

Heart Transplant: 100% Recycled

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Objectives:

- Participants will be familiar with:
 - the heart transplant program in BC
 - pre-assessment work-up and selection for heart transplant
 - post-operative management
 - life after heart transplant

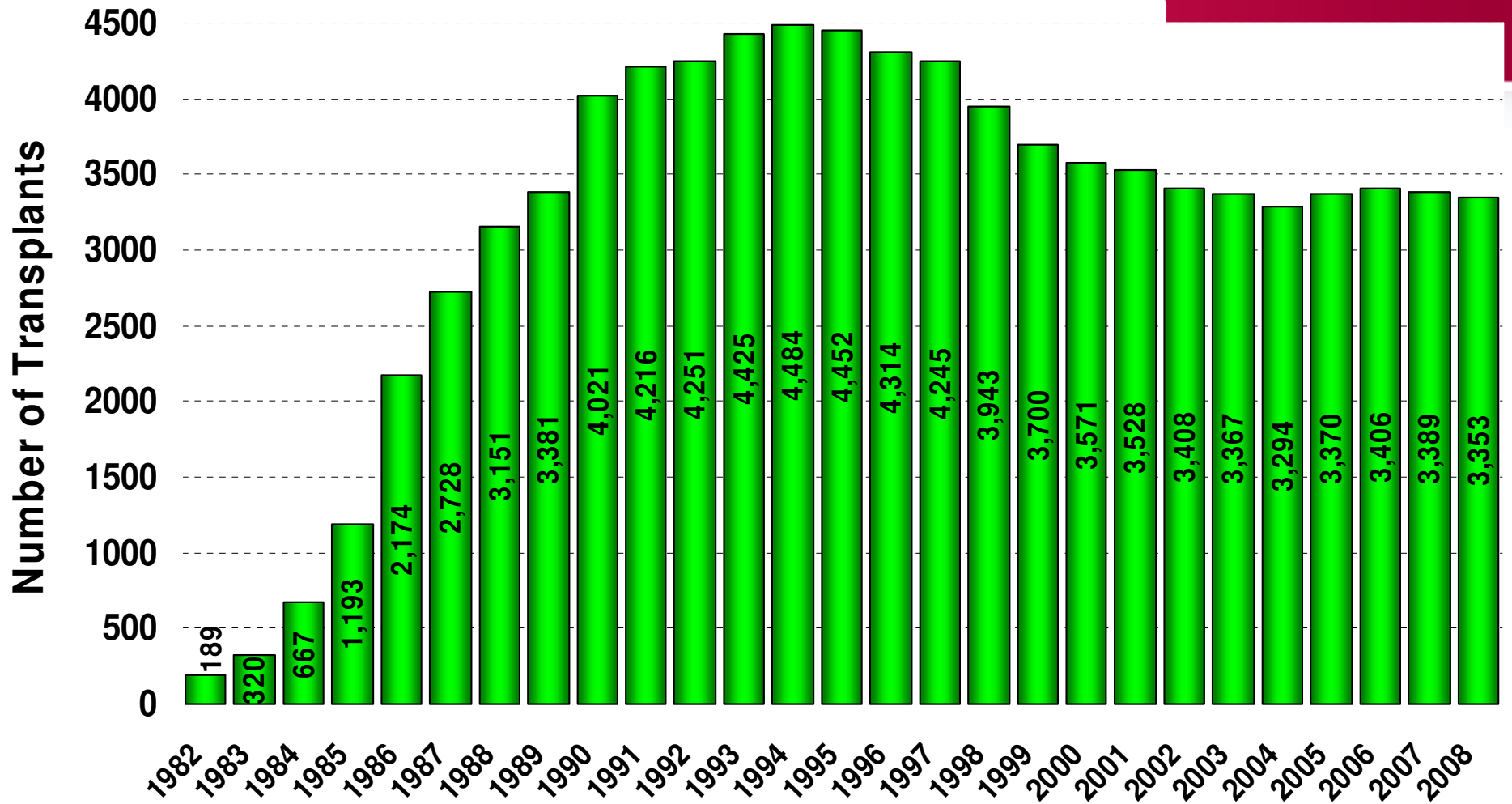
Background

- 1967 - Christian Barnard performed the 1st successful heart transplant in Cape Town, South Africa
- By the late 1970s HT was established as effective therapy to treat end-stage heart failure
- Today it is treatment of choice when medical therapy has failed
- Improvements on organ donation, preservation and anti-rejection have improved survival rates

Some current issues:

