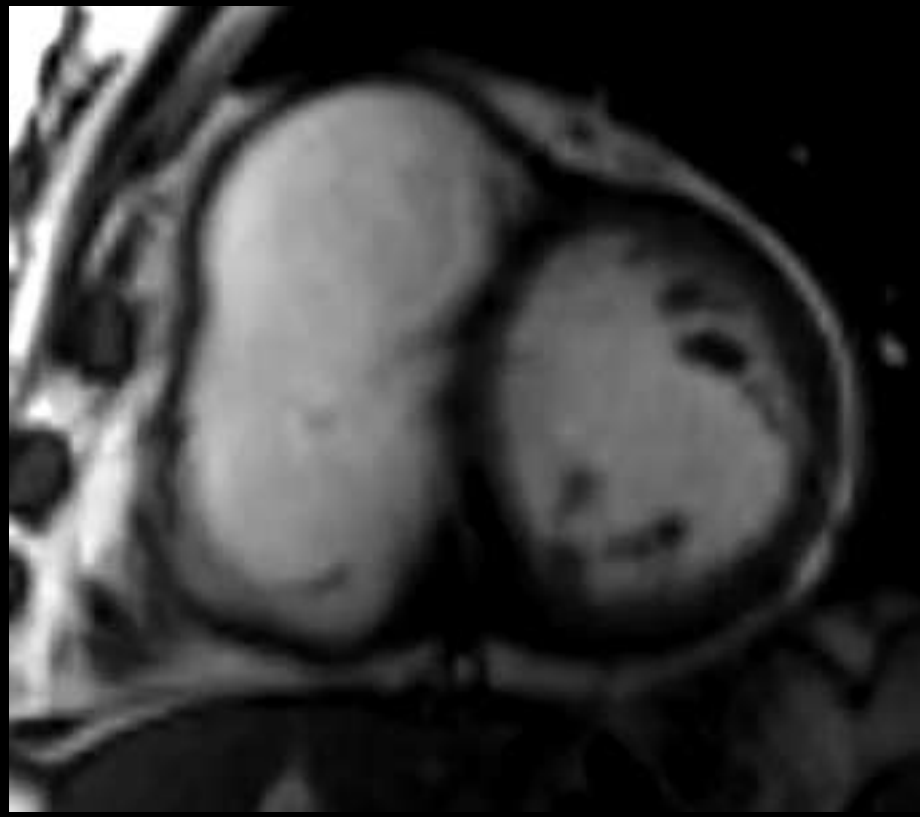
Cause of ACHD Mortality



Verheugt CL et al.EHJ 2010.31:1220-29.

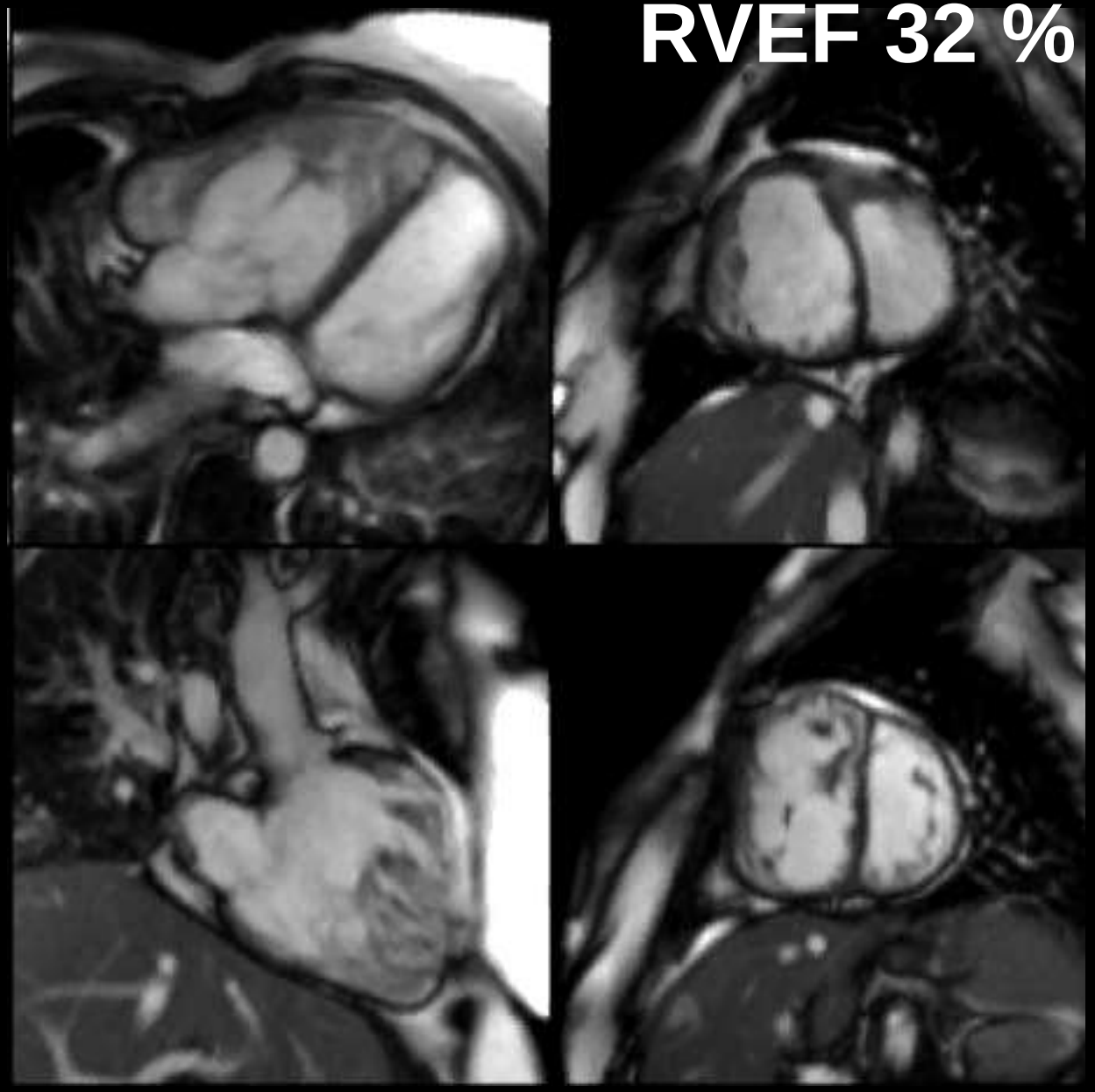
26 yo Repaired TOF, Severe PI, RVEF 22 %





