

# The Mechanical Heart - The future of surgery for Adult CHD ?

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Ivan M. Rebeyka  
University of Alberta  
&  
Stollery Children's  
Hospitals

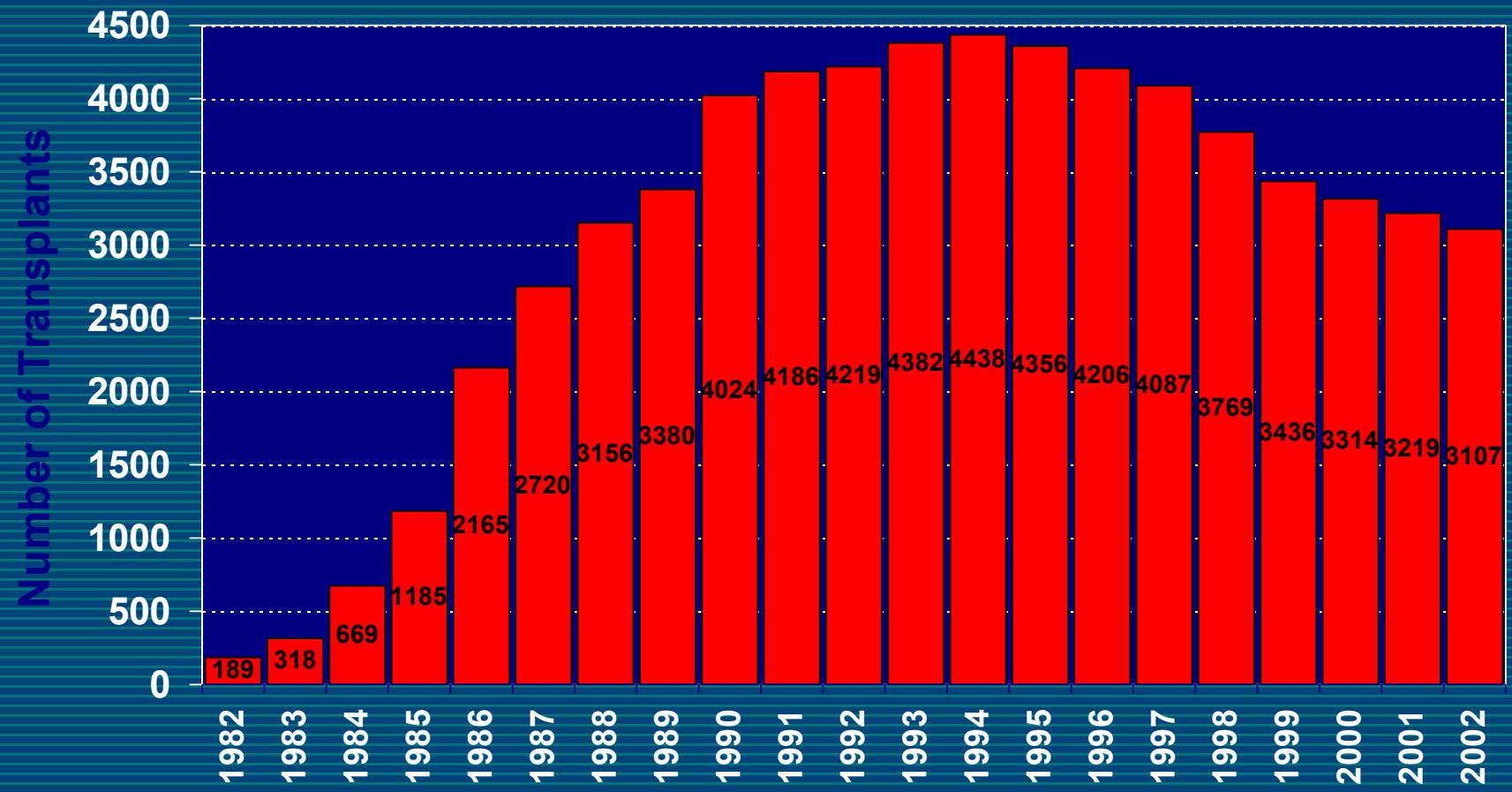
ACHD Patient Day  
May 23, 2015

# Phoenix, Arizona – July 2011

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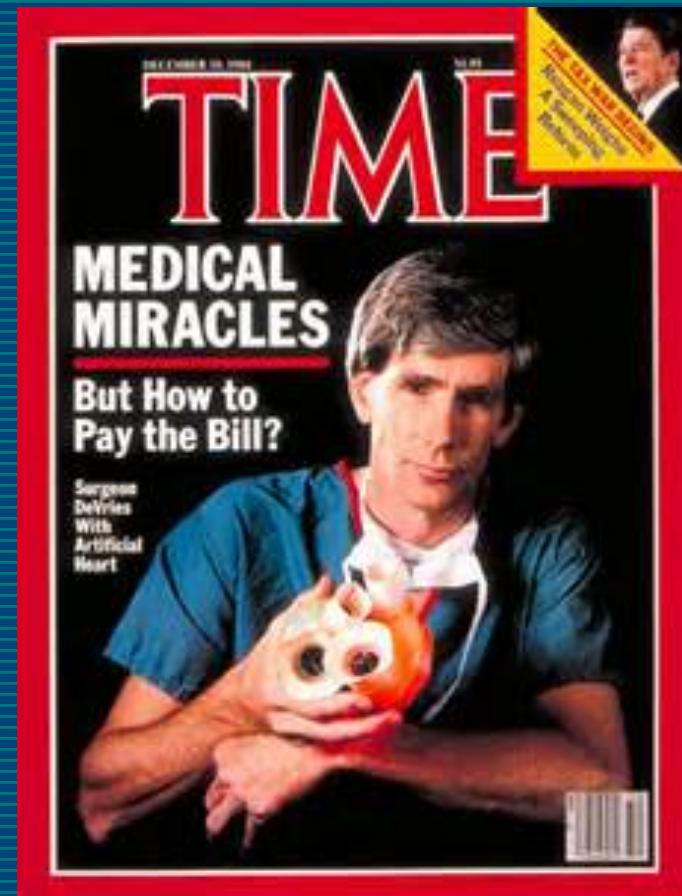


