

The History of Heart Valves an Industry Perspective: From Initial Designs to Today

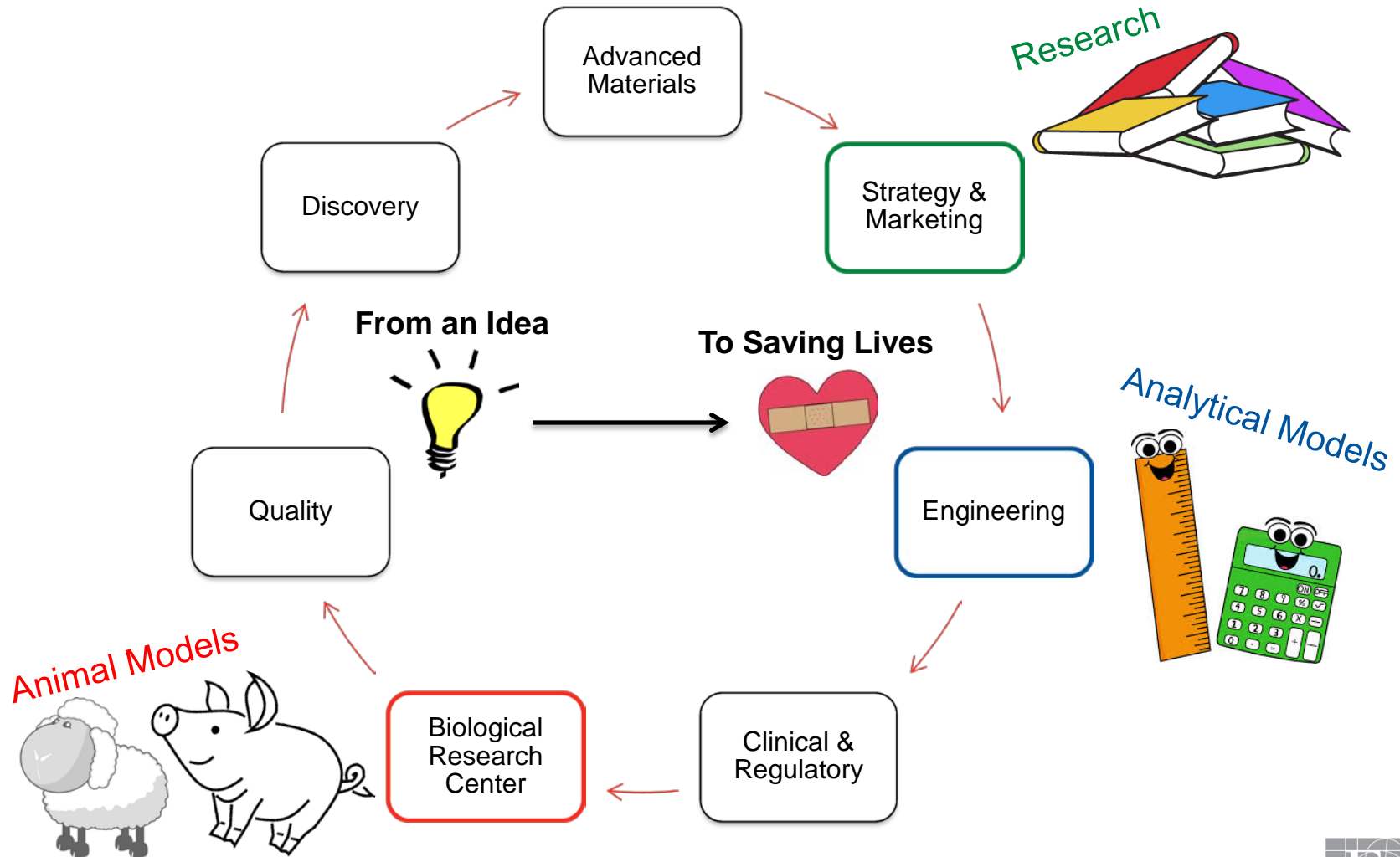
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Edwards Lifesciences

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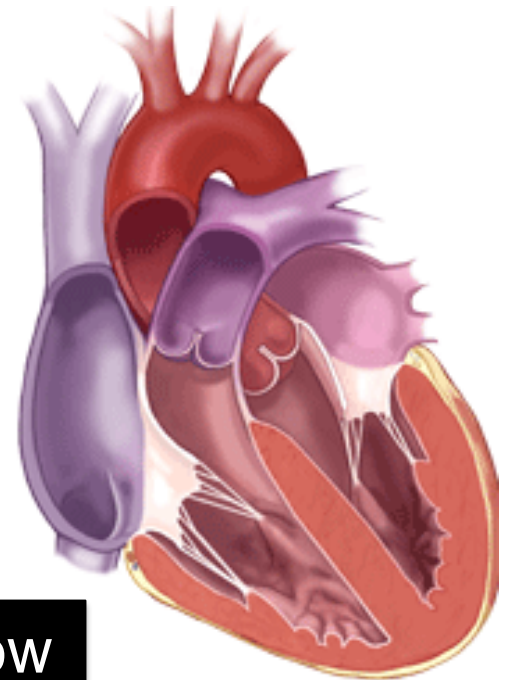
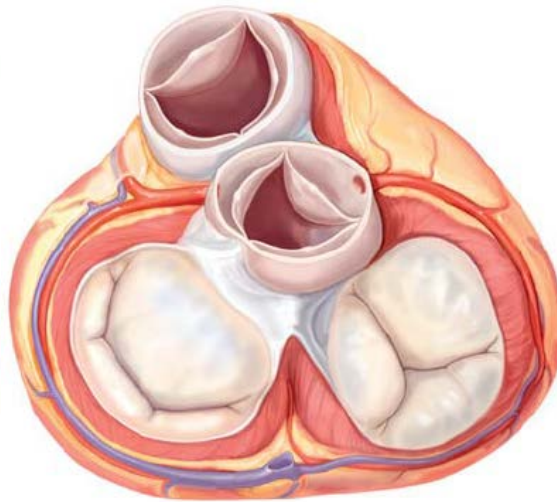
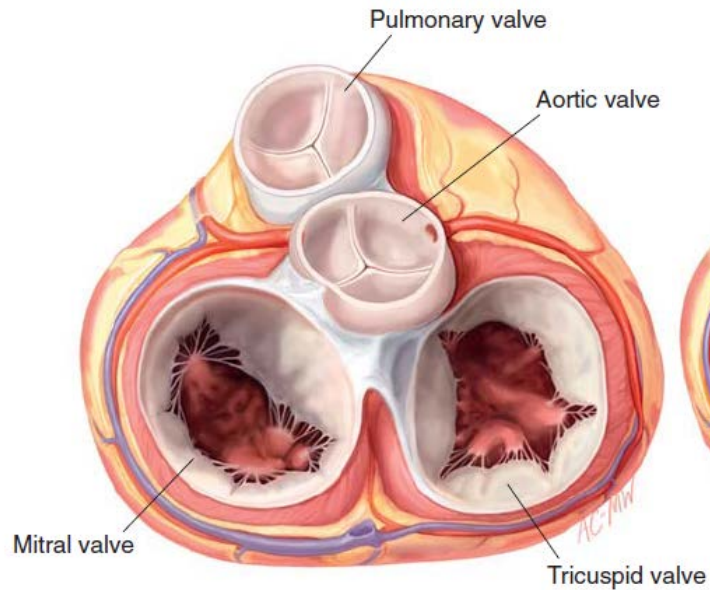
Edwards Lifesciences, Advanced Technologies



Why does this matter?