34 yo D-TGA/Atrial Switch

RVEF 32 %

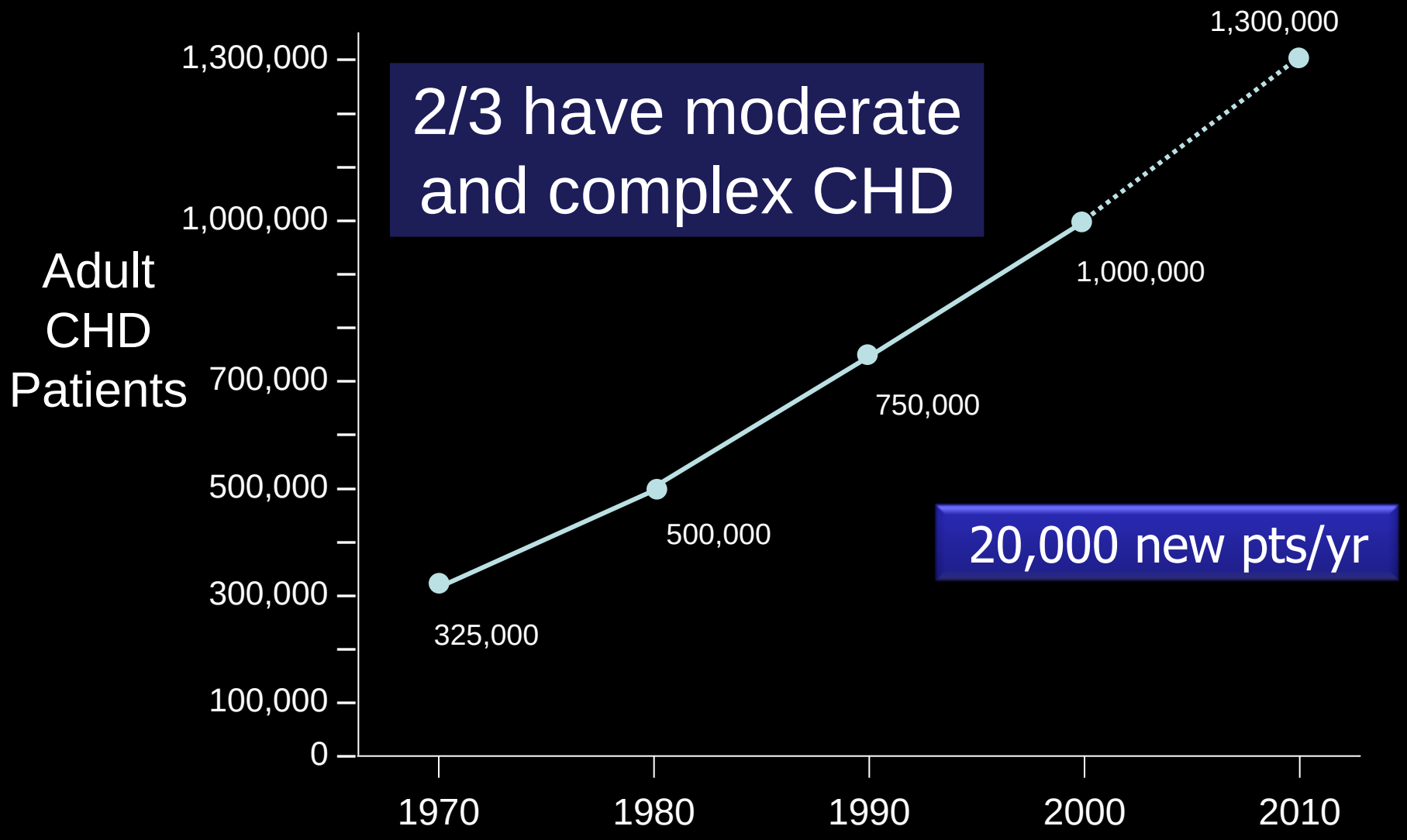


Single Ventricle Failing Fontan

ACHD – Heart Failure Trials

0

Patients Reaching Adulthood with CHD



SOLUTION

Change The Outcome

WHO takes care of the patients

- Fellowship Trained Pediatric Cardiology Training

How Do We Change The Outcome For ACHD Patients

ACHD Training

Residency **Cardiology**

Level 1: Basic Training for all Medical Cardiology Fellows

All medical cardiology trainees should be exposed to a core of information regarding adults with congenital heart disease. The goal of Level 1 training is for all graduates to be able to recognize and evaluate common, simple congenital heart lesions and the sequelae of the more commonly repaired congenital heart defects. These graduates should always consider consultation and collaborative patient management with a Level 2— or 3—trained specialist or pediatric cardiologist when major management decisions are made for adults with congenital heart disease and for periodic discussions of ongoing care.

We suggest that at least 6 hours of formal lectures within the core curriculum of the training program be devoted to congenital heart disease in adults. Table 1 indicates the content suggested for these 6 hours, covering key basic and clinical aspects of these disorders.

General IM → **Cardio IM**

1 2 3 4 5 6 7 8 9

PGY

ACHD Training

Residency **Cardiology**

General PEDS → **Cardio PEDS**

General IM → **Cardio IM**

LEVELS OF TRAINING

Core Training (Level 1)

We differentiate three levels of training and expected expertise in the care of adults with CHD. Core training represents the level of knowledge appropriate for all trainees in pediatric cardiology and indicates the knowledge content that each graduate of such a program should acquire. This level of knowledge should be tested in the Subspecialty Certification Examination in Pediatric Cardiology and will provide the graduate with sufficient expertise to care for adolescents with CHD and prepare them for transition to ACHD care. In addition to the basic science and clinical knowledge included in every pediatric cardiology curriculum, certain additional knowledge areas should be included:

- general knowledge
- natural history of cardiac defects
- postoperative residua, long-term issues
- understanding care in the adult setting
- transition issues
- adolescent medicine
- outpatient experience
- lectures as part of core curriculum
- indications for and access to local/regional expert consultation
- adolescent and young adult medical care issues
- contraception, gynecologic issues, pregnancy
- physical activity, sports, and activity counseling
- education, health and general
- insurability
- employment
- psychosocial issues

1 2 3 4 5 6 7 8 9

PGY

Petition for ACHD Subspecialty Certification
American Board of Internal Medicine Pathway

Based on ABIM Criteria for Recognition as Subspecialty Certification

Michael J. Landzberg, MD and Curt Daniels, MD
for the ABIM Petition Working Group

Submitted in 2007

Member	Representing
Michael Landzberg, MD, FACC, Chair	ISACHD
Curt Daniels, MD, FACC, Co-Chair	ABP/ABIM
Elyse Foster, MD, FACC	AHA
Thomas Graham, MD, FACC	ABP
Gerard Martin, MD, FACC	ACC
Stephanie Mitchell	ACC
Amy Verstappen	ACHA
Carole Warnes, MD, FACC	ACC
Gary Webb, MD, FACC	ACC/ACHA

Petition for ACHD subspecialty certification – American Board of Pediatrics

Based on **ABP GUIDELINES FOR ESTABLISHING A NEW SUBSPECIALTY**

ABP Petition Writing Group

Member	**Representing**
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Curt Daniels, MD, FACC	ACC
Robert Beekman, MD, FACC	AAP/JCCHD
Michelle Gurvitz, MD, FACC	ACC
Gerard Martin, MD, FACC	ACC/JCCHD
Allison Knauth, MD, FACC	AHA
Catherine Webb, MD, FACC	JCCHD
David Sahn, MD, FACC	CHF

News Release: ABMS Announces Certification in New Subspecialty Adult Congenital Heart Disease

NEWS RELEASE

ABMS Media Contac
Lori Bouka
(312) 436-26
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See complete list of specialty and subspecialty certificat

ABMS Announces Certification in New Subspecialty: Adult Congenital Heart Disease

CHICAGO - December 5, 2012 - The American Board of Medical Specialties (ABMS) announces the creation of physician certification in a new subspecialty: Adult Congenital Heart Disease (ACHD). The ABMS Board of Directors and ABMS Reserved Powers Board approved the subspecialty at its September 2012 meeting. The subspecialty will be offered by the American Board of Internal Medicine (ABIM) and will create a pathway for certification for cardiologists previously certified by either the ABIM or the American Board of Pediatrics (ABP) with the expectation that the certification exam will be available within the next three years. The Accreditation Council for Graduate Medical Education (ACGME) will be approached to develop accreditation standards for training programs very shortly.

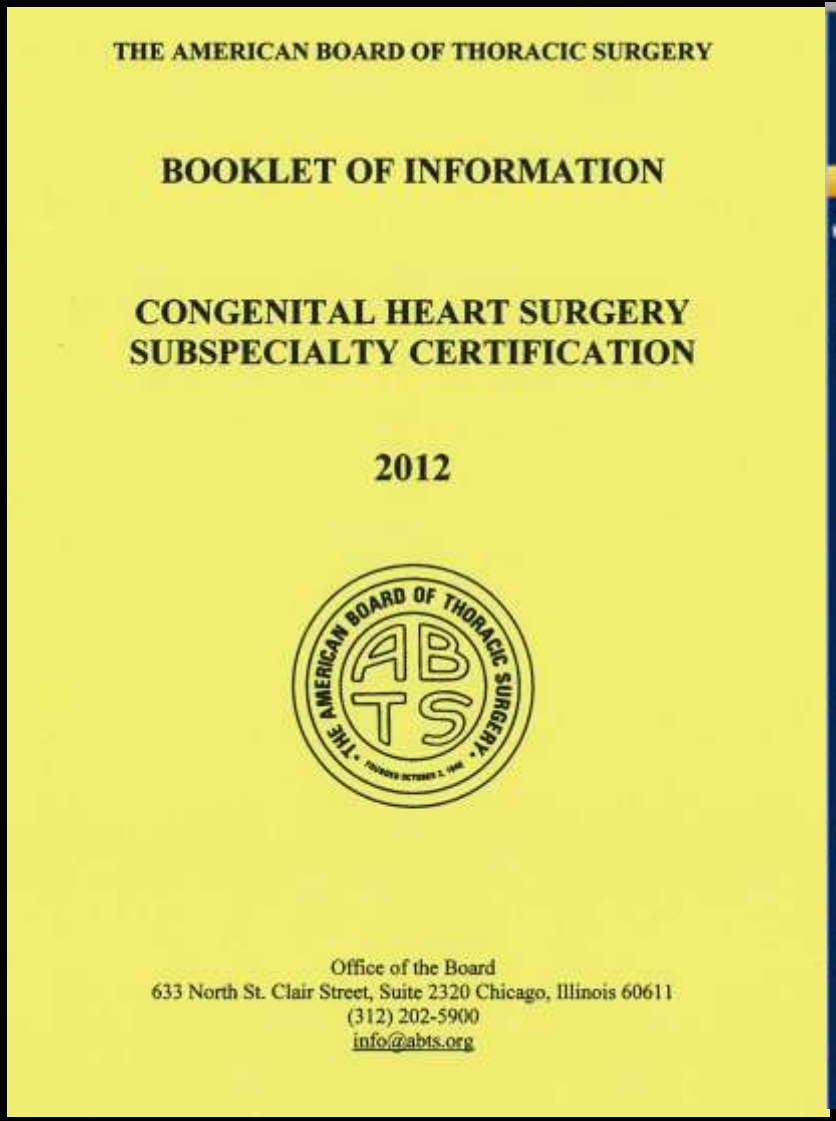
"Children who suffer from Pediatric Congenital Heart Disease are now surviving into adulthood, with specialized medical needs that will be best met by trained specialists in Adult Congenital Heart Disease noted Eric Holmboe, MD, FACP, ABIM's Chief Medical Officer. "This new subspecialty will enable patients to identify those clinicians with the competence and skill necessary to deliver quality care."