# Number of Heart Transplants Reported by Year



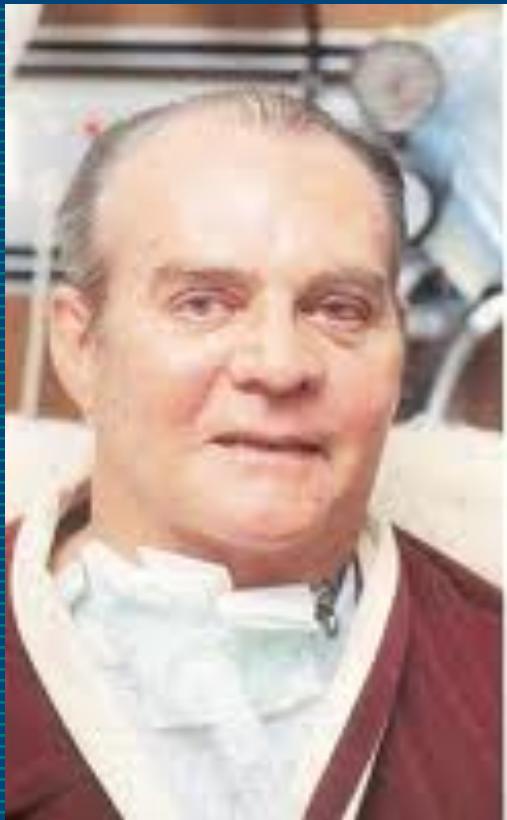
Ref.: ISHLT, J Heart and Lung Transplant 2004; 23: 796-803

# Dr. William DeVries - 1982



# Barney Clark - 1982

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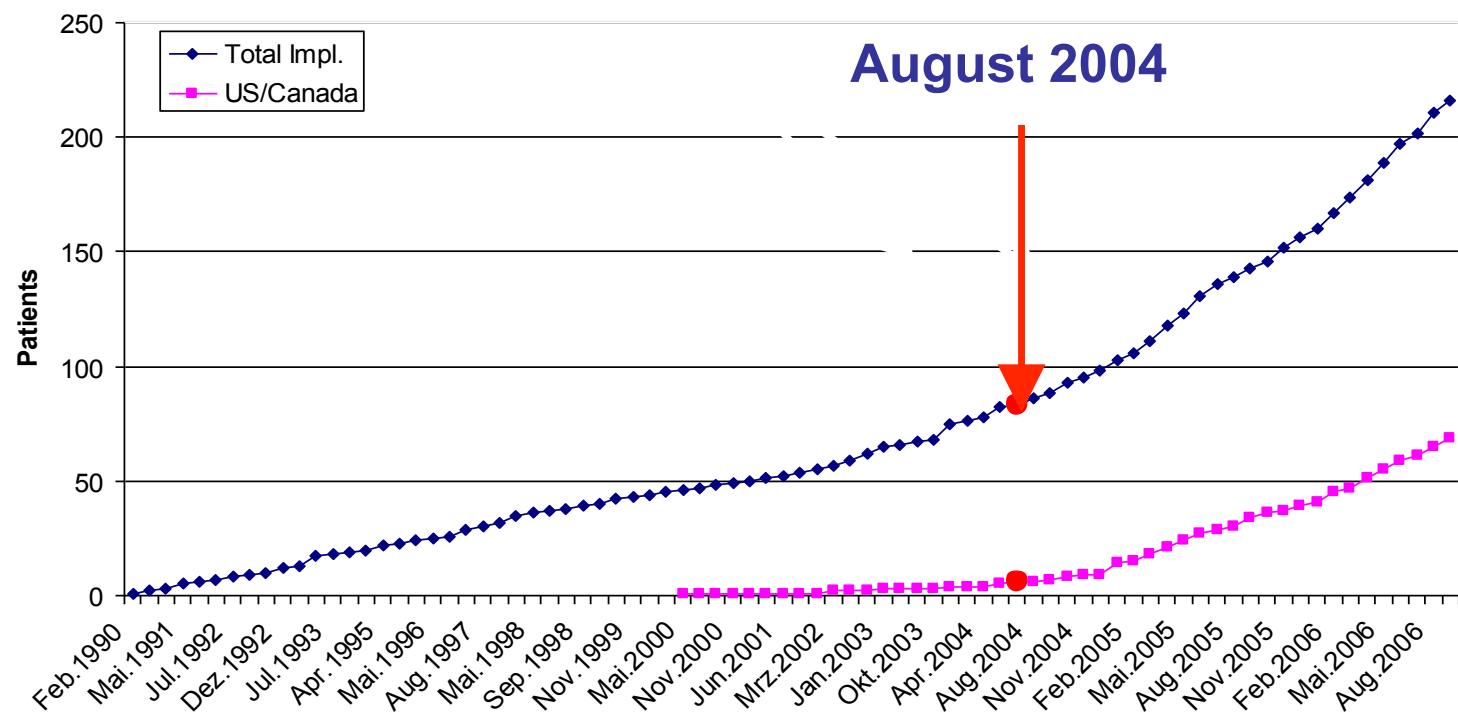


# Current Ventricular Assist Device (VAD) Options

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- Berlin Heart
- HeartWare (HVAD)
- Heartmate II
- Total Artificial heart (Syncardia)

# Total World-wide Pediatric Berlin Heart Implants



# North American Berlin Heart 'Miles'tone



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That's Fit to Print"

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**The New York T**

Terrence J. McCarthy for The New York Times

Adrian Coulson and his wife, Leigh Bills, with their son Miles, who is being kept alive by a heart pump brought from Germany.

**Tubes, Pump and Fragile Hope  
Keep a Baby's Heart Beating**

By DENISE GRADY

PALO ALTO, Calif. — In an Internet message to family and friends, Coulson, 32, wrote: "I am writing this message to family and friends."

**LAST RESORTS**

Fourth article of a series.

Fourth article of a series.