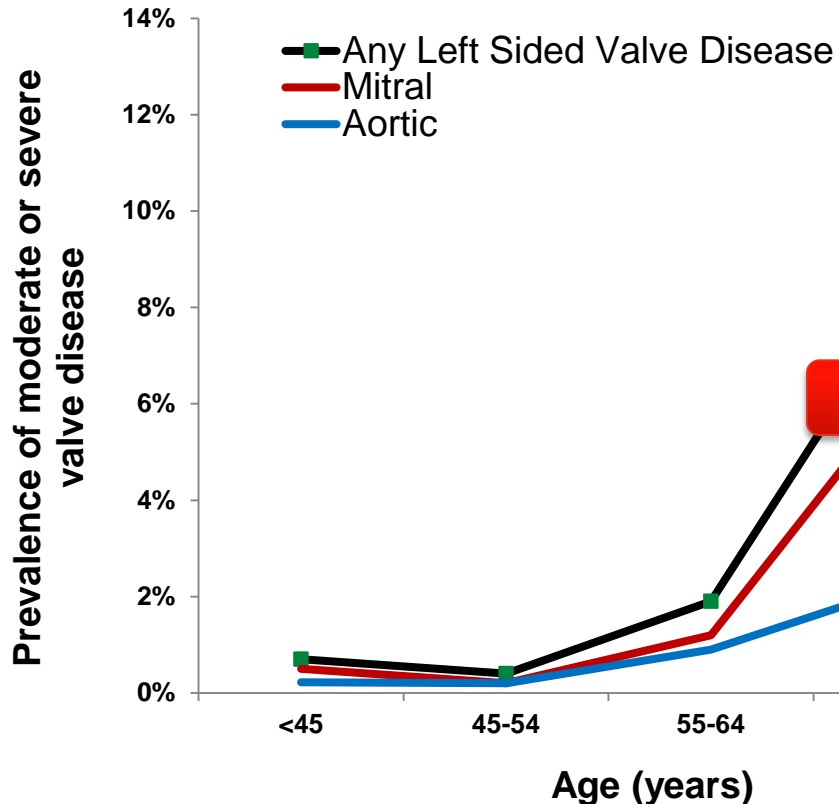
- Heart disease is the #1 cause of death for men and women in the US, claiming approximately 1 million lives annually
- Every 33 seconds someone in the United States dies from cardiovascular disease
- More die of heart disease than of AIDS and all cancers combined

The Different Valves

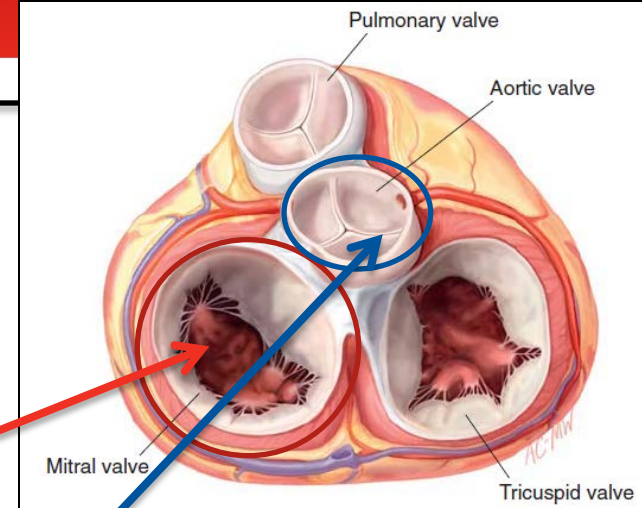


Goal of a heart valve: Unidirectional blood flow

Left Sided Valvular Diseases

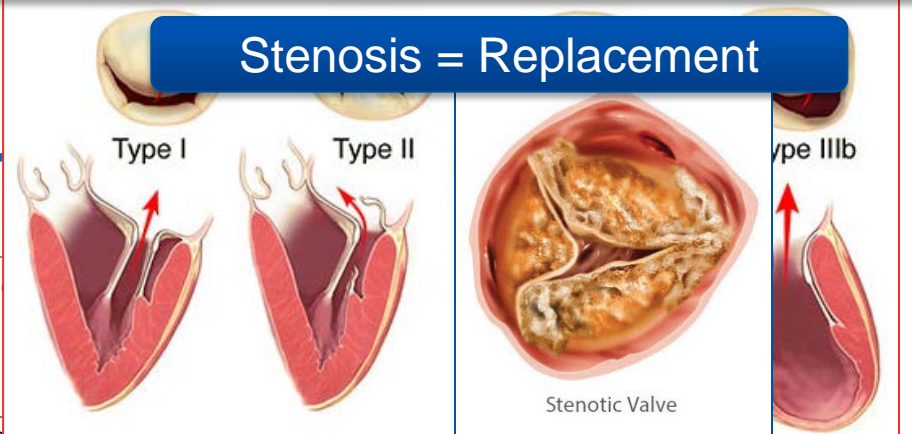


Graph adapted from *Burden of Valvular Heart Disease: A Population Based Study* (2006)

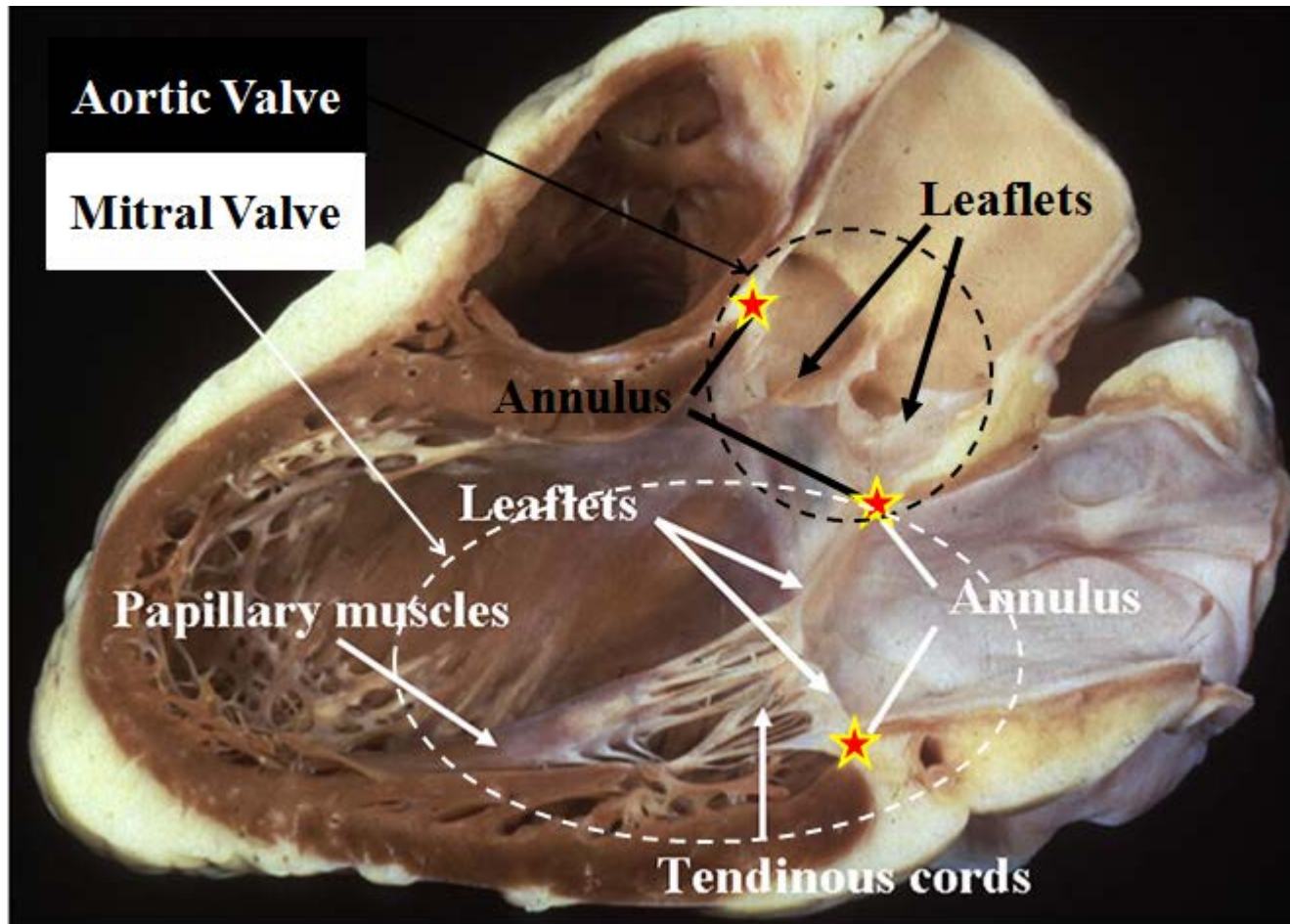


Regurgitation = Replacement or Repair

Stenosis = Replacement



Complexity in Structure

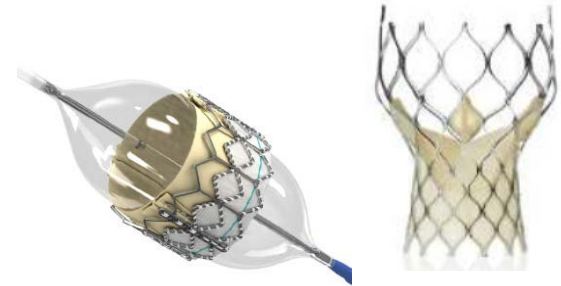


Current Options and Trends

Replacement



Replacement



Surgical

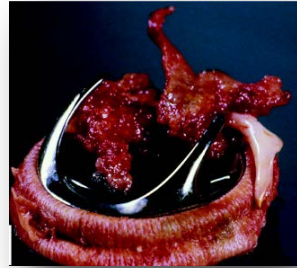
Transcatheter

Which Valve is Best?