The ACHD subspecialty will:

- Meet the needs of the growing population of adults with congenital heart disease by ensuring there are enough physicians with the appropriate training to care for them in a consistent and comprehensive manner that is in compliance with recently published guidelines.
- Enable adult congenital heart specialists to work in an environment that specializes in caring fo this patient population and provides a mechanism for transition of care from adolescence to adulthood that would eliminate gaps in medical care.
- Develop well-defined training pathways for internal and pediatric medicine cardiology trainees through the ABIM and the ABP. These pathways would culminate in a final common examinatic and subspecialty certification available.

General Certificate(s)	Subspecialty Certificates
American Board of Family Medicine	
Family Medicine	Adolescent Medicine Geriatric Medicine Hospice and Palliative Medicine Sleep Medicine Sports Medicine
American Board of Internal Medicine	
Internal Medicine	Adolescent Medicine Adult Congenital Heart Disease[3] Advanced Heart Failure and Transplant Cardiology Cardiovascular Disease Clinical Cardiac Electrophysiology Critical Care Medicine Endocrinology, Diabetes and Metabolism Gastroenterology Geriatric Medicine Hematology Hospice and Palliative Medicine Infectious Disease Interventional Cardiology Medical Oncology Nephrology Pulmonary Disease Rheumatology Sleep Medicine Sports Medicine Transplant Hepatology
American Board of Medical Genetics	
Clinical Biochemical Genetics* Clinical Cytogenetics* Clinical Genetics (MD)* Clinical Molecular Genetics*	Medical Biochemical Genetics Molecular Genetic Pathology

Change The Outcome



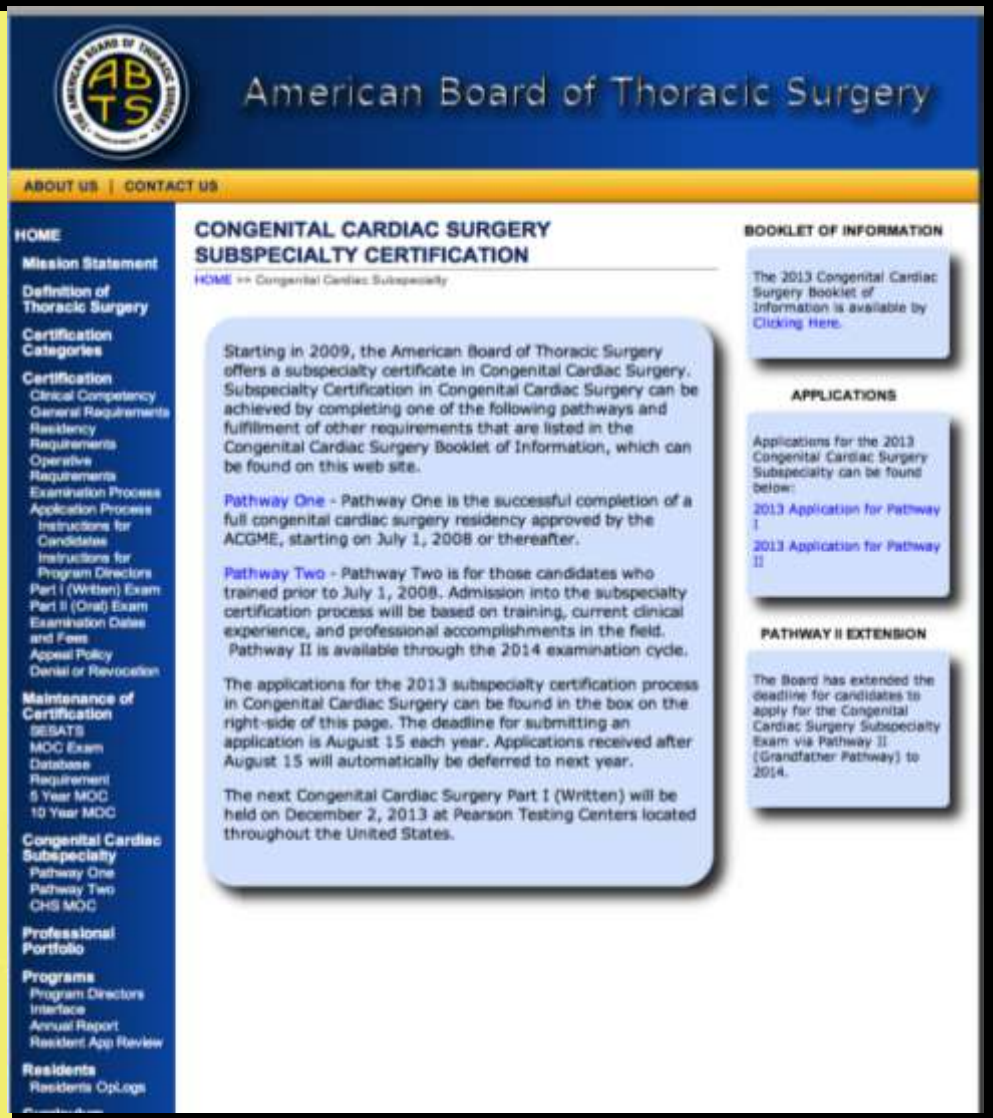
THE AMERICAN BOARD OF THORACIC SURGERY

BOOKLET OF INFORMATION

CONGENITAL HEART SURGERY
SUBSPECIALTY CERTIFICATION

2012

Office of the Board
633 North St. Clair Street, Suite 2320 Chicago, Illinois 60611
(312) 202-5900
info@abts.org



American Board of Thoracic Surgery

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CONGENITAL CARDIAC SURGERY SUBSPECIALTY CERTIFICATION

HOME >> Congenital Cardiac Subspecialty

Starting in 2009, the American Board of Thoracic Surgery offers a subspecialty certificate in Congenital Cardiac Surgery. Subspecialty Certification in Congenital Cardiac Surgery can be achieved by completing one of the following pathways and fulfillment of other requirements that are listed in the Congenital Cardiac Surgery Booklet of Information, which can be found on this web site.

Pathway One - Pathway One is the successful completion of a full congenital cardiac surgery residency approved by the ACGME, starting on July 1, 2008 or thereafter.

Pathway Two - Pathway Two is for those candidates who trained prior to July 1, 2008. Admission into the subspecialty certification process will be based on training, current clinical experience, and professional accomplishments in the field. Pathway II is available through the 2014 examination cycle.

The applications for the 2013 subspecialty certification process in Congenital Cardiac Surgery can be found in the box on the right-side of this page. The deadline for submitting an application is August 15 each year. Applications received after August 15 will automatically be deferred to next year.

The next Congenital Cardiac Surgery Part I (Written) will be held on December 2, 2013 at Pearson Testing Centers located throughout the United States.

BOOKLET OF INFORMATION

The 2013 Congenital Cardiac Surgery Booklet of Information is available by Clicking Here.

APPLICATIONS

Applications for the 2013 Congenital Cardiac Surgery Subspecialty can be found below:

2013 Application for Pathway I

2013 Application for Pathway II

PATHWAY II EXTENSION

The Board has extended the deadline for candidates to apply for the Congenital Cardiac Surgery Subspecialty Exam via Pathway II (Grandfather Pathway) to 2014.

Adults or Big Kids: What Is the Ideal Clinical Environment for Management of Grown-Up Patients With Congenital Heart Disease?