# Berlin Heart System

**Blood Pump**

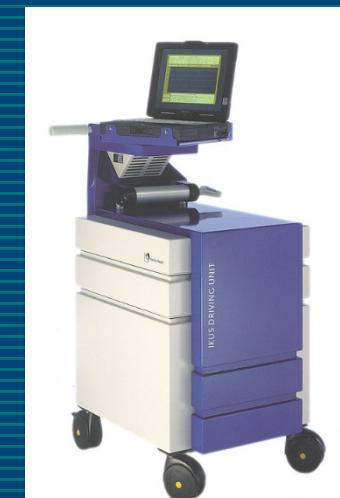


80 ml

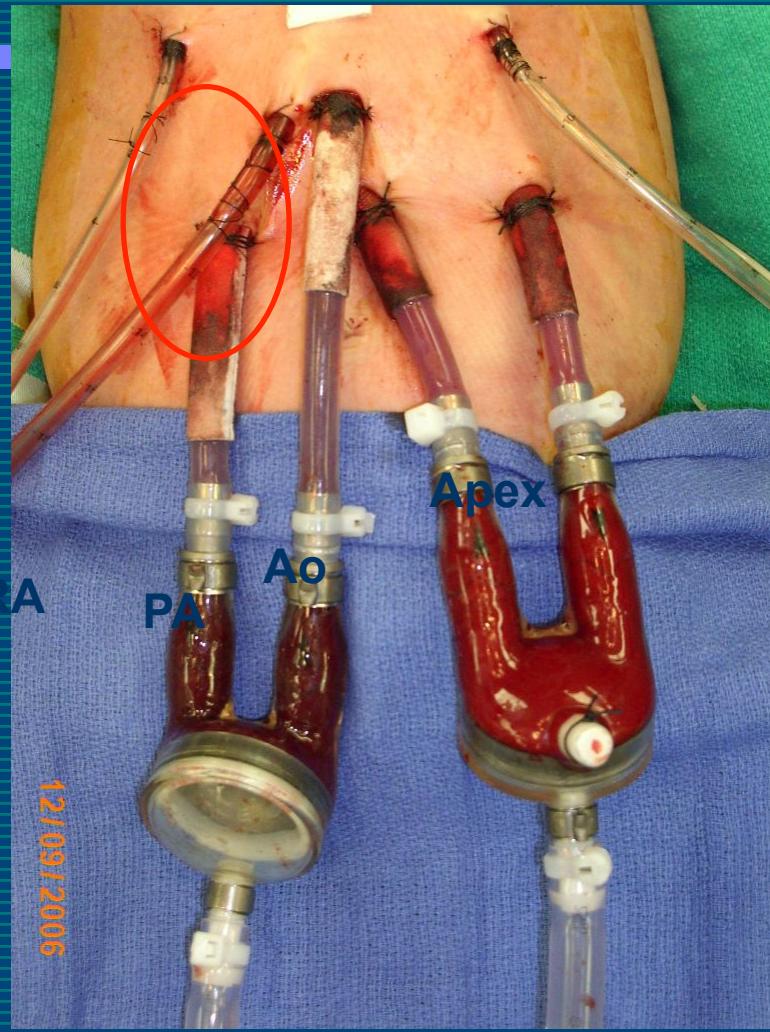
**Cannulas**



**Driving Unit**



# Cannula and Pump Placement



# Berlin Heart Blood Pump



# Berlin Heart Blood Pumps (10 ml – 60 ml)



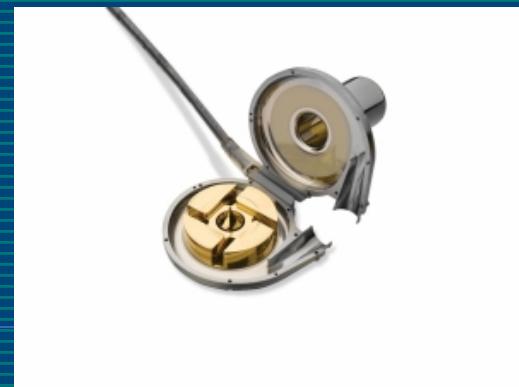
# HeartWare - I

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- Size = 50 cc



- Centrifugal continuous flow device