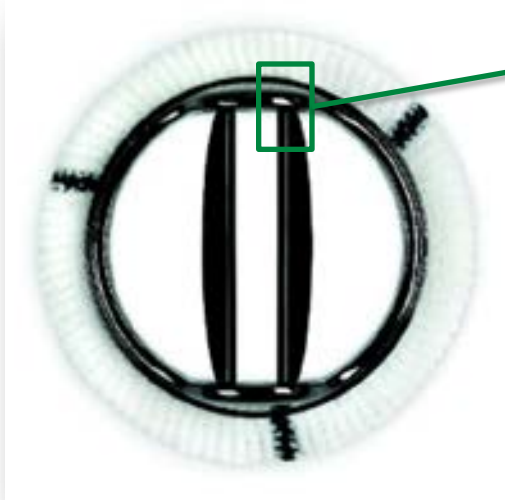
- If the patient is young....

Durability

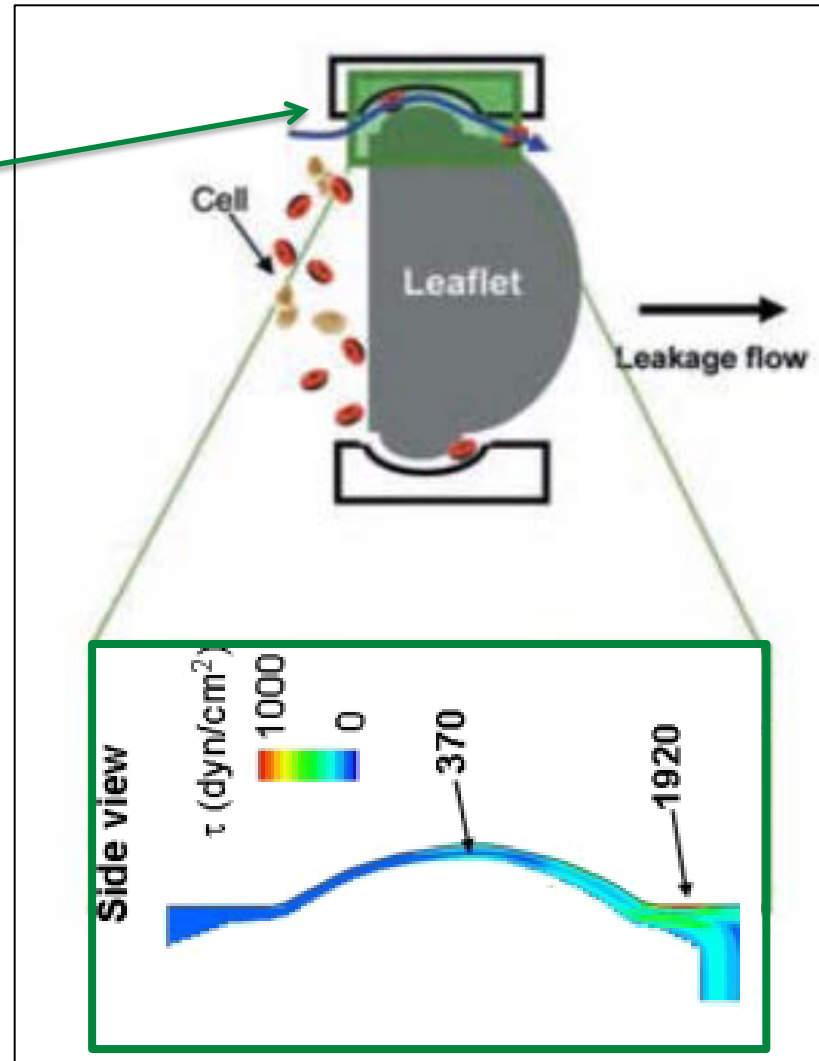
→ Materials, Design, Process



Computation Fluid Dynamics to Improve Designs



Platelet Activation =
Shear Stress and/or
Residence Time

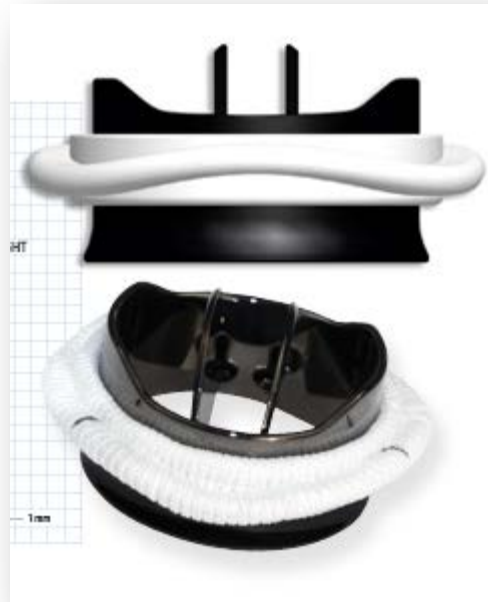


Moving towards

Blood Thinners

Aspirin

No Medications



?

Which Valve is Best?

- If the patient is young....