Tara Karamlou, MD, Brian S. Diggs, PhD, Ross M. Ungerleider, MD, MBA, and Karl F. Welke, MD, MS

Divisions of Cardiothoracic Surgery and Surgery, Oregon Health and Science University, Portland, Oregon; Division of Pediatric Cardiothoracic Surgery, Department of Surgery, Case Western Reserve University, Cleveland, Ohio; and Mary Bridge/Swedish Pediatric Cardiothoracic Surgery Program, Mary Bridge Children's Hospital and Health Center, Multicare Health System, Tacoma, Washington

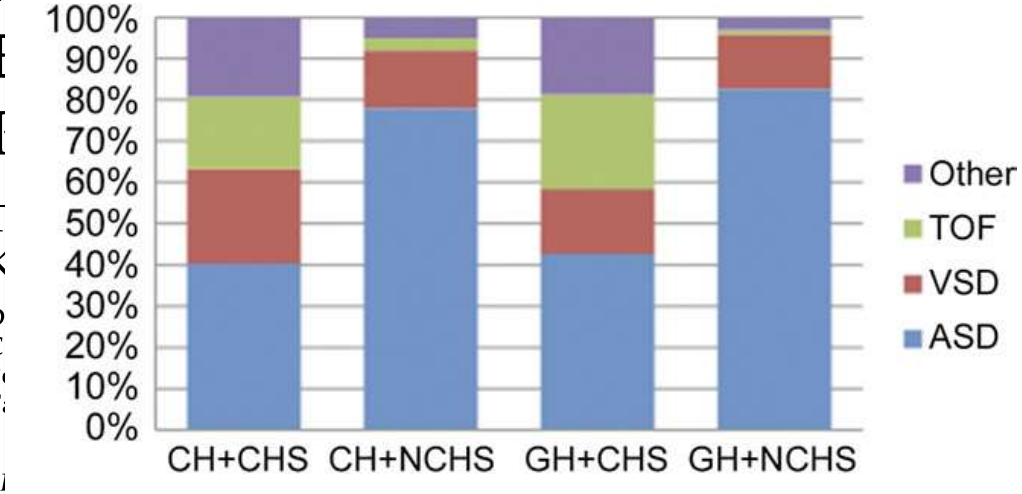
Background. Initiatives to develop Adult Congenital Centers for management of grown-up congenital heart disease (GUCH) patients (aged ≥18 years) have widened without evidence identifying the ideal clinical environment. To elucidate the optimum care paradigm, we investigated whether mortality for patients with GUCH was influenced by the type of hospital where they had surgery, children's specialty hospital (CH) versus general hospital (GH), and by the clinical focus of the surgeon, congenital heart surgery (CHS) or noncongenital (adult acquired) heart surgery (NCHS).

Methods. In the Nationwide Inpatient Sample 1988–2003, we identified index procedures in patients 18 or more years of age within 12 congenital cardiac disease diagnostic groups. The CHS surgeons were defined as those whose annual practice volume consisted of more than 75% pediatric cardiac operations. Four clinical environment combinations were constructed: CH plus CHS, CH plus NCHS, GH plus CHS, and GH plus NCHS. Years were grouped into quartiles to identify trends in management over time.

Results. In all, 29,070 operations occurred at GH and 10,971 occurred at CH. Unadjusted in-hospital mortality was lowest in the CH plus CHS environment (1.14%), and highest for in the GH plus CHS environment (9.93%; $p < 0.001$). After risk adjustment for patient factors, the CH plus CHS environment remained optimum, whereas the other three environments increased the risk of in-hospital death (GH plus NCHS: odds ratio 2.4 [95% confidence interval: 0.9 to 6.2]; CH plus NCHS: odds ratio 2.4 [95% confidence interval: 0.9 to 6.5]; GH plus CHS: odds ratio 9.1 [95% confidence interval: 3.0 to 27.6]). Over the study period, there was a dramatic rise in the number of GUCH patients treated in GH plus NCHS and CH plus NCHS, suggesting that the shift in clinical environment was provider specific rather than hospital-type specific.

Conclusions. Case mix varies with the clinical environment, with more complex procedures performed at GH plus CHS. The optimal environment for complex GUCH surgery involved CHS operating within CH. Initiatives to develop adult congenital centers dedicated to the care of GUCH patients are warranted, and should include congenital heart surgeons operating in a setting mimicking children's hospitals.

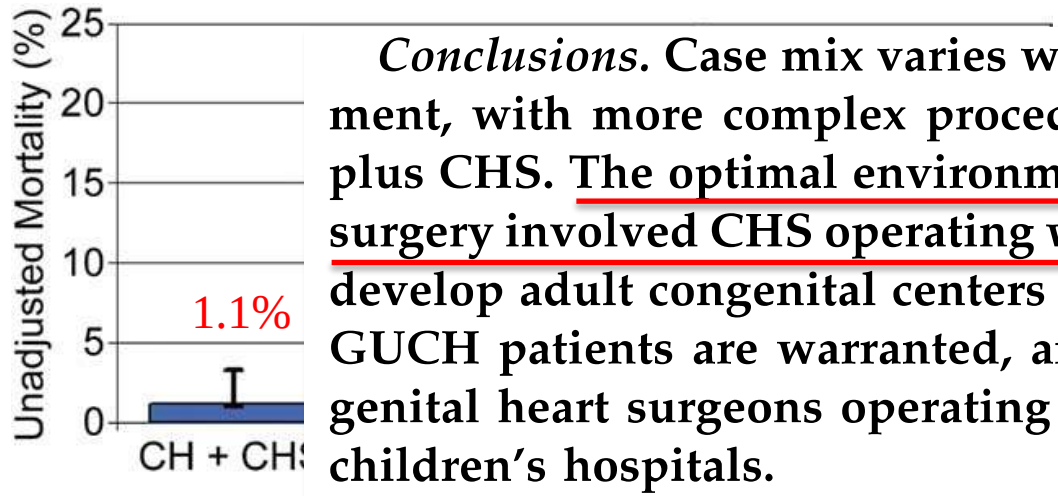
(Ann Thorac Surg 2010;90:573–9)



al Clinical rown-Up ease?

ler, MD, MBA, and

Portland, Oregon; Division of Pediatric and, Ohio; and Mary Bridge/Swedish h Center, Multicare Health System,



Centers for management of grown-up congenital heart

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(Ann Thorac Surg 2010;90:573–9)

Change The Outcome

- ACHD Subspecialty Certification
- CHD Surgeons
- Multi-Center Research
- Evidence Based Clinical Guidelines

Alliance for Adult Research in Congenital Cardiology (AARCC)

University of Washington, Seattle, WA
Oregon Health & Science Univ, Portland, OR
University of California, Los Angeles, CA
University of Colorado, Denver, CO
Mayo Clinic, Rochester, MN
Medical College of Wisconsin, Milwaukee, WI
NCH/Ohio State University, Columbus, OH
Pennsylvania State University, Hershey, PA
University of Pennsylvania, Philadelphia, PA
Columbia University, New York, NY
Children's Hospital Boston, Boston, MA
Montreal Heart Institute, Montreal, QC
Baylor University, Houston TX
Emory University, Atlanta, GA

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PRACTICE GUIDELINE: FULL TEXT

ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines on the Management of Adults With Congenital Heart Disease)

Developed in Collaboration With the American Society of Echocardiography, Heart Rhythm Society, International Society for Adult Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons