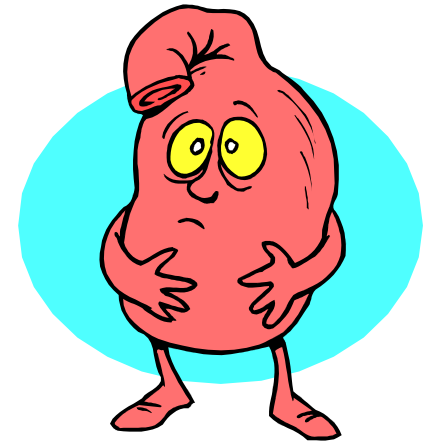
- World-wide gap in supply and demand
- Current listing criteria are strict - difficult to get on transplant list
- Thankfully improved medical therapies, decreased disease progression and increased survival for patients with end-stage heart failure has eased the demand

NUMBER OF HEART TRANSPLANTS REPORTED BY YEAR



Organ shortage

- <1% of deaths can result in potential organ donation
- Fewer people are dying of causes that historically led to brain death
 - improved safety features on vehicles
 - helmet laws
 - advancements in medical care



Heart Transplant Program Assessment and Work- up



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Guidelines for Heart Transplant

- 2001 Canadian Cardiovascular Society Consensus Conference on Cardiac Transplantation
- 2008 Canadian Cardiovascular Society Consensus Conference update on cardiac transplant 2008: Executive Summary

Purpose of the Consensus Document:

- To outline indications for and contraindications
- To review surgical management of recipient and donor
- To review post transplant management - including the management of infection and rejection
- To review potential alternatives to transplantation that are emerging

Indications for Transplant

- NYHA class 111 or 1V
- Poor one-year survival
- Failure to respond to maximal medical therapy
- Absence of conventional surgical options
- Absence of contraindications
- Potential for rehabilitation after transplant

Contraindications

- Pulmonary hypertension that does not respond to aggressive challenge
- Primary systemic disease
- Renal dysfunction
- Active infection
- Technical issues

Contraindications (cont.)

- Psychological or lifestyle issues
- Recent malignancy
- Morbid obesity
- Osteoporosis
- Peripheral vascular or cerebrovascular disease
- Diabetes mellitus with end-organ damage

Referral to the Pre-heart Transplant Clinic

- Patients who might require transplant assessment:
 - End stage heart failure
 - All medical and surgical options explored
 - Age
 - “Crash & burn”

FYI - 10% of patients who get referred and followed up at heart transplant clinic get listed

Heart Transplant Team

- Administrative Staff
- Cardiologist
- Clinical Nurse Specialist
- Coordinator Pre-Heart Transplant
- Dietician
- Ethicist
- Patient Educators
- Pastoral Care
- Pharmacist
- Physiotherapy
- Psychologist
- Social Worker
- Transplant Surgeon

Transplant Assessment

- Pre-printed Physicians Orders set
 - Routine (when listing needs to occur in 1 month)
 - Urgent (when listing needs to occur in 1 week)
 - Emergent (when listing needs to occur in 24 hrs)
- Routine orders:
 - Stage 1: blood test & diagnostics i.e. CT, Doppler, CXR,
 - Stage 2: consults & immunizations

Gridding & Listing

Heart Transplant Program CANDIDATE SELECTION FORM

Date: _____ Diagnosis: _____

Medical/Surgical Contraindications	Lifestyle Management Contraindications
<input type="checkbox"/> NONE <input type="checkbox"/> Neurological <input type="checkbox"/> Cardiovascular <input type="checkbox"/> Respiratory <input type="checkbox"/> GI/Hepatic <input type="checkbox"/> Renal <input type="checkbox"/> Urogenital <input type="checkbox"/> Skin/Eyes <input type="checkbox"/> Musculoskeletal <input type="checkbox"/> Hematologic <input type="checkbox"/> Endocrine <input type="checkbox"/> OTHER	<input type="checkbox"/> NONE <input type="checkbox"/> Smoking <input type="checkbox"/> Substance misuse <input type="checkbox"/> Exercise <input type="checkbox"/> Medications <input type="checkbox"/> Diet <input type="checkbox"/> Weight <input type="checkbox"/> Fluid restriction <input type="checkbox"/> Missed appointments <input type="checkbox"/> OTHER
Psychosocial Contraindications	Decision Making Process
<input type="checkbox"/> NONE <input type="checkbox"/> Psychiatric disorder <input type="checkbox"/> Personality disorder <input type="checkbox"/> Cognitive deficits <input type="checkbox"/> Poor coping <input type="checkbox"/> Social support system limitations <input type="checkbox"/> Relocation concerns <input type="checkbox"/> Financial concerns <input type="checkbox"/> OTHER	THIS DECISION WAS MADE WITH: <ul style="list-style-type: none"> <input type="checkbox"/> Open and honest discussion amongst the team <input type="checkbox"/> An invitation for dissenting opinions <input type="checkbox"/> Input from all appropriate team members <input type="checkbox"/> A holistic assessment of the patient <input type="checkbox"/> Input from patient re personal preferences <input type="checkbox"/> Respect for patient's dignity and autonomy COMMENTS:

Transplant Team Decision: Transplant Candidate YES NO V.A.D. Candidate YES NO Deferred

Decision Approved By: Cardiologist: _____ Surgeon: _____

Plan: _____

- Living Will
- Power of Attorney Will
- Will

Status Criteria

- **Status 1:**

- out of hospital, waiting at home

- **Status 2:**

- In hospital pt
- Adult with cyanotic CHD
- Pts listed for multi organ transplant (other than heart-lung)

Status Criteria (cont.)