Durability

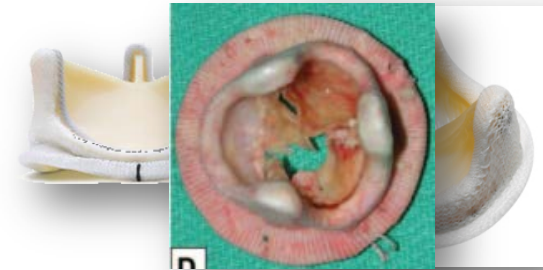
→ Materials, Design, Process



- If the patient cannot tolerate anti-coagulants

Hemodynamics

→ Fluid Mechanics



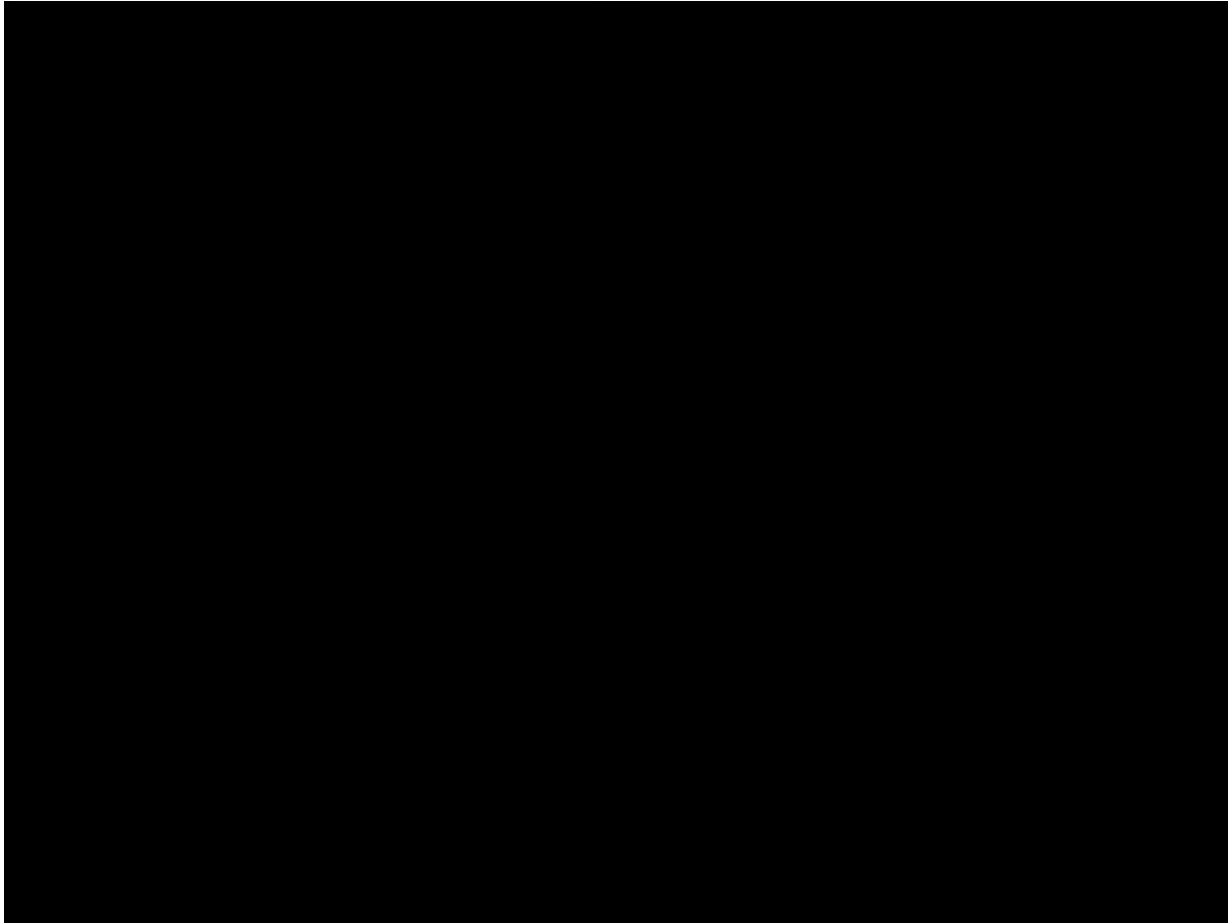
Accelerated Wear Testing



Accelerated Wear Testing

Time Zero
(0 Cycles)

25 Simulated Years
(1 Billion Cycles, ~2.5 years)



Which Valve is Best?

- If the patient is young....

Durability



Materials, Design, Process



- If the patient can not tolerate anti-coagulants

Hemodynamics



Fluid Mechanics

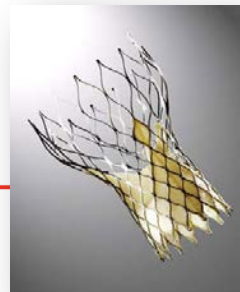


- If the patient a high risk surgical candidate

Implantation



Anatomy

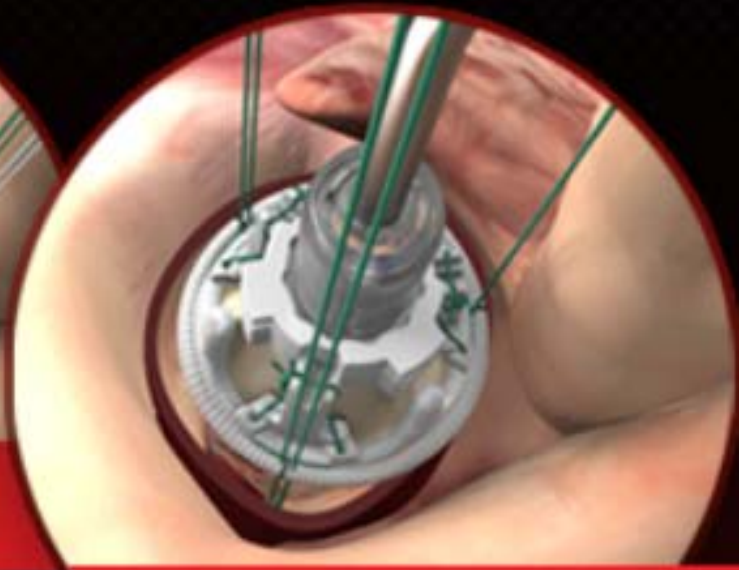


Minimally Invasive Procedures

Traditional Surgical Valves VS EDWARDS INTUITY Elite Valve



12-15 Sutures

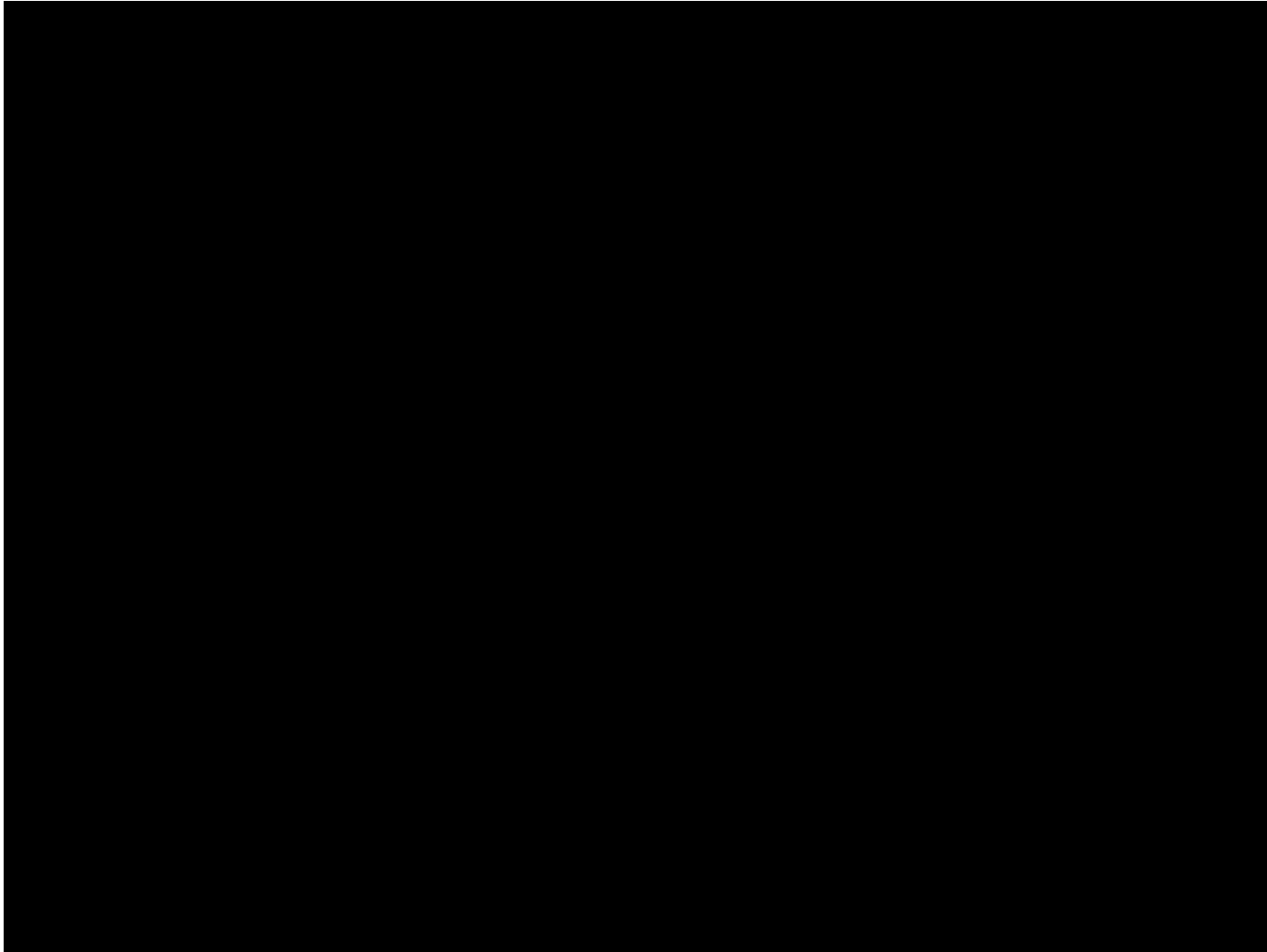


3 Sutures

Streamlined Delivery

Utilizes a balloon expanded frame and 3 guiding sutures to provide greater ease of implantation and excellent visualization.