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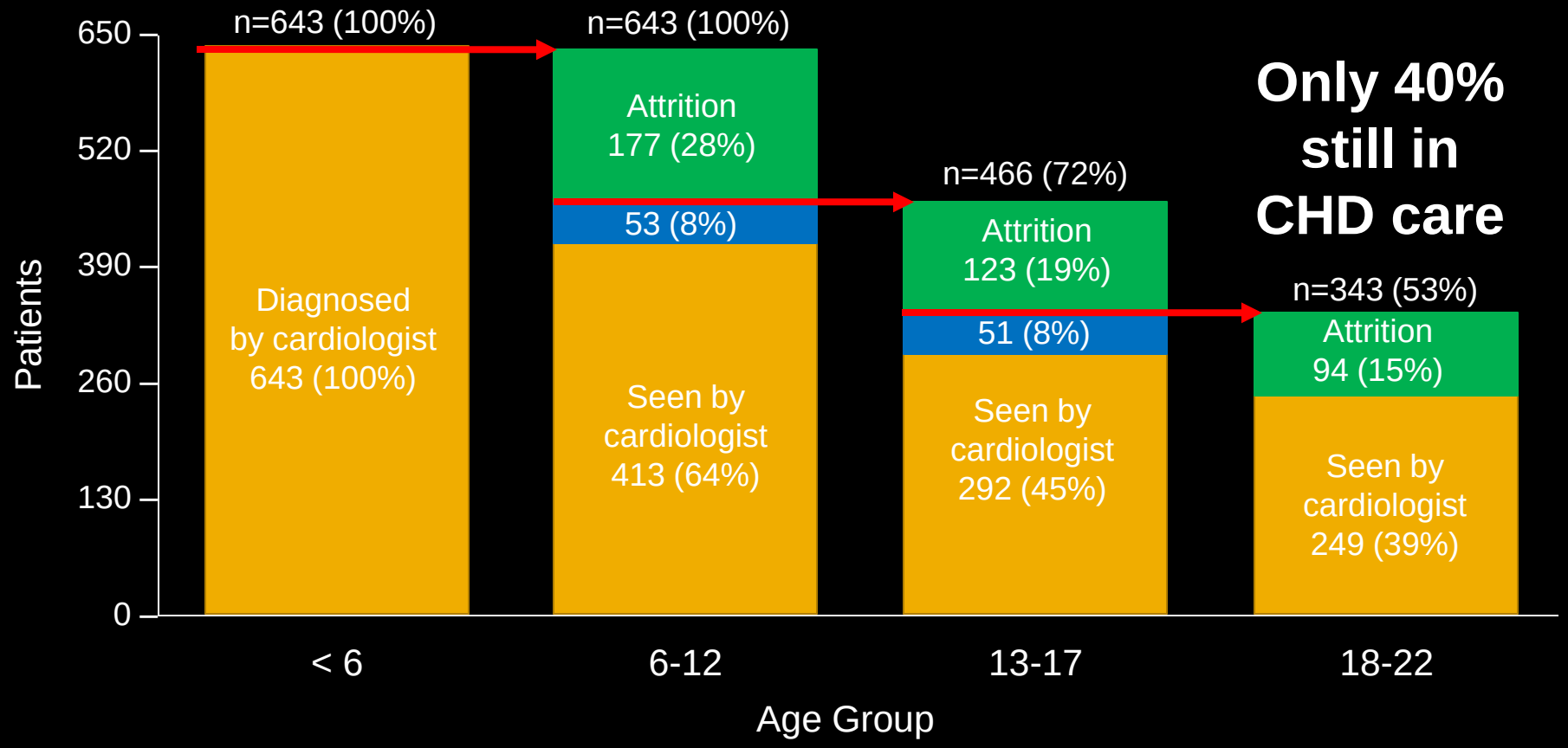
EXPERT OPINION

Change The Outcome

- ACHD Subspecialty Certification
- CHD Surgeons
- Multi-Center Research
- Evidence Based Clinical Guidelines
- Reduce Lost to Care

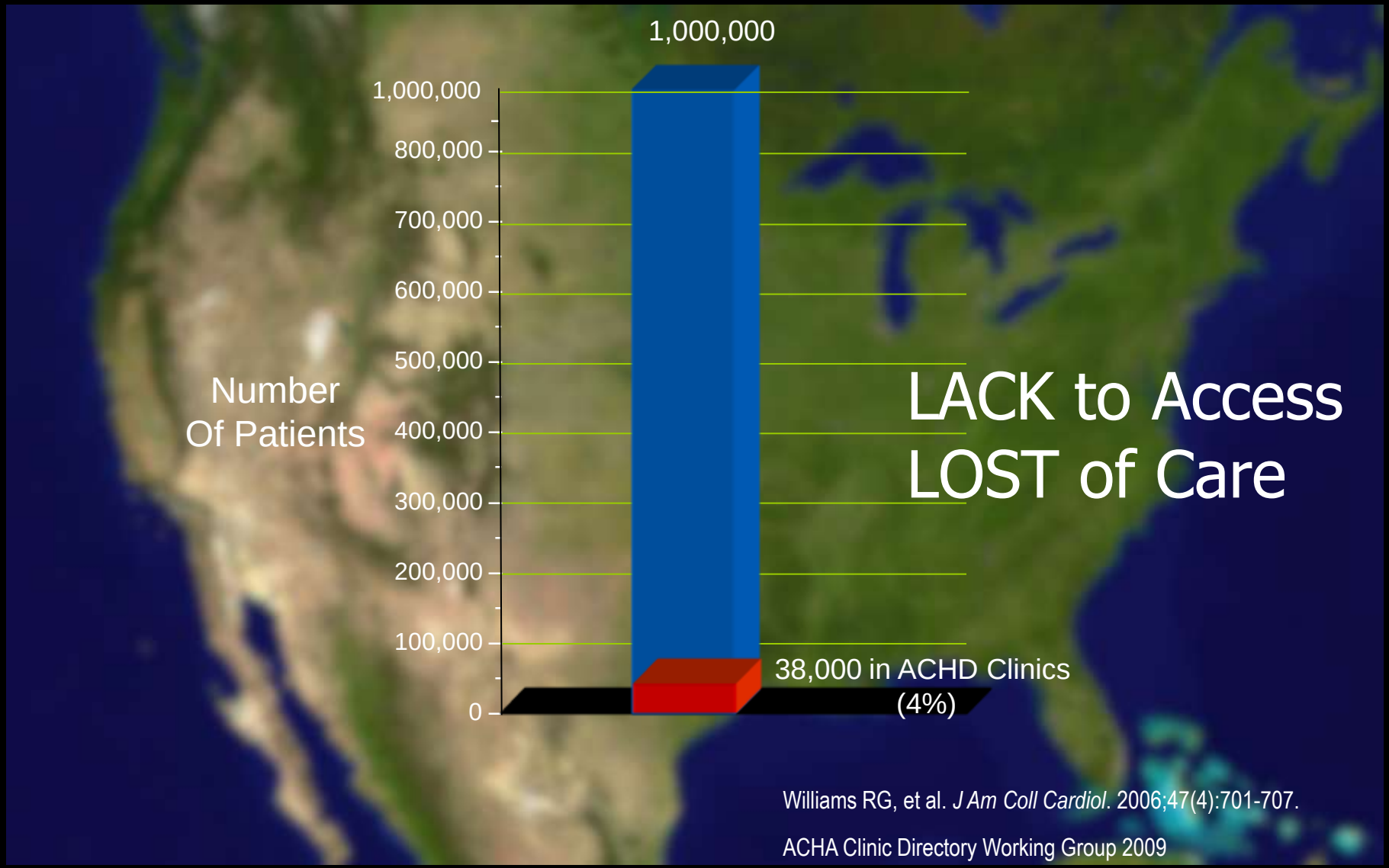
LOST TO CARE



Only 40% still in CHD care

Mackie, et al. *Circulation.* 2009;120:302-309.

ACHD Patients in US vs Those in ACHD Clinics



Williams RG, et al. *J Am Coll Cardiol*. 2006;47(4):701-707.

ACHA Clinic Directory Working Group 2009

Change The Outcome

- ACHD Subspecialty Certification
- CHD Surgeons
- Multi-Center Research
- Evidence Based Clinical Guidelines
- Reduce Lost to Care
- ACHD Program Building

Task Force 4: Organization of Delivery Systems for Adults With Congenital Heart Disease

Michael J. Landzberg, MD, FACC, *Co-Chair*, Daniel J. Murphy, Jr, MD, FACC, *Co-Chair*, William R. Davidson, Jr, MD, FACC, John A. Jarcho, MD, FACC, Harlan M. Krumholz, MD, FACC, John E. Mayer, Jr, MD, FACC, Roger B. B. Mee, MD, ChB, David J. Sahn, MD, FACC, George F. Van Hare, MD, FACC, Gary D. Webb, MD, FACC, Roberta G. Williams, MD, FACC

RECOMMENDATIONS

- Care of adults with CHD should be coordinated by regional ACHD centers that represent a resource for the medical community.
- An individual primary caregiver or cardiologist without specific training and expertise in adult CHD should manage adults with moderate and complex CHD only in collaboration with a physician with advanced training and experience in caring for adults with CHD.
- Every academic adult cardiology/cardiac surgery center should have access to a regional ACHD center for consultation and referral.
- Every cardiologist should have a referral relationship with a regional ACHD center.
- Approximately one regional ACHD center should be created to serve a population of 5 to 10 million people, with 30 to 50 such centers in the U.S.
- Within a single urban center, institutions should establish collaborative relationships.
- Each pediatric cardiology program should identify the ACHD center to which the transfer of patients will be made.

geni

Chair

- Most cardiac catheterization and electrophysiology procedures for adults with moderate and complex CHD should be performed in a regional ACHD center with appropriate experience in CHD, and in a laboratory with appropriate personnel and equipment. After consultation with staff in regional ACHD centers, it may be appropriate for local centers to perform such procedures.
- Surgical procedures in adults with CHD as outlined in Tables 4 and 5 of Task Force #1 should generally be performed in a regional ACHD center with specific excellence in the surgical care of CHD.
- Each regional ACHD center should participate in a medical and surgical database aimed at defining and improving outcomes in adults with CHD.
- Each regional ACHD center should encourage all ACHD patient data to be included in a national CHD database. Programs should work collaboratively on multicenter projects and develop investigator-initiated research proposals dealing with ACHD.