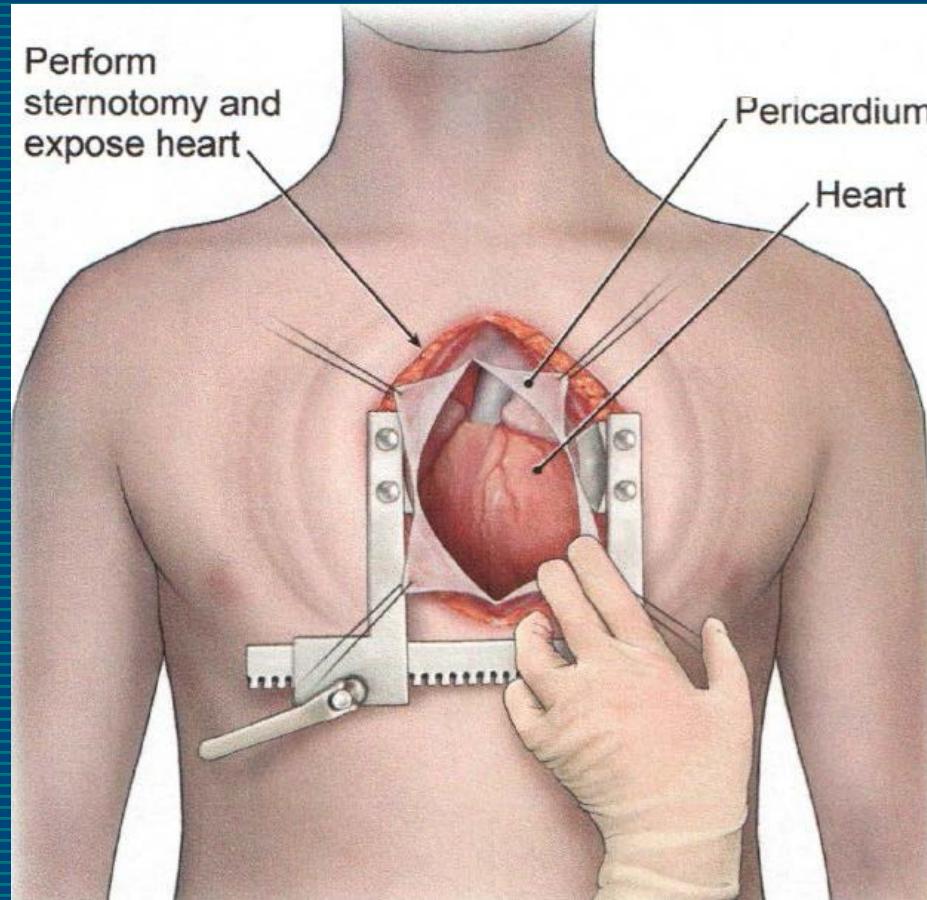


# HeartWare - II

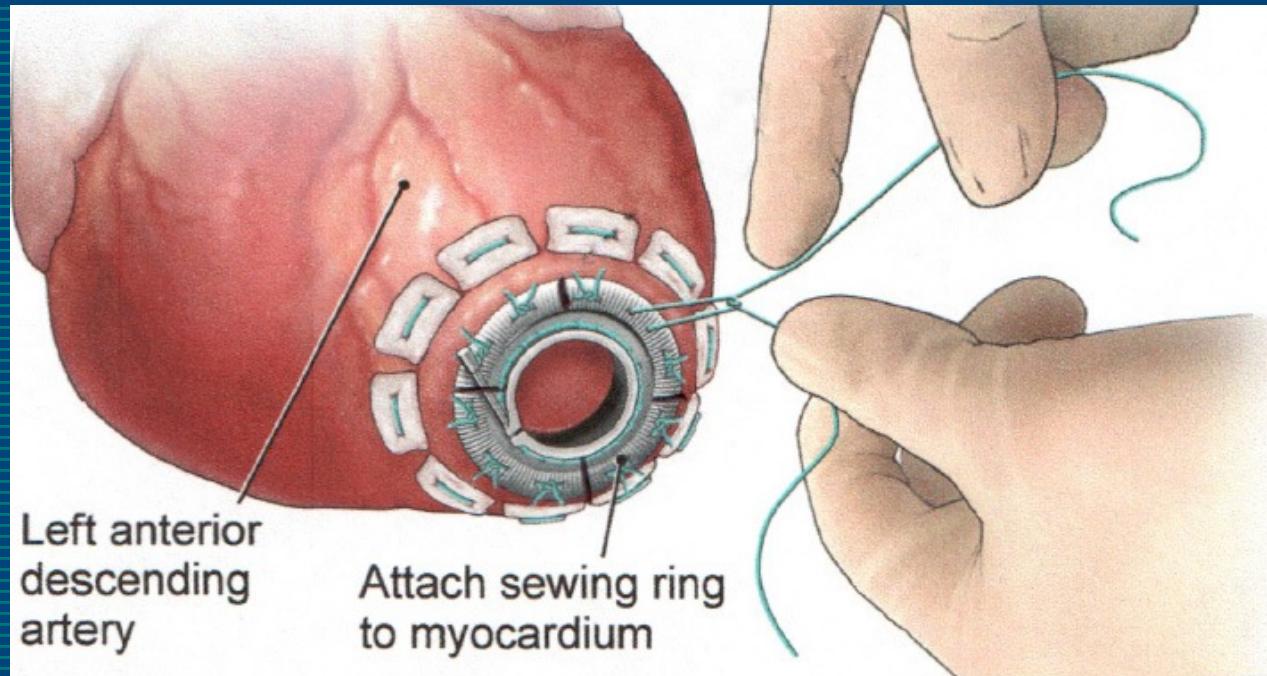
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- Flow - 3.5-7.0 L/min (max 10 L/min)
  
- Long-term device
  - Longest current implant – 7 years !!!

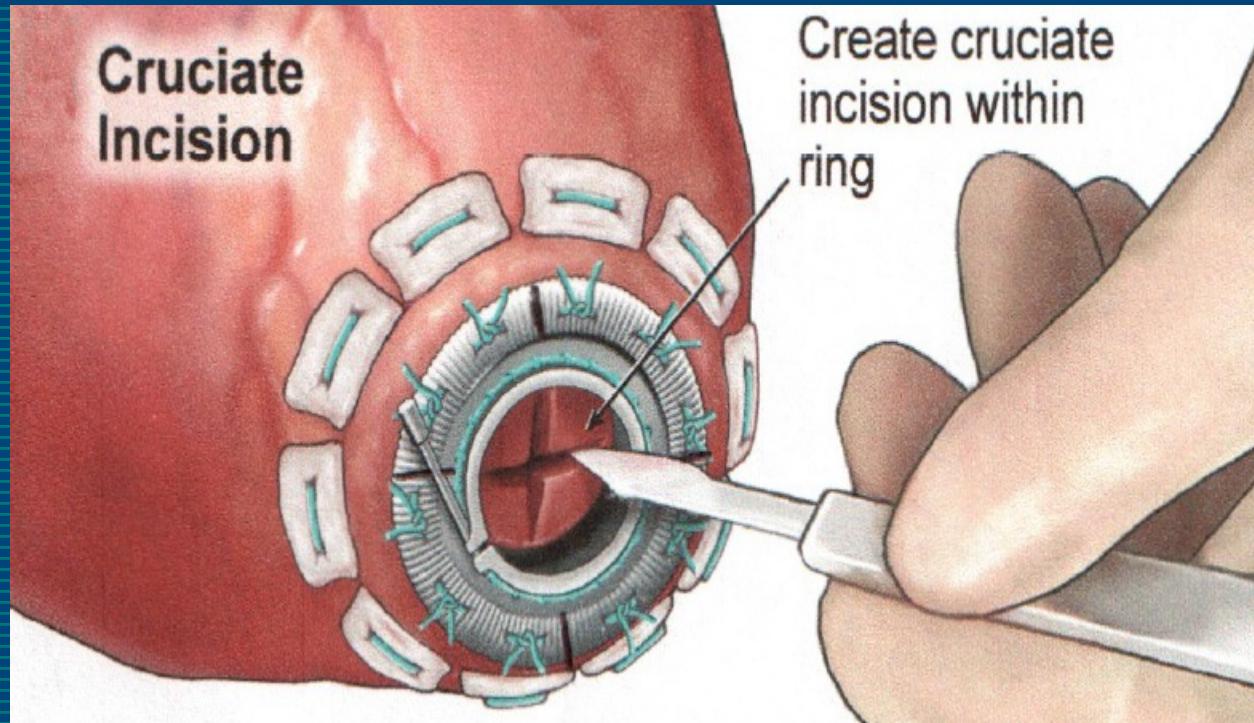
# Standard (sternotomy) HVAD implant - I



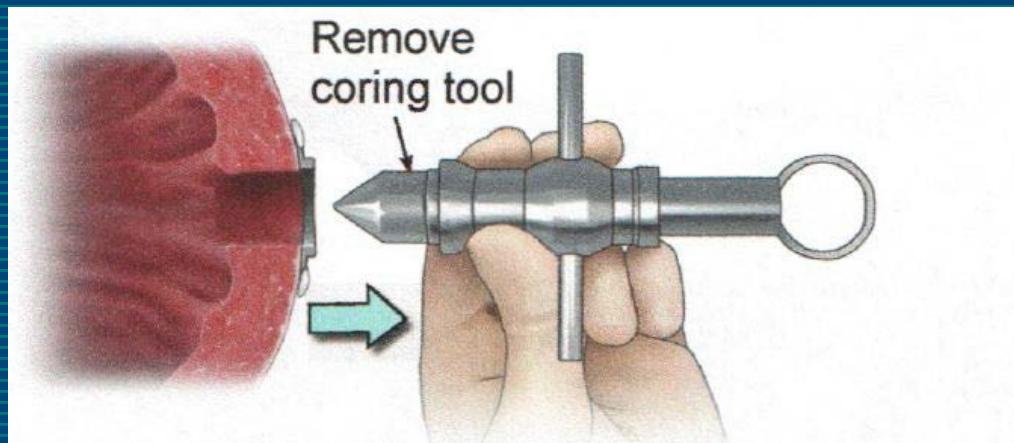
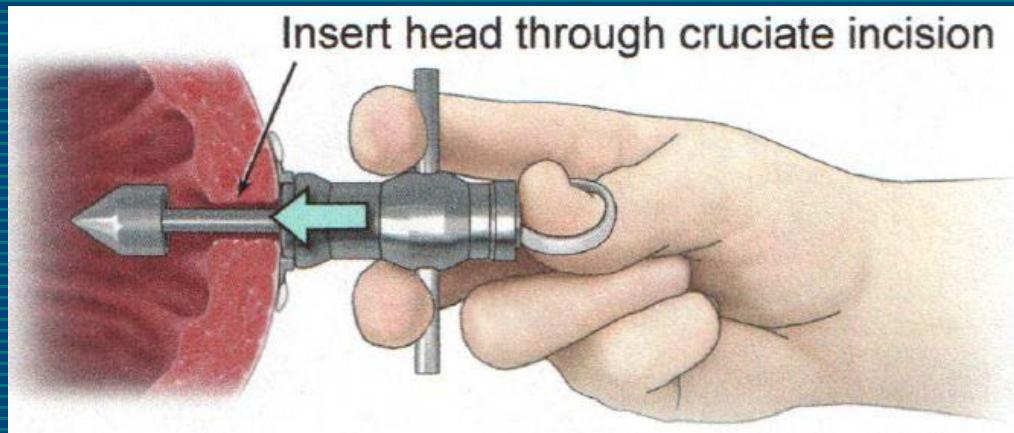
## Standard (sternotomy) HVAD implant - II