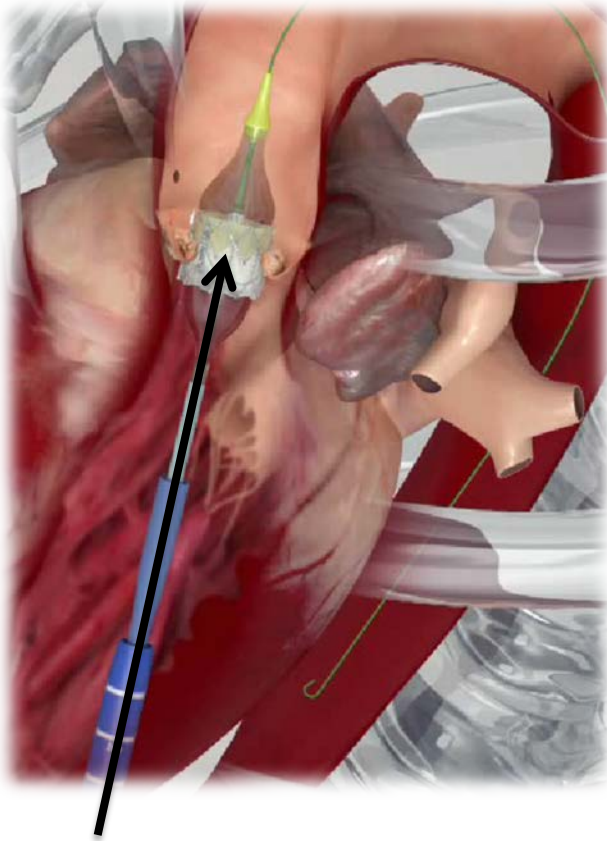
Transcatheter Technologies



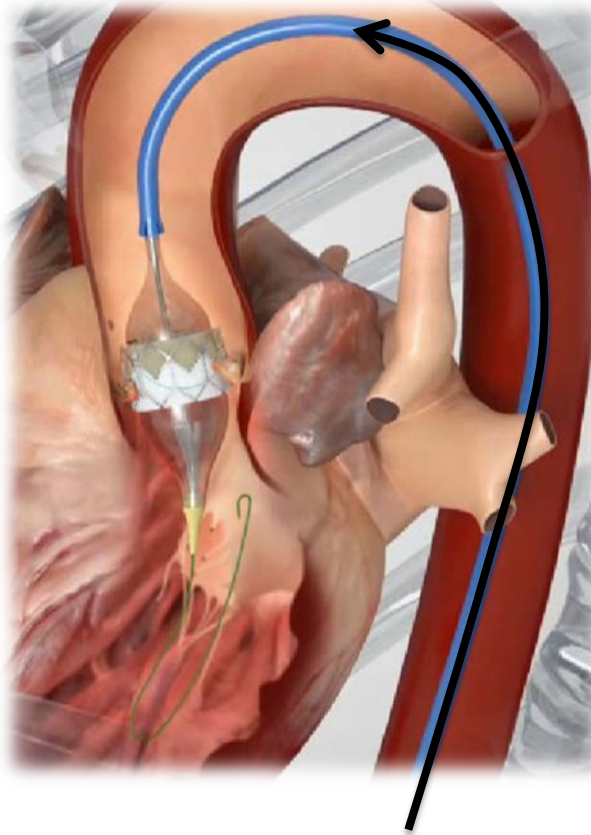
Edwards

Transcatheter Technologies

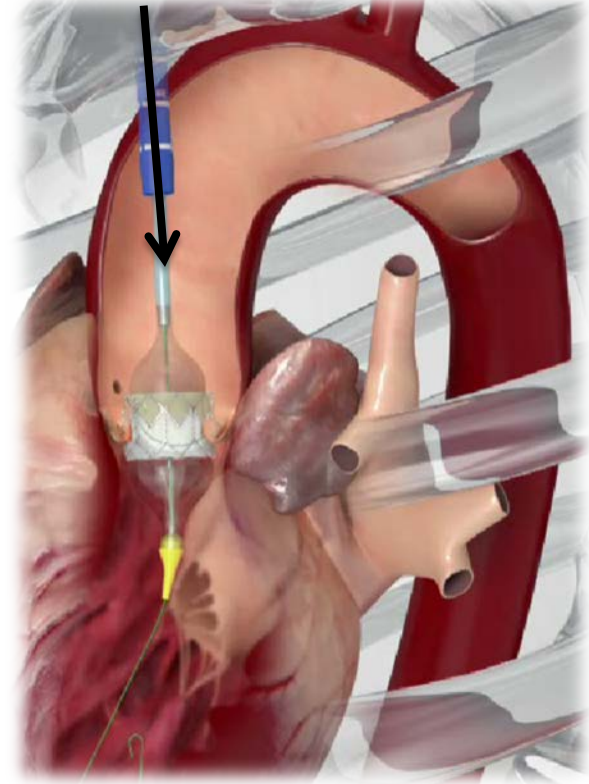
Apical Access



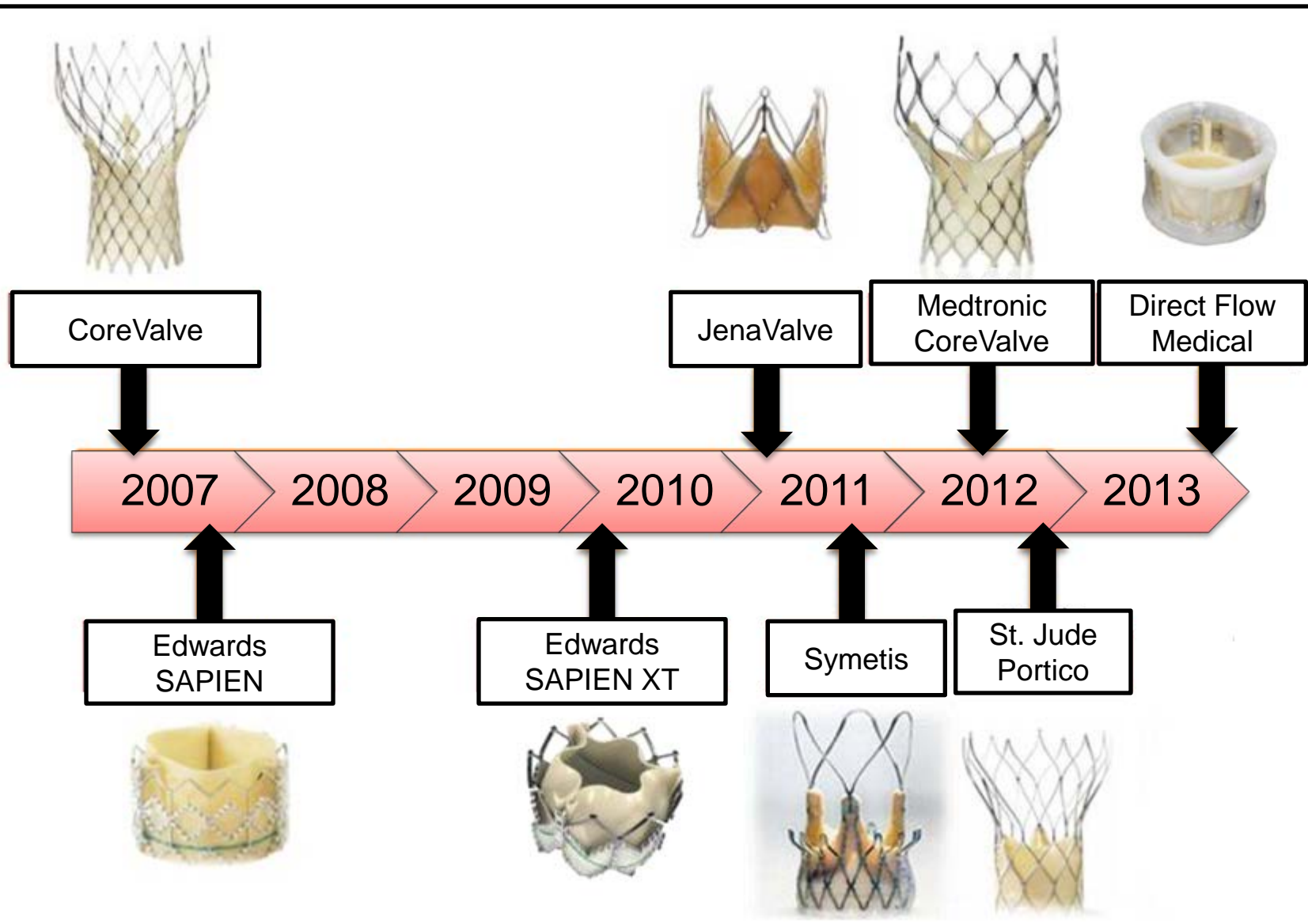
Femoral Access



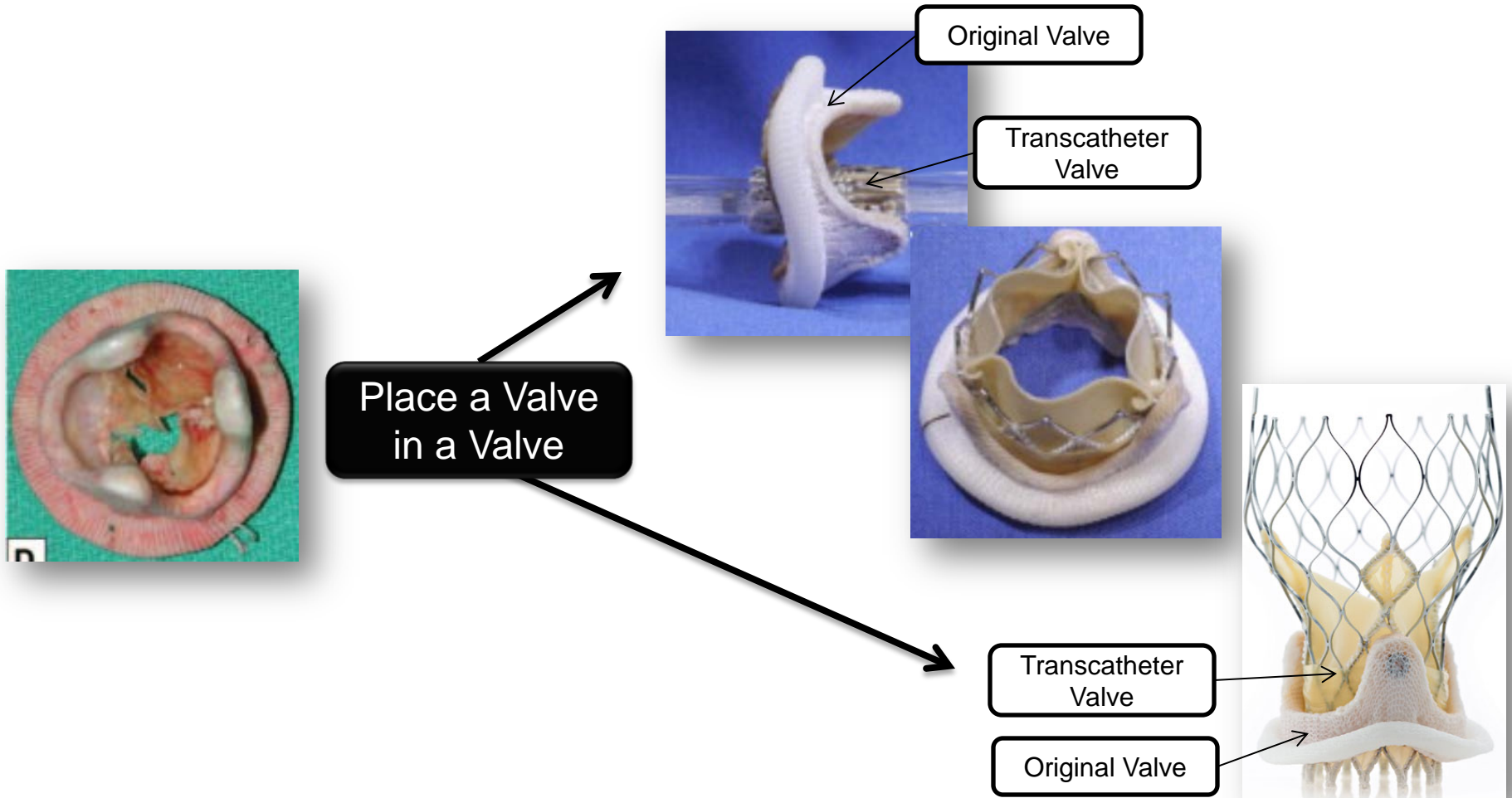
Aortic Access



Transcatheter Landscape is Growing



Extending the Life of Tissue Valves