ACC/AHA Guideline

ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease: Executive Summary

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Adults With Congenital Heart Disease)

Developed in Collaboration With the American Society of Echocardiography, Heart Rhythm Society, International Society for Adult Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons

(*Circulation*. 2008;118:2395-2451.)

1.5. Recommendations for Delivery of Care and Ensuring Access

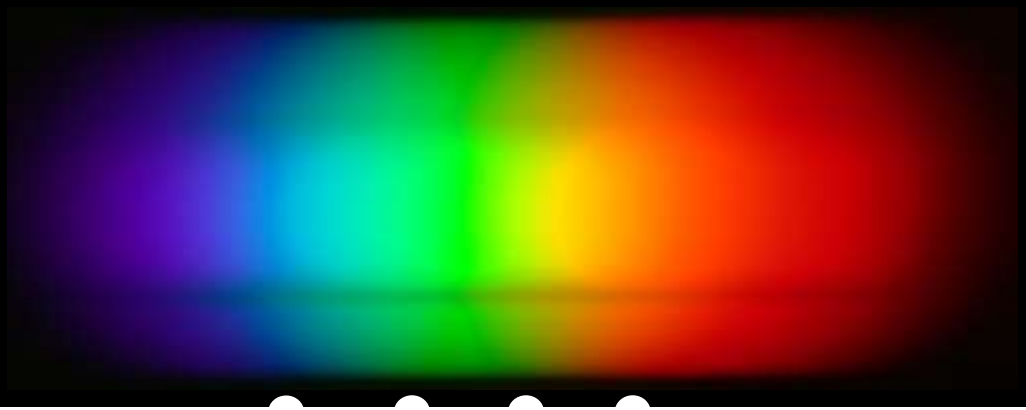
Class I

1. The focus of current healthcare access goals for ACHD patients should include the following:
   a. Strengthening organization of and access to transition clinics for adolescents and young adults with CHD, including funding of allied healthcare providers to provide infrastructure comparable to that provided for children with CHD. (*Level of Evidence: C*)
   b. Organization of outreach and education programs for patients, their families, and caregivers to recapture patients leaving pediatric supervisory care or who are lost to follow-up. Such programs can determine when and where further intervention is required. (*Level of Evidence: C*)
   c. Enhanced education of adult cardiovascular specialists and pediatric cardiologists in the pathophysiology and management of ACHD patients. (*Level of Evidence: C*)
   d. A liaison with regulatory agencies at the local, regional, state, and federal levels to create programs commensurate with the needs of this large cardiovascular population. (*Level of Evidence: C*)
2. Health care for ACHD patients should be coordinated by regional ACHD centers of excellence that would serve as a resource for the surrounding medical community, affected individuals, and their families. (Table 2)
   a. Every academic adult cardiology/cardiac surgery center should have access to a regional ACHD center for consultation and referral. (*Level of Evidence: C*)
   b. Each pediatric cardiology program should identify the ACHD center to which the transfer of patients can be made. (*Level of Evidence: C*)
   c. All emergency care facilities should have an affiliation with a regional ACHD center. (*Level of Evidence: C*)
3. ACHD patients should carry a complete medical "passport" that outlines specifics of their past and current medical history, as well as contact information for immediate access to data and counsel from local and regional centers of excellence. (*Level of Evidence: C*)

ACHD Delivery of Care

- In the US, no standard for an delivery of ACHD care
- Extremes of what is called an "ACHD Program"

ACHD CARE



ACHD Clinic

- Director w No Formal ACHD training or experience
- No specialized APNs, RNs
- No ACHD call
- No CHD trained interv'alist, EP, surgical care
- No specialized ACHD outpt clinic
- No in-hospital ACHD consult svc
- No transition or patient education

ACHD Program

- Director w ACHD training
- Specialized ACHD APNs, RNs
- 24/7 ACHD call
- Specific ACHD trained interventionalist, EP, surgery
- Specific ACHD outpatient
- ACHD hospital consult svc
- Advanced therapies
- Patient Education programs

ACHA ACHD Program Accreditation

Goal: To improve the quality of ACHD care delivered in the US.

Objectives

- Establish minimal criteria for Accreditation of US ACHD Programs
- Incremental expansion of criteria with development of ACHD board certification, quality metrics, registry, database
- Application plus site visits
- Begin Accrediting Programs in 2015

ACHA
Adult Congenital Heart Association

Change The Outcome

- ACHD Subspecialty Certification
- CHD Surgeons
- Multi-Center Research
- Evidence Based Clinical Guidelines
- Reduce Lost to Care
- ACHD Program Building
- Accreditation and Quality Metrics
- Improve Communication and Education among Internal Medicine, Pediatric and ACHD cardiologists

PATCH

ACC Chapters Unite with the Adult Congenital Heart Association to Improve the Care for ACHD Patients:

Provider Action for Treating Congenital Hearts (PATCH)
Pilot Program Chapter Opportunities

ACC BOG and Chapters ⟷ ACHA

The ACC/ACHA Provider Action for Treating Congenital Hearts (PATCH) Program:

ACHA and ACC are working to collaborate on the PATCH Program to address four major challenges to the provision of high quality coordinated ACHD care in the U.S.:

- Lack of educational resources specific to the complex needs of the ACHD population
- Lack of awareness of ACHD care guidelines
- Access to ACHD trained cardiologists and centers of excellence
- Lack of networking between ACHD specialists and cardiologists

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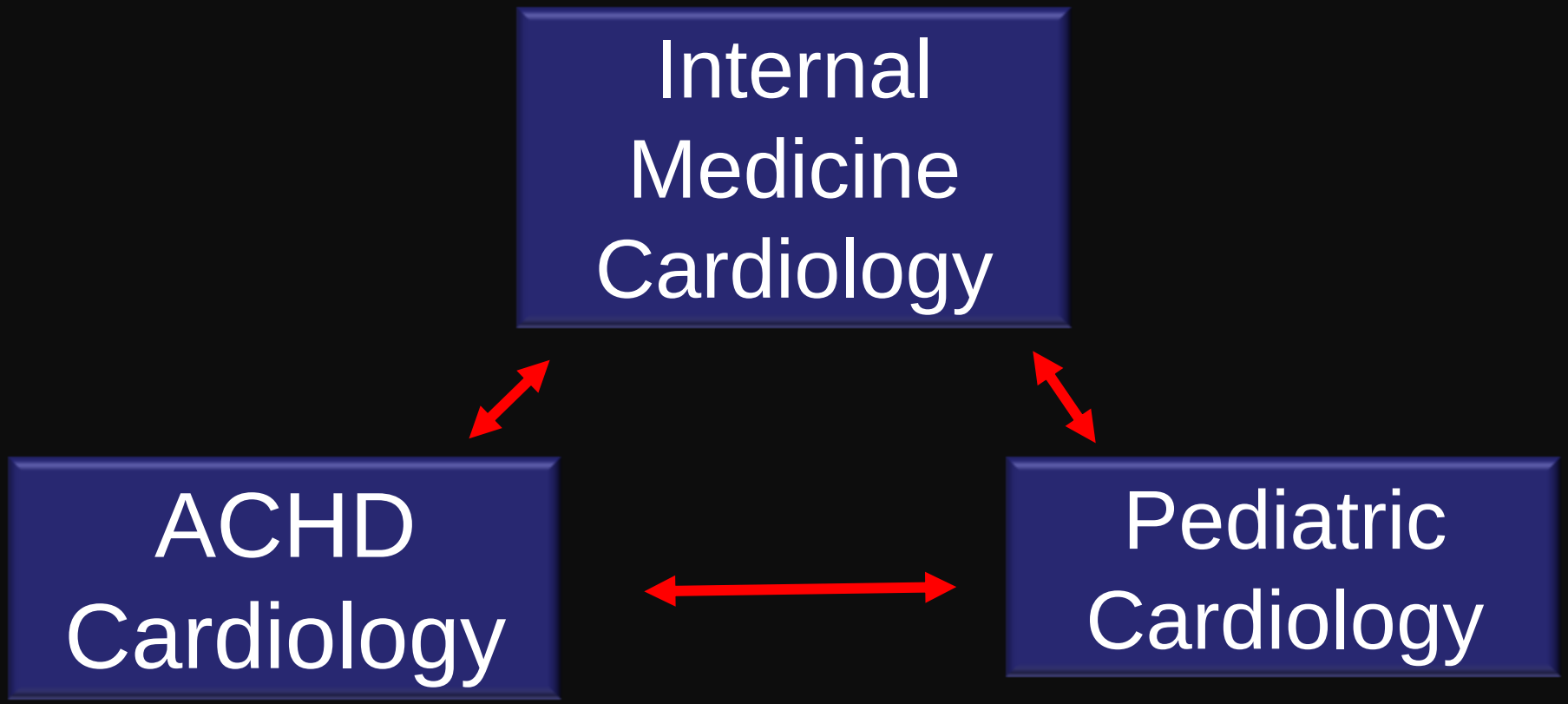

PATCH

ACC Chapters Unite with the Adult Congenital Heart Association to Improve the Care for ACHD Patients:

Provider Action for Treating Congenital Hearts (PATCH)
Pilot Program Chapter Opportunities

ACHD ACC Chapter Lecture

ACHD Webinars

ACHD Toolkit

Create Networking

www.patchheartprogram.org

About PATCH

ACHA AND ACC HAVE INITIATED THE PROVIDER ACTION FOR TREATING CONGENITAL HEARTS (PATCH), A PROGRAM INTENDED TO CREATE LEARNING OPPORTUNITIES AND COLLABORATION BETWEEN INTERNAL MEDICINE GENERAL CARDIOLOGISTS AND ADULT CONGENITAL HEART DISEASE SPECIALISTS.