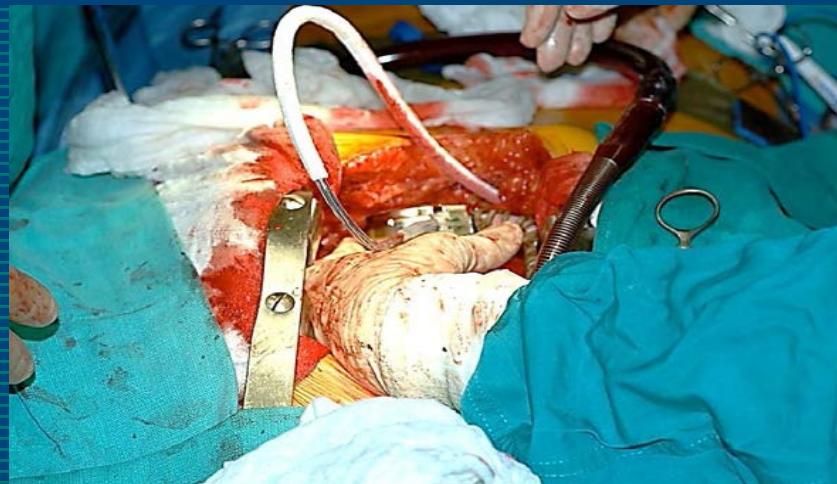
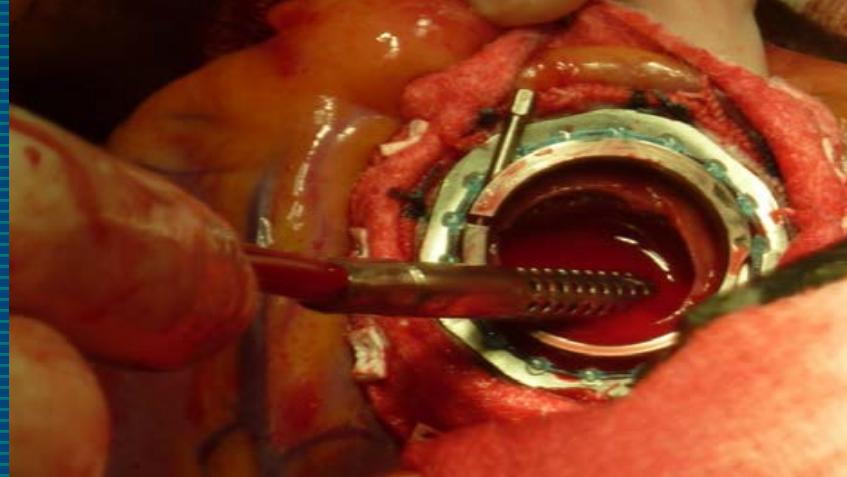
# Standard (sternotomy) HVAD implant - III



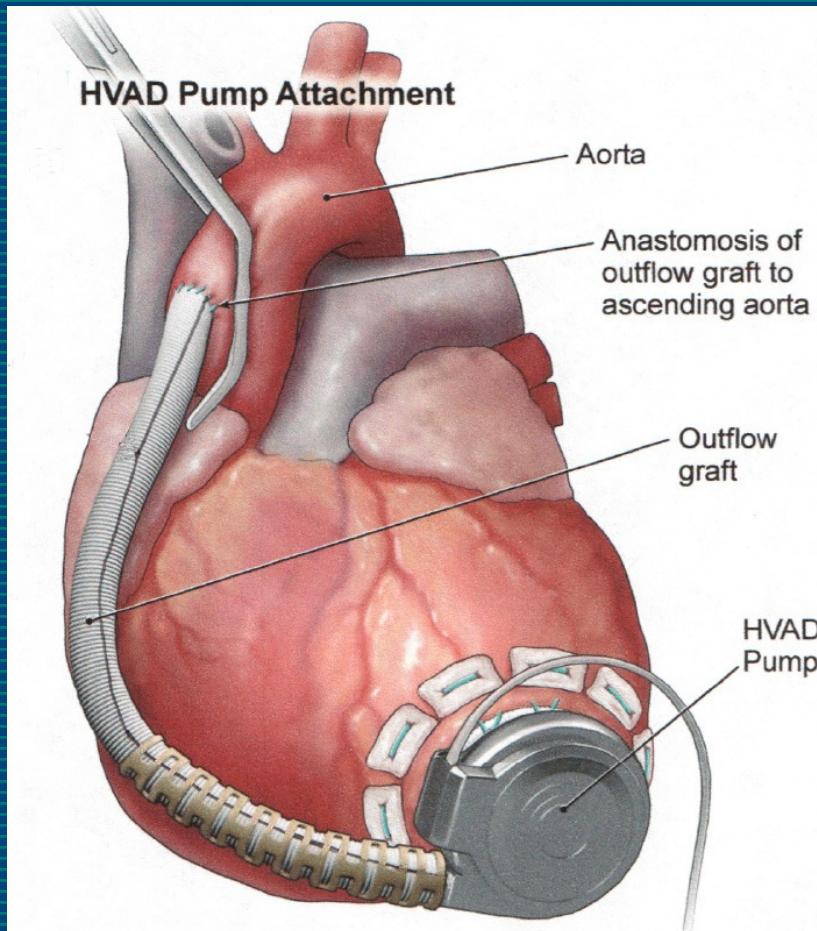
# Standard (sternotomy) HVAD implant - IV