Which Valve is Best?

- If the patient is young....

Durability

→ Materials, Design, Process



- If the patient can not tolerate anti-coagulants

Hemodynamics

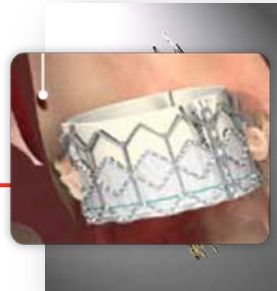
→ Fluid Mechanics



- If the patient a high risk surgical candidate

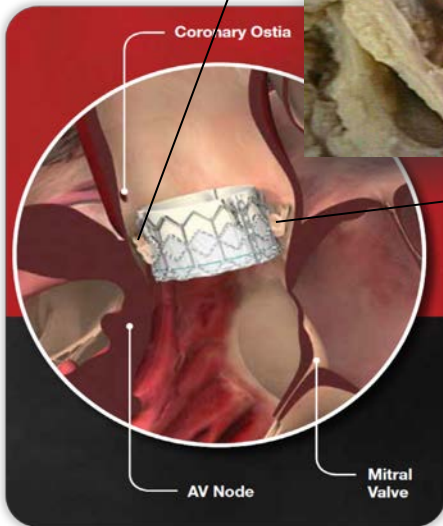
Implantation

→ Anatomy

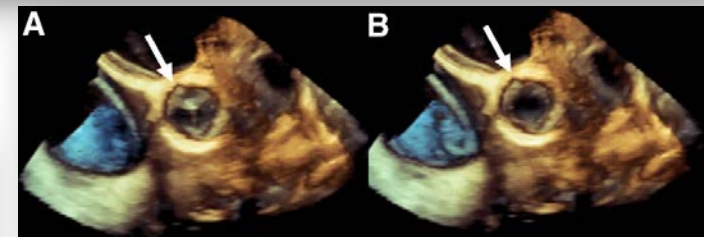
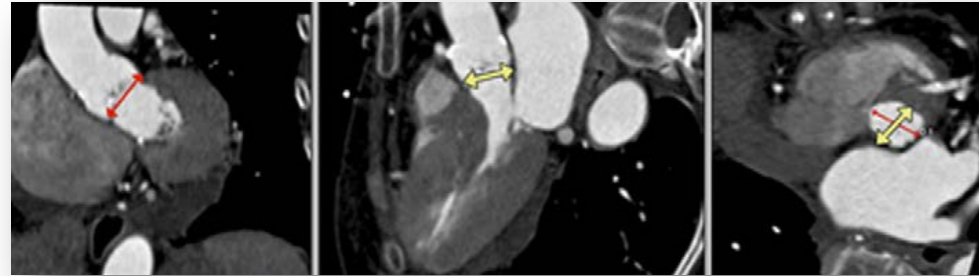