The overarching goal of PATCH is to improve the care for adult congenital heart patients, and to do so through education, communication, and networking and by utilizing the organizational structure of ACHA, the ACC Board of Governors, Chapter infrastructure and its membership.

The ACC/ACHA PATCH Program will address four major challenges to the provision towards the highest quality coordinated ACHD care in the U.S.:

- Lack of educational resources specific to the complex needs of the ACHD population
- Lack of awareness of ACHD care guidelines
- Access to ACHD trained cardiologists and centers of excellence
- Lack of networking between ACHD specialists and internal medicine general cardiologists

For more information about the PATCH Program goals, please click here.

There is a need for increased awareness of the ACC/AHA guidelines for ACHD care and when referral to ACHD provider is needed. Click here for more information about these guidelines.

ACHA
Adult Congenital
Heart Association

AMERICAN
COLLEGE of
CARDIOLOGY
FOUNDATION

Provider Action for Treating Congenital Hearts (PATCH)
Program Webinars

November 2012– May 2013

Date	Time	Webinar Subject/Title	Presenter
November 27, 2012	7-8 pm EST	ACHD 101 for the Healthcare Provider	Gary Webb, MD, FACC
December 10, 2012	7-8 pm EST	ASD: What every non-CHD Provider Should Know	Curt Daniels, MD, FACC
January 31, 2013	7-8 pm EST	CHD/PH Eisenmenger Syndrome	Michael Earing, MD, FACC
Date TBD	7-8 pm EST	Tetralogy of Fallot – The spectrum of late medical issues after repair	Joseph Kay, MD, FACC
February 13, 2013	7-8 pm EST	Discussing Pregnancy and Birth Control with your CHD Patients	Arwa Saidi, MD, FACC
March 2013	7-8 pm EDT	Transposition (D-TGA, L-TGA)	Alison Meadows, MD, PhD
April 2013	7-8 pm EDT	Single Ventricle/Fontan	Karen Stout, MD, FACC
May 2013	7-8 pm EDT	Bicuspid Aortic Valve/Coarctation	Stephen Cook, MD, FACC

All webinars are recorded and an archived version is available at www.patchheartprogram.org.


OHIO STATE
BUCKEYES
ACHD

OHIO ACHD Programs

Ohio Chapter of the American College of Cardiology
Adult Congenital Heart Disease Resources

AKRON

Adult Congenital Heart Service at Akron Children's Hospital
The Heart Center, Suite 5200
One Perkins Square
Akron OH 44308
330-543-8521
www.akronchildrens.org

Available presenter for local meetings:
John R. Lane, MD
Director of both Pediatric Cardiology and Adult Congenital Cardiology at Akron Children's Hospital

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CLEVELAND

1. Adult Congenital Heart Disease Services
The Cleveland Clinic
9500 Euclid Ave.
Cleveland, Ohio 44195
216-445-7430

Available presenter for local meetings:
Richard Krasuski, M.D. - krasusr@ccf.org
Director, Adult Congenital Heart Disease Services

---

2. UH Rainbow Babies & Children's Hospital
MS RBC 6001
11100 Euclid Ave
Cleveland, OH 44106
216-844-8529
Fax 216-844-5478

Available presenter for local meetings:
Christopher S. Snyder, MD
Christopher.snyder@uhhospitals.org
Associate Professor of Pediatrics
Director, Division of Pediatric Cardiology
KeyBank-Meyer Family Chair for Excellence in Leadership

COLUMBUS

The COACH Program
Columbus Ohio Adult Congenital Heart Disease and Pulmonary Hypertension Program
The Ohio State University
Nationwide Children's Hospital
700 Childrens Dr
Columbus, OH 43205
OSU: 614-293-8761
NCH: 614-722-5622
Director: Curt J. Daniels, MD, FACC, cell 614-204-8909

Available presenters for local meetings:
Curt J. Daniels, MD, FACC - curt.daniels@osumc.edu
Ali Zaidi, MD - ali.zaidi@osumc.edu
Sharon Roble, MD, FACC - sharon.roble@osumc.edu

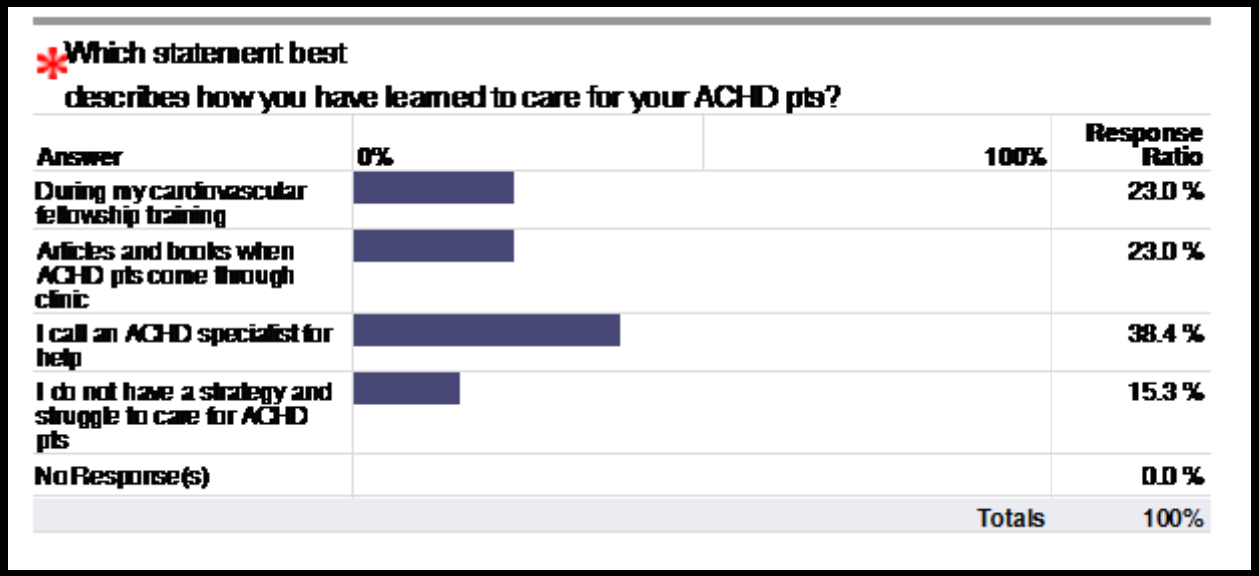
CINCINNATI

Cincinnati Adolescent and Adult Congenital Heart Disease Program
The Heart Institute at Cincinnati Children's Hospital Medical Center
513-803-1777

Available presenters for local meetings:
Christopher Learn, MD - christopher.learn@cchmc.org
Gruschen Veldtman, FRCP, MBChB - gruschen.veldtman@cchmc.org
Gary Webb, MD, FACC - gary.webb@cchmc.org

OHIO ACC SURVEY

- 85% IM Cardiologist
- 50% Academic Cardiologist
- 46% Non-Invasive, 30% Invasive
- 46% in practice 10-20 years
- 62% See < 10, 30% 10-50 ACHD patients



*Which statement best describes how you have learned to care for your ACHD pts?