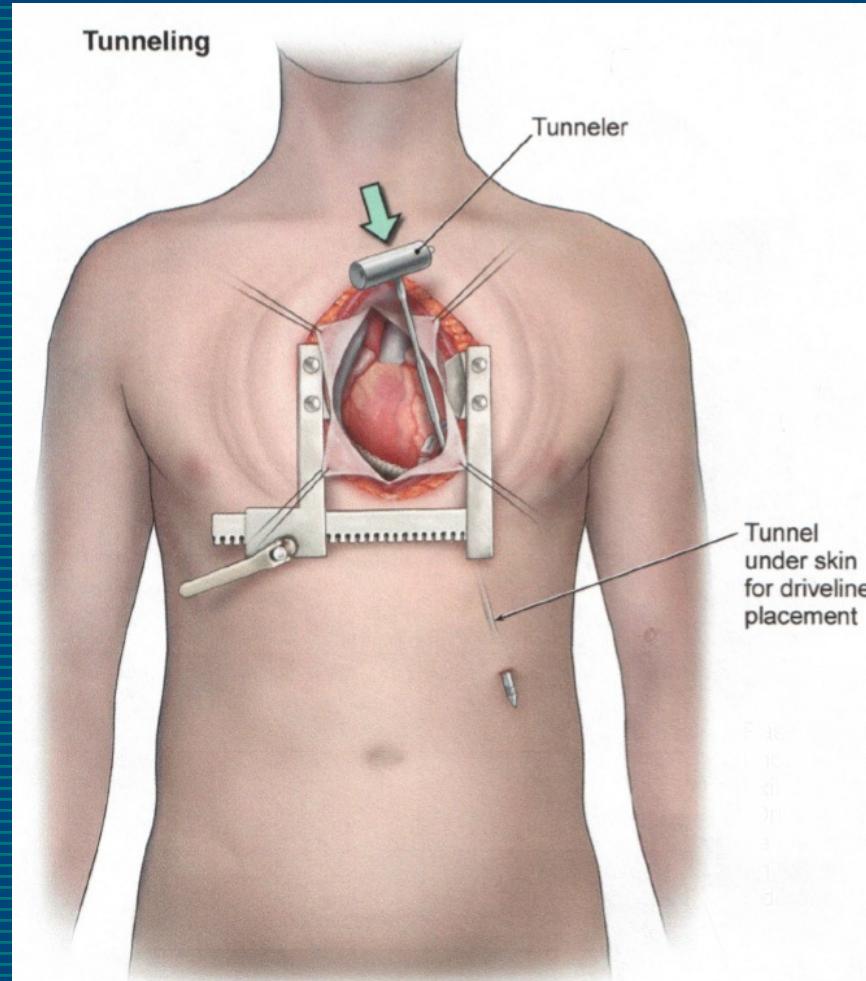
# Standard (sternotomy) HVAD implant - V



# Standard (sternotomy) HVAD implant - VI



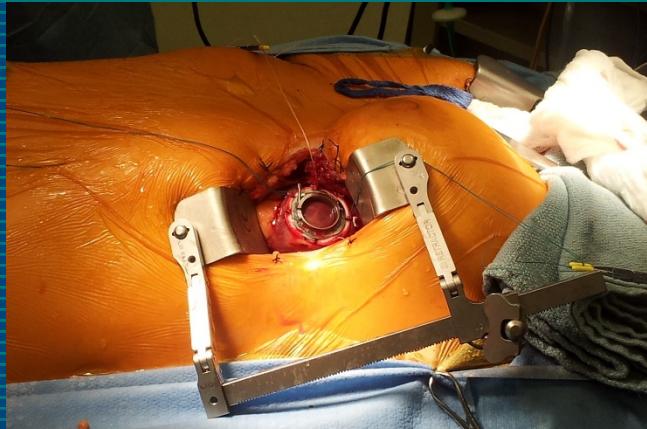
# Standard (sternotomy) HVAD implant - VII



## Minimally invasive implant II

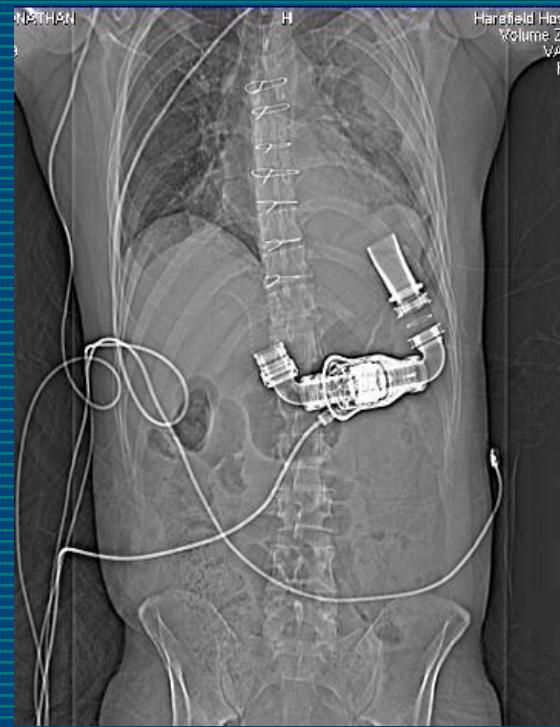
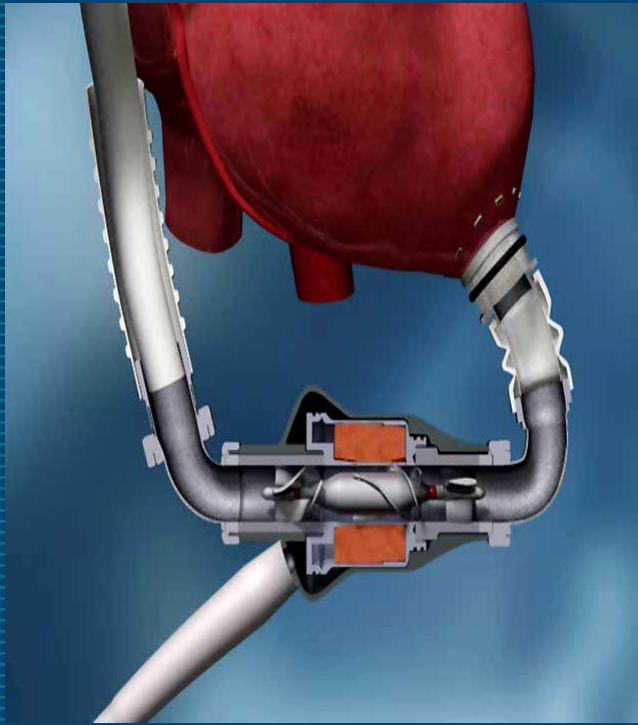
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- Superior Hemisternotomy + 5<sup>th</sup> ICS thoracotomy
- Aortic arterial / femoral venous cannulae