New Challenges

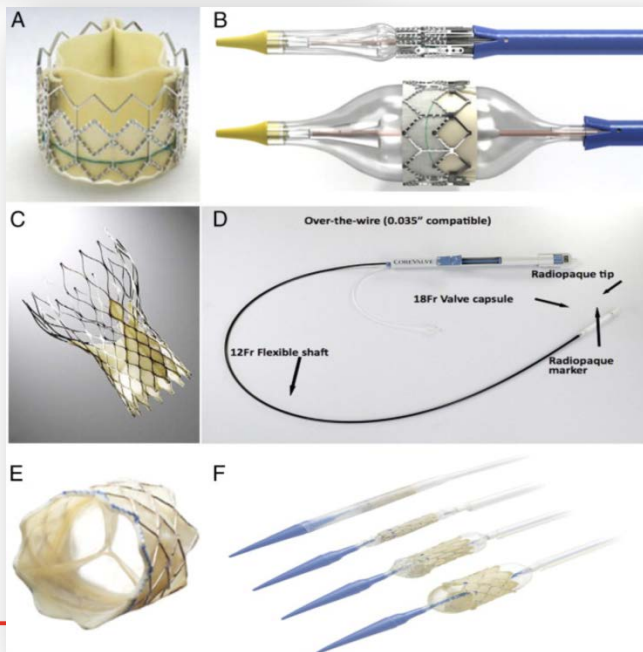
Heartvalvesurgery.com



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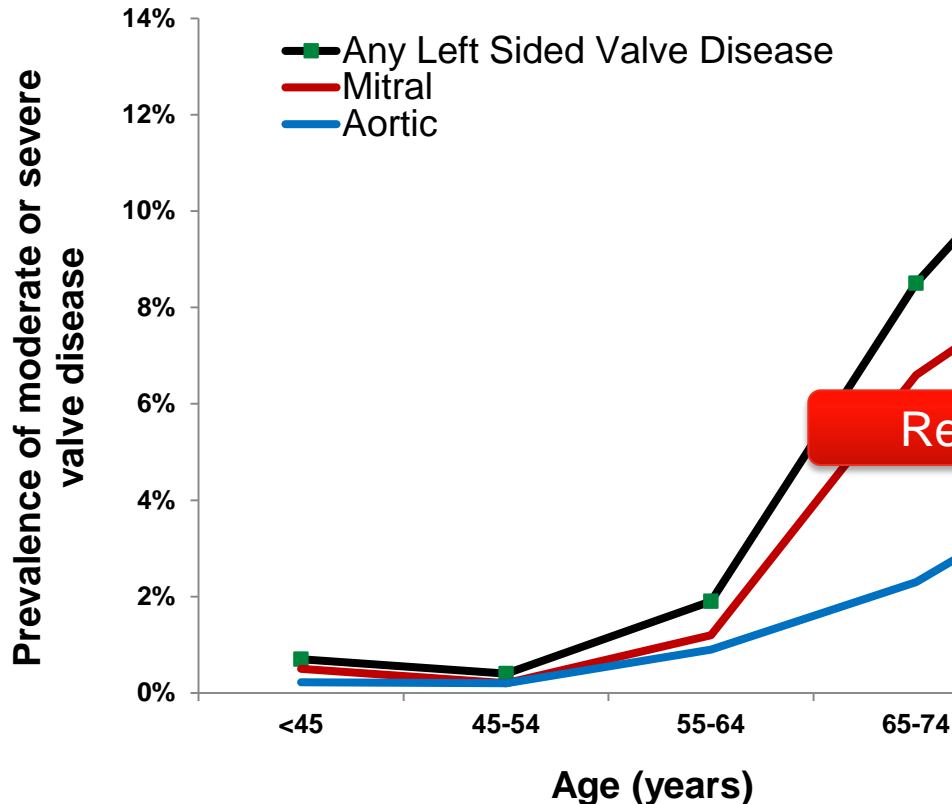


Lerakis S JACC: Cardiovascular Imaging. February 2010:219-21

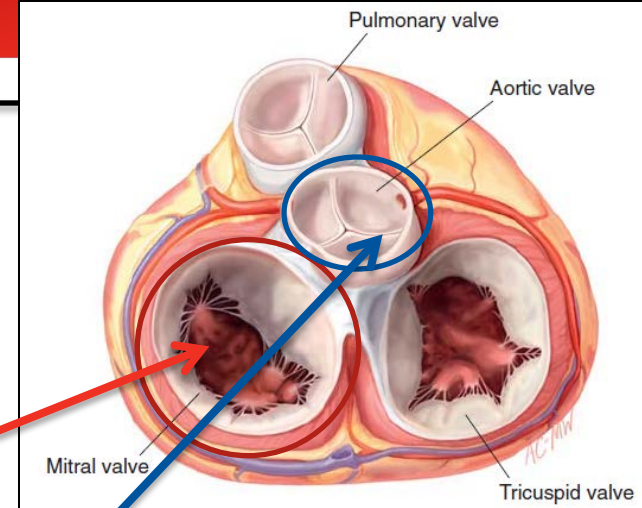


Gurvitch R JACC. November 2011: Vol 58, Issue 21

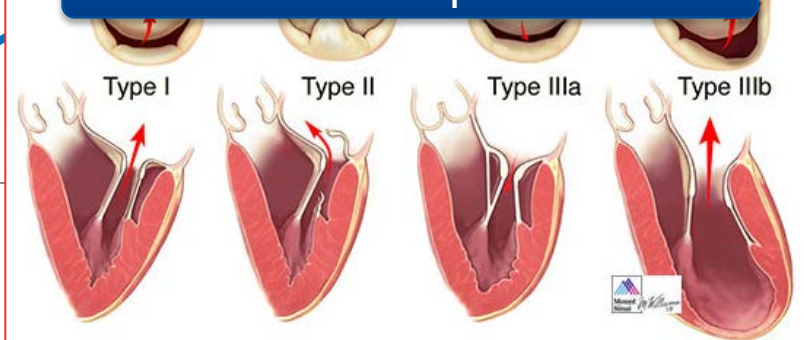
Left Sided Valvular Diseases



Graph adapted from *Burden of Valvular Heart Disease: A Population Based Study* (2006)



Regurgitation = Replacement or Repair
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Current Options and Trends

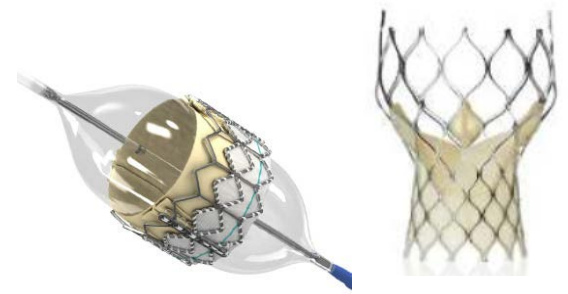
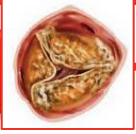
Replacement



Repair



Replacement



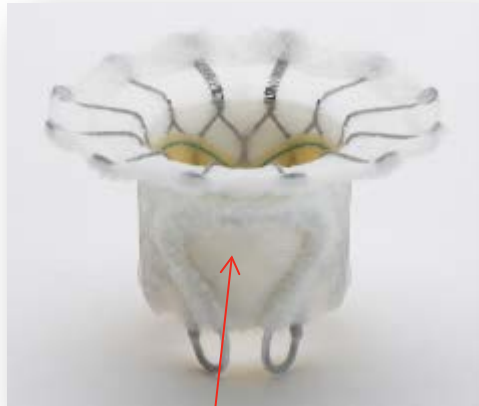
Repair



Surgical

Transcatheter

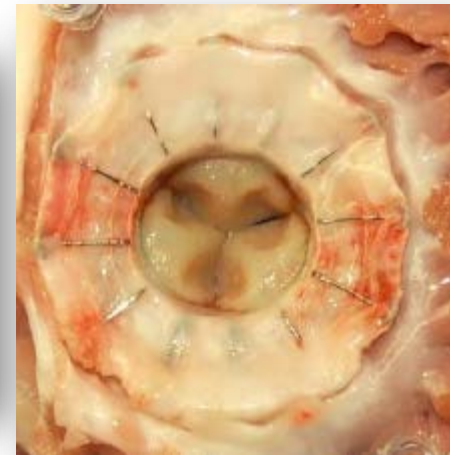
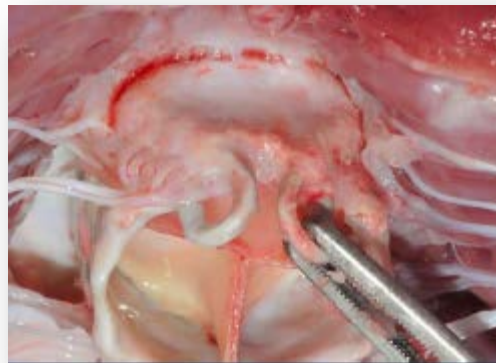
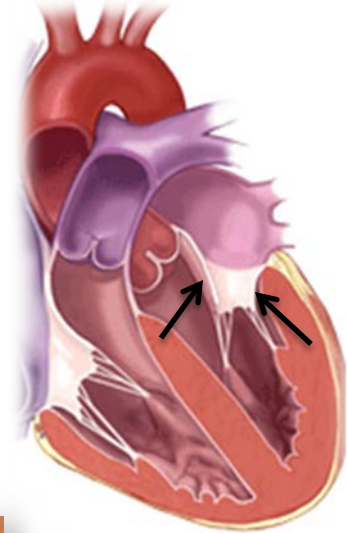
Transcatheter Mitral Valve Replacement



Leaflet Attachment



Atrial Flange

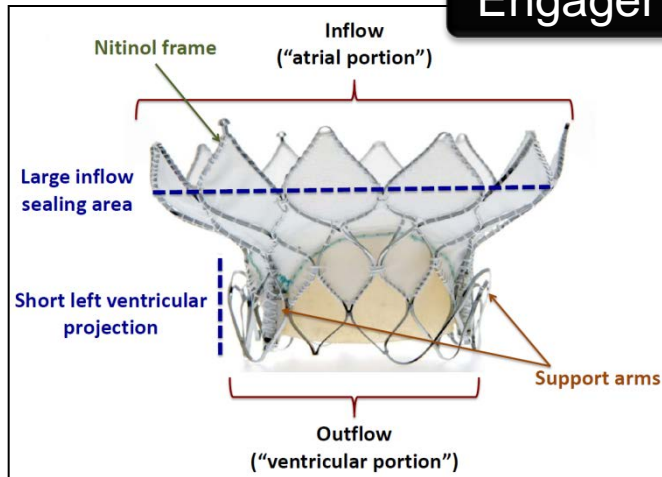


Pre-clinical Animal Models

"Transcatheter Mitral Valve Implantation is Complex"