Answer	0% 100%	Response Ratio
During my cardiovascular fellowship training		23.0 %
Articles and books when ACHD pts come through clinic		23.0 %
I call an ACHD specialist for help		38.4 %
I do not have a strategy and struggle to care for ACHD pts		15.3 %
No Response(s)		0.0 %
	Totals	100%

OHIO ACC SURVEY

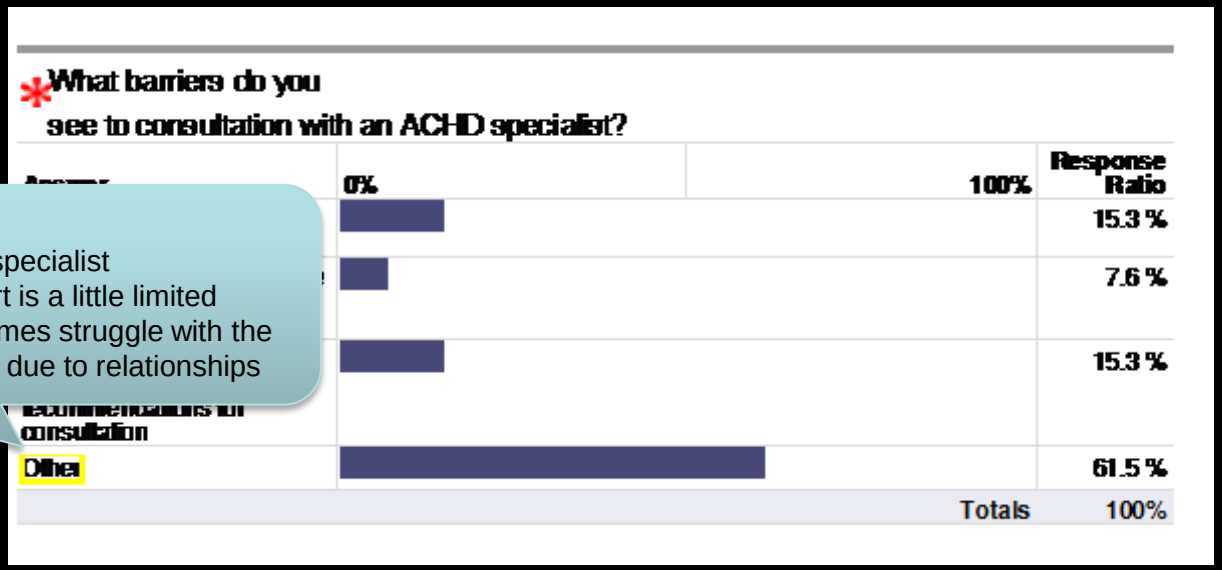
*What resources would you like to have available to care for ACHD patients (ply)

Answer	0% 100%	Response Ratio
Listing of local and regional ACHD specialists and contact information		76.9 %
Easy access to ACHD educational material and care guidelines		92.3 %
ACHD webinars		15.3 %
Regional ACHD conferences		30.7 %
Other		0.0 %
	Totals	100%

*Do you consult an ACHD specialist for patients with moderate and complex CHD

Answer	0% 100%	Response Ratio
Yes		100.0 %
No		0.0 %
No Response(s)		0.0 %
	Totals	100%

OHIO ACC SURVEY

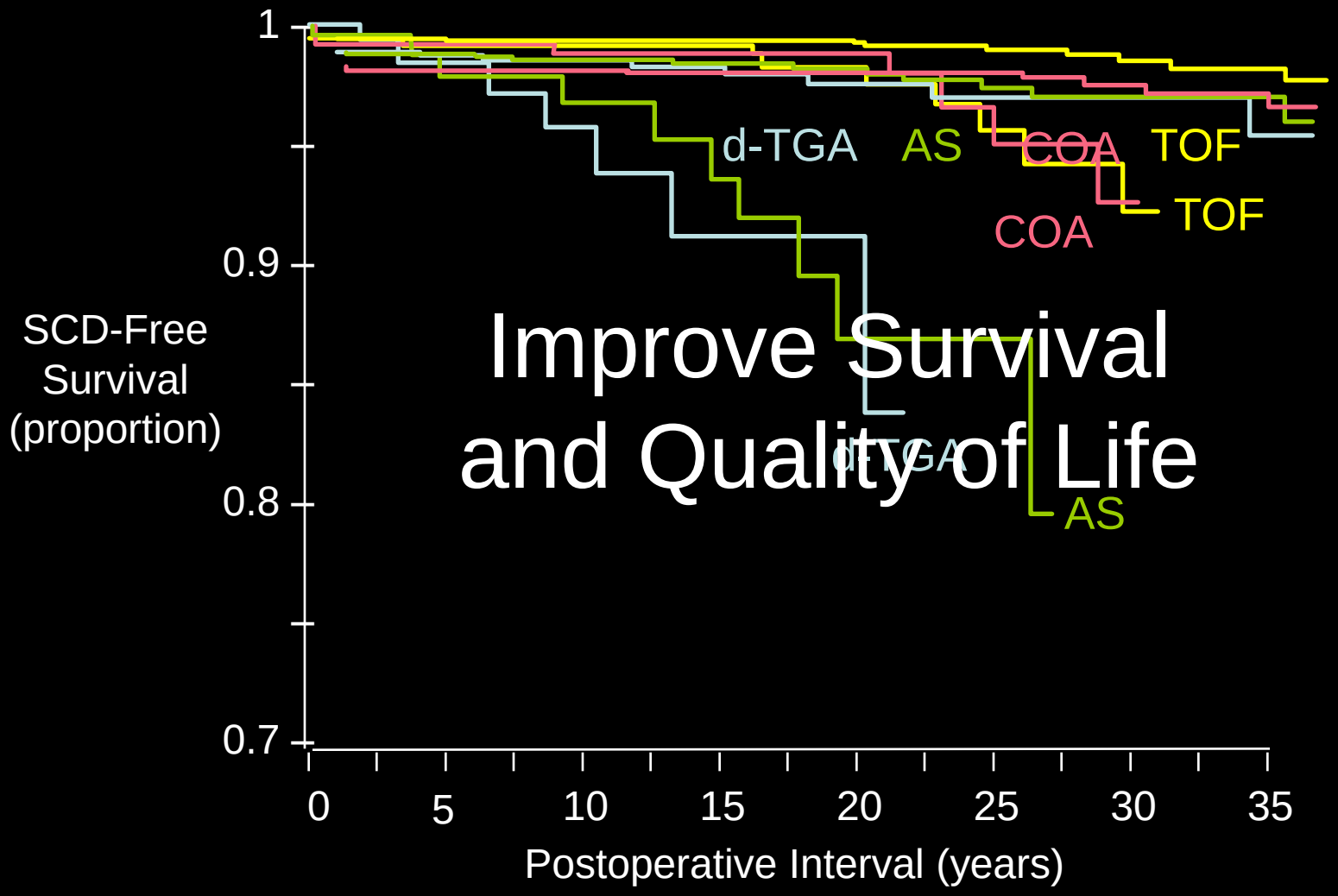


OTHER
1. Distance to specialist
2. Local support is a little limited
3. Patients at times struggle with the transfer of care due to relationships

“Any other issues caring for ACHD patients?”

1. Complex patients at times prefer to stay locally in their community setting rather than travelling to the tertiary care centers that have ACHD specialists on staff.
2. Limited volumes make me feel uncomfortable caring for ACHD patients.
3. Where are they best cared for and what model is best? In other words, adult hospital versus pediatric hospital
4. Where are they best served for surgical or catheterization intervention?
5. Where are they best served for transplant?

Actuarial Probability of SCD-Free Survival After Surgical Treatment



PATCH PANEL DISCUSSION

- **Tim Feltes, MD, FACC**
  Chief of Pediatric Cardiology
  Nationwide Children's Hospital
- **Chris Learn, MD**
  ACHD Specialist
  Cincinnati Children's Hospital
- **Dave Orsinelli, MD, FACC**
  Academic Internal Medicine Cardiologist
  The Ohio State University
- **Michael Deucher, MD, FACC**
  Private Practice Internal Medicine Cardiologist
  Southwest General Health System Cleveland
- **Deena Barber, RN**
  ACHD Nurse Coordinator
  Akron Children's Hospital

PATCH Program Resources

PATCH Program website www.patchheartprogram.org

American College of Cardiology www.cardiosource.org

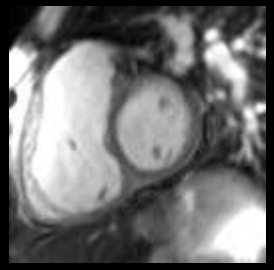
Adult Congenital Heart Association www.achaheart.org

ACHA/ISACHD Clinic Directory
www.achaheart.org/home/clinic-directory.aspx

PATCH
Provider Action for Treating Congenital Hearts

Adult Congenital Heart Disease

Improving Education and Communication Among Cardiologist



Curt J Daniels, MD, FACC

Professor, Internal Medicine and Pediatrics

Director, **COACH** Program **C**olumbus **O**hio **A**dult **C**ongenital **H**eart Disease and Pulmonary Hypertension Programs

Division of Cardiology, The Ohio State University & The Heart Center at Nationwide Children's Hospital

Nationwide Children's Hospital℠

The Ohio State University Medical Center