- ? Off-pump – Germany / Austria

# Heartmate II

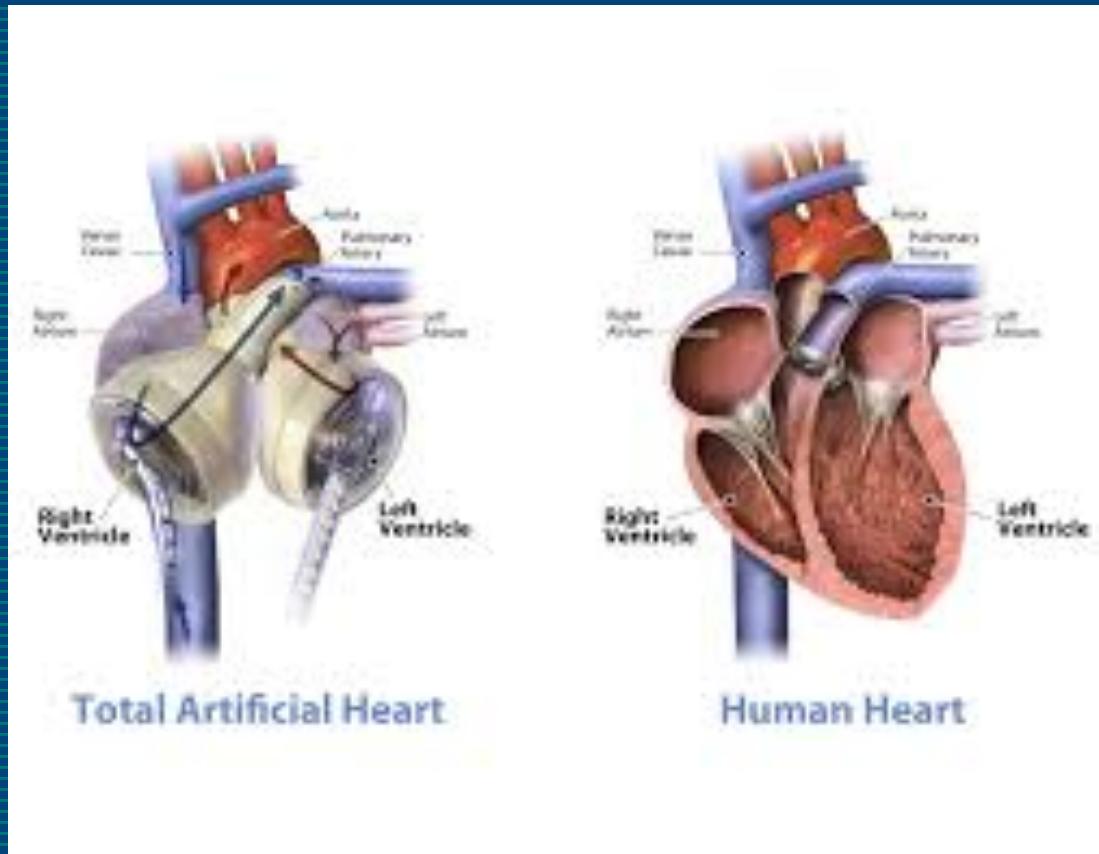


# Shane L.

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# Total Artificial Heart (Syncardia TAH)

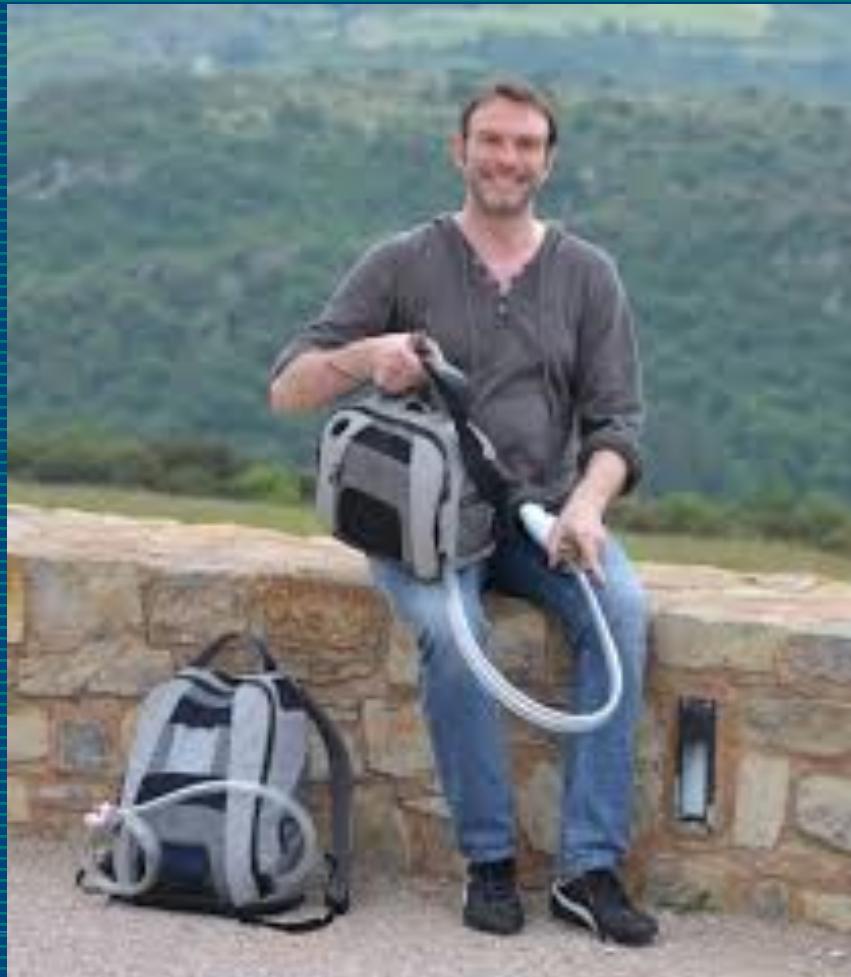


# Total Artificial Heart (Syncardia TAH)



# Total Artificial Heart (Syncardia TAH)

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# What do we do after the mechanical heart is in ?

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- Transplantation
- Recovery (Bridge To Recovery)
- Withdrawal of therapy
- .....