Transcatheter Mitral Valve Replacement

Engager - Medtronic



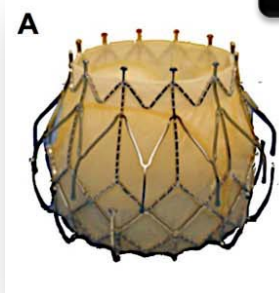
Tiara - Neovasc



Flat aspect of the "D" shaped Tiara

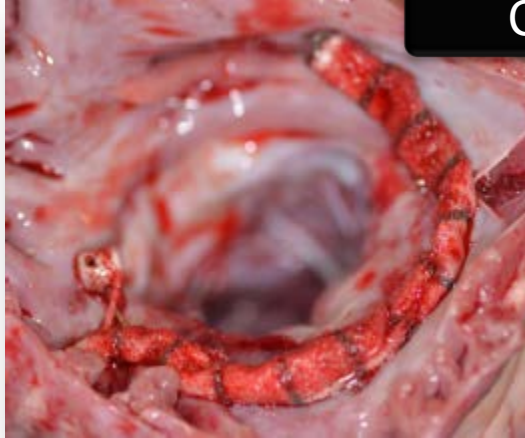


CardiAQ

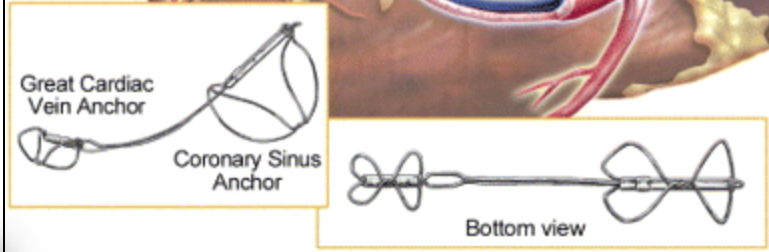
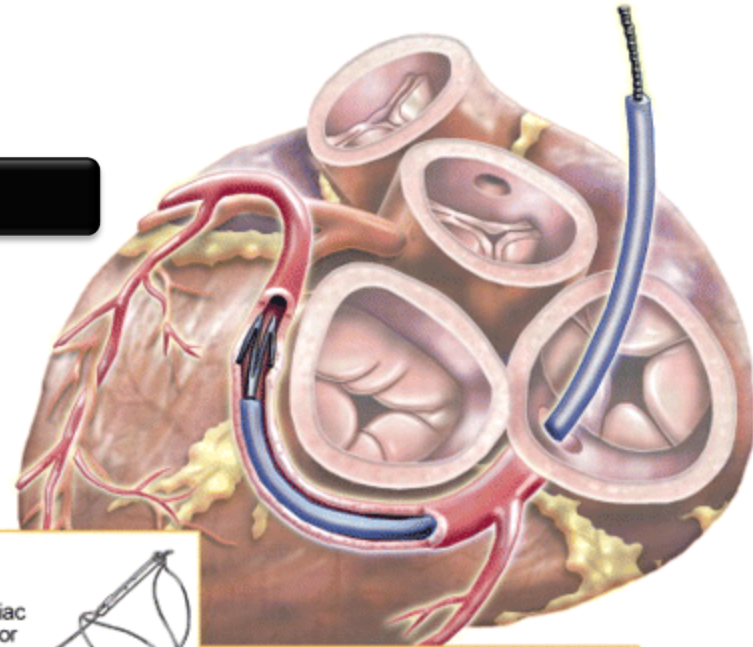


Transcatheter Mitral Valve Repair

Cardioband



Carillon

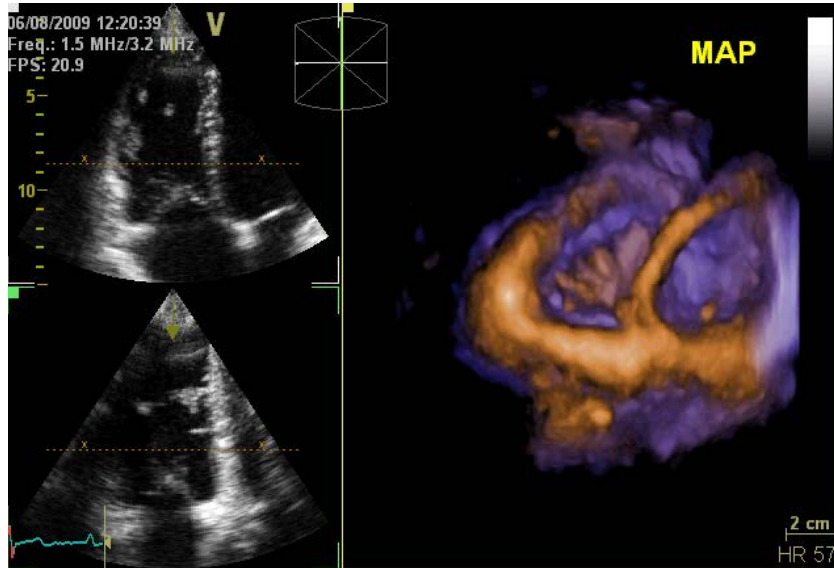


Mitraclip

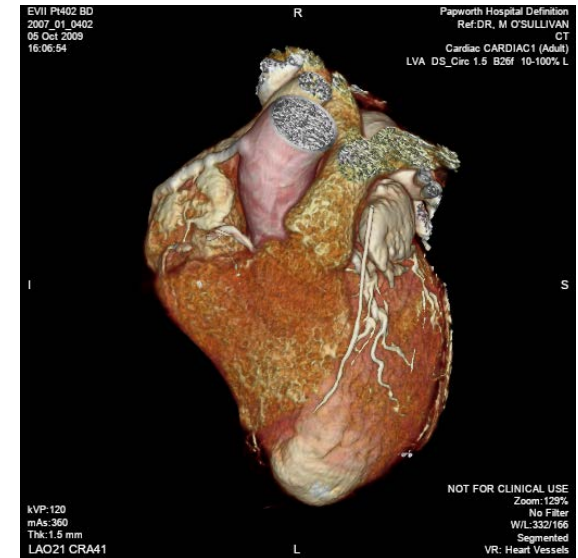


The Future....

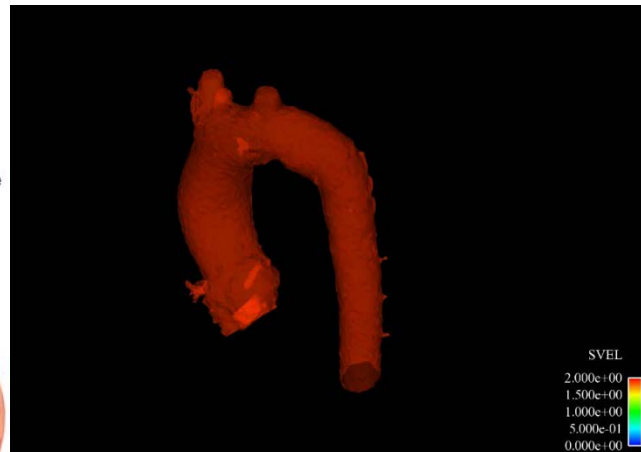
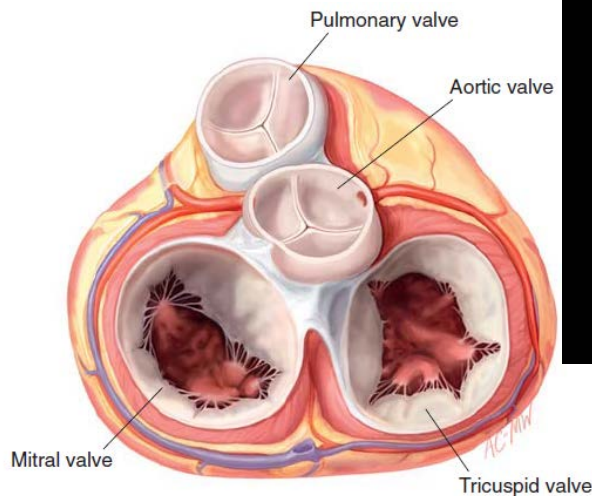
Planning for the best valve for the patient
specific anatomy
Expanding to help more patients



3D Echocardiography



3D Computed Tomography



Computation Fluid Dynamics



Edwards

Helping Patients is Our Life's Work, and
life is now