# What do we do after the mechanical heart is in ?

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- Transplantation
- Recovery (Bridge To Recovery)
- Withdrawal of therapy
- Implantable VAD (Destination therapy)

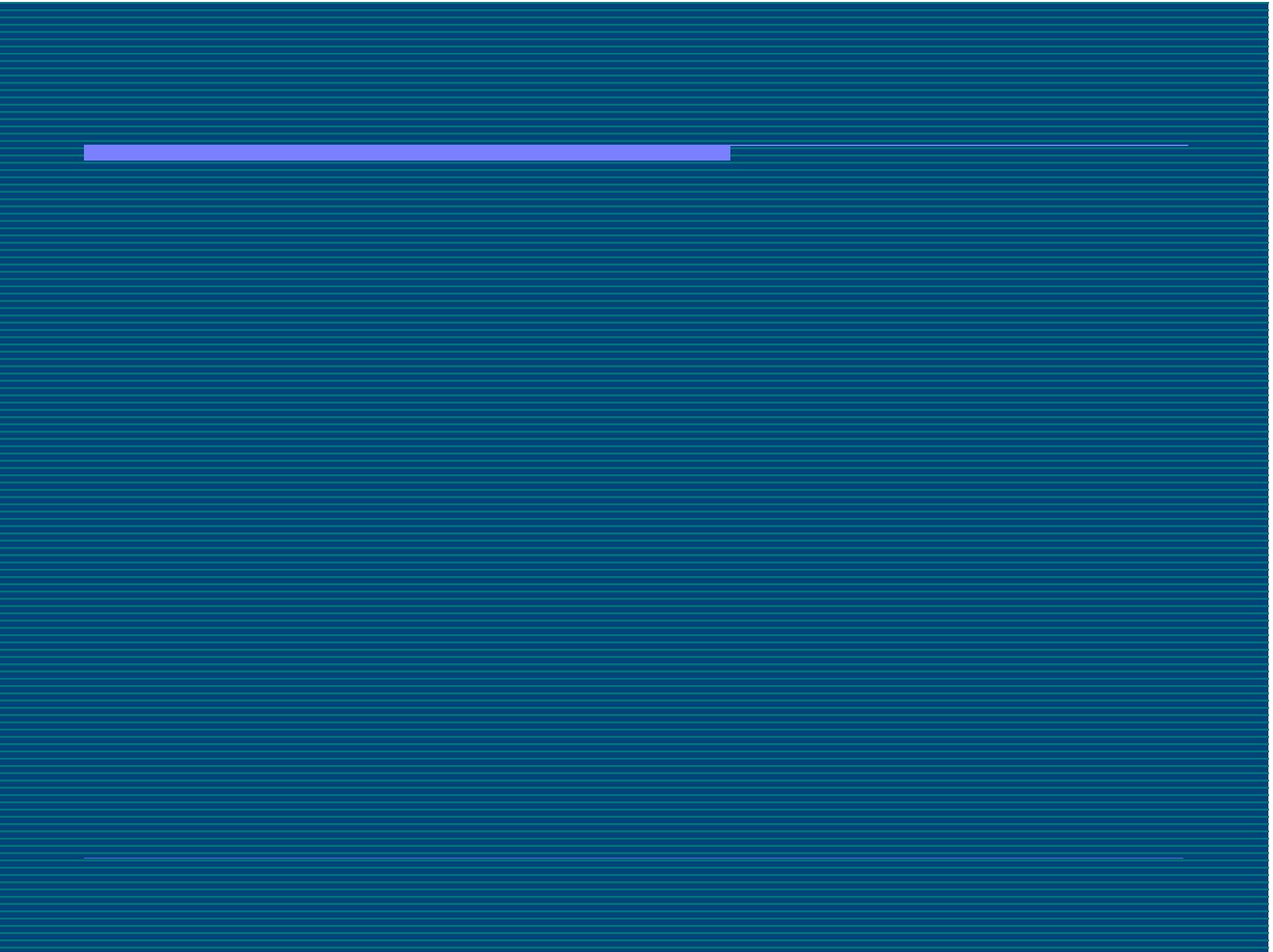
# Destination Therapy ???



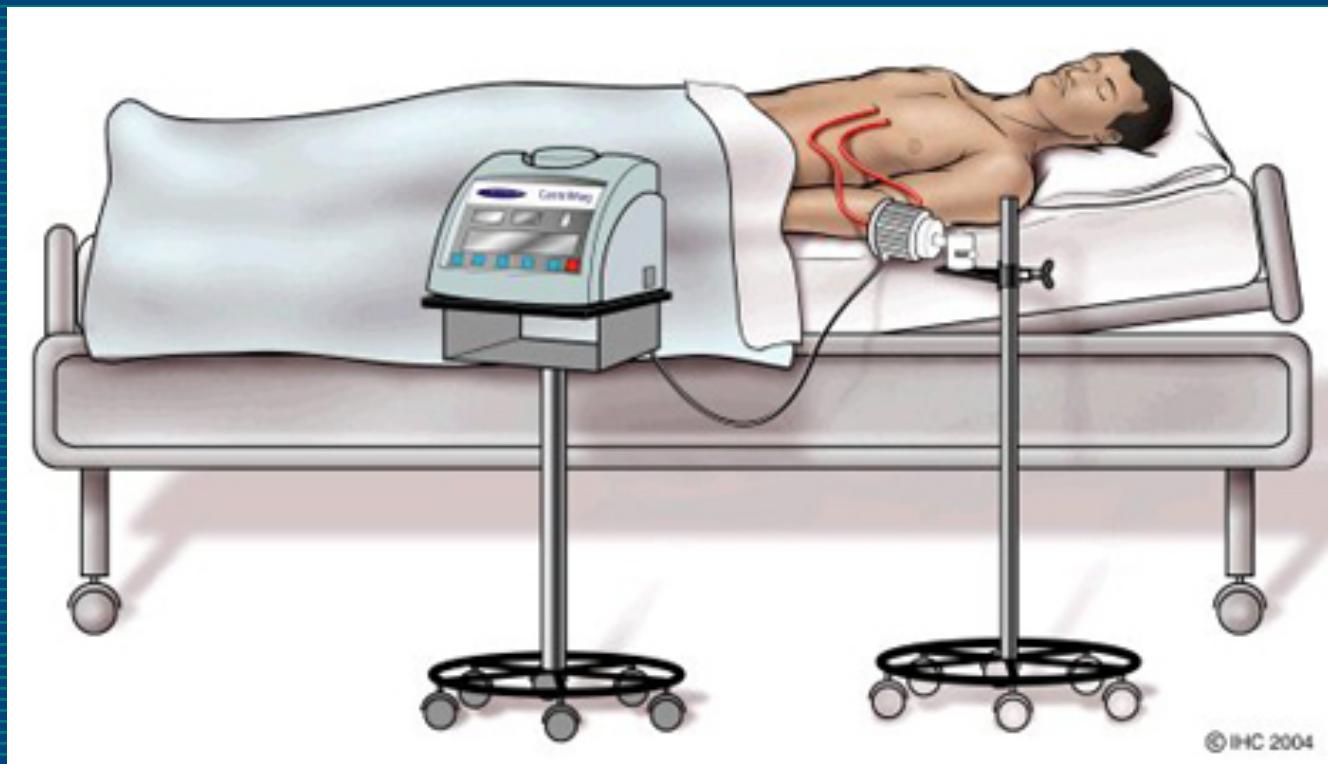
# Rebecca N.

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# Temporary Mechanical Circulatory Support



# MVAD vs HVAD

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