- **Status 3**

- Pts on Inotropes in hospital
- VAD not meeting Status 4 criteria

- **Status 3.5**

- High-dose or multiple Inotropes in hospital, & pts not candidates for VAD or no VAD available

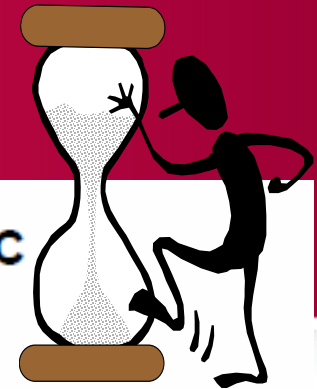
Status Criteria (cont.)

- **Status 4**
 - Mechanically ventilated patients on high-dose single or multiple inotropes \pm mechanical support (IABP/ECMO/Impella)

On Call

- Once the patient has been listed
 - Pager
 - Contact Details
 - Travel Arrangements
 - Monitoring

Average wait time

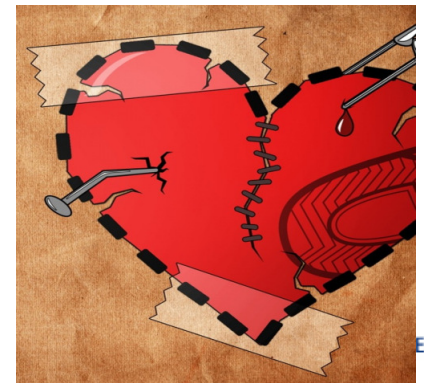


**Average Waiting Days for Heart Transplants in BC
by Blood Type (1999 - 2008)**

Year	A	B	AB	O	Average
1999	102	46	17	40	71
2000	67	A/N	3	243	103
2001	103	38	A/N	110	91
2002	87	45	48	37	70
2003	38	47	16	199	75
2004	137	155	67	342	189
2005	198	158	A/N	290	208
2006	37	60	A/N	227	124
2007	60	156	14	223	141
2008	36	72	24	168	63
Average	90	88	29	198	112

A good heart...

- No history of significant heart disease
- No evidence of cardiac trauma
- Normal Echo
- Normal 12 lead ECG
- Clear Coronary Angiography
- Brain dead...



Brain Death

- Absence of intracranial blood flow
- Irreversible loss of all functions of the brain
- Absence of brainstem reflexes
- Absence of spontaneous respiration – on ventilator



Neurologic Death

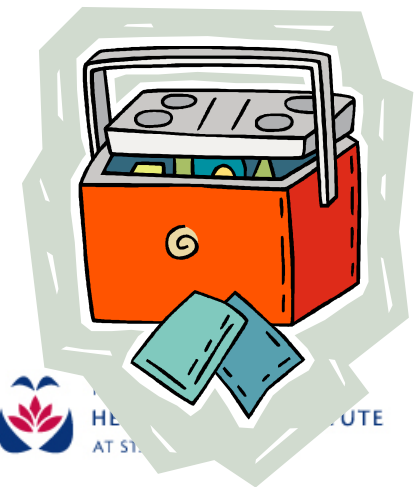
- Determination of Neurological Death - done by 2 Physicians (independent of the transplant team)
 - Clinical Examination
- Where the neurological diagnosis is in doubt, testing should be done at least twice. 12-24 hours apart.

Organ Allocation

- ABO - O(45%), A(40%), B(11%), AB(4%)
- Body size
- Listing status
- Sickest

Ideal cold ischemic times

Heart	2- 4 hours
Lungs	2 hours
Pancreas	6- 8 hours
Liver	4 - 8 hours
Kidneys	8- 24 hours



Management Post - Transplant



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After the Transplant

- CSICU - 24 to 48 hours
- Ward - Day 3 or 4
- Discharge home - 10 to 14 days
- Stay close by for three months
- Regular clinic visits

Goals of Treatment

- standard post cardiac surgical recovery goal
- Competency-based Education Guidelines
 - Rejection
 - Infection
 - Medications
 - Who to call

Rejection

Advances in immunosuppressant therapy have made rejection so rare that the danger is in it not being diagnosed since staff are not used to seeing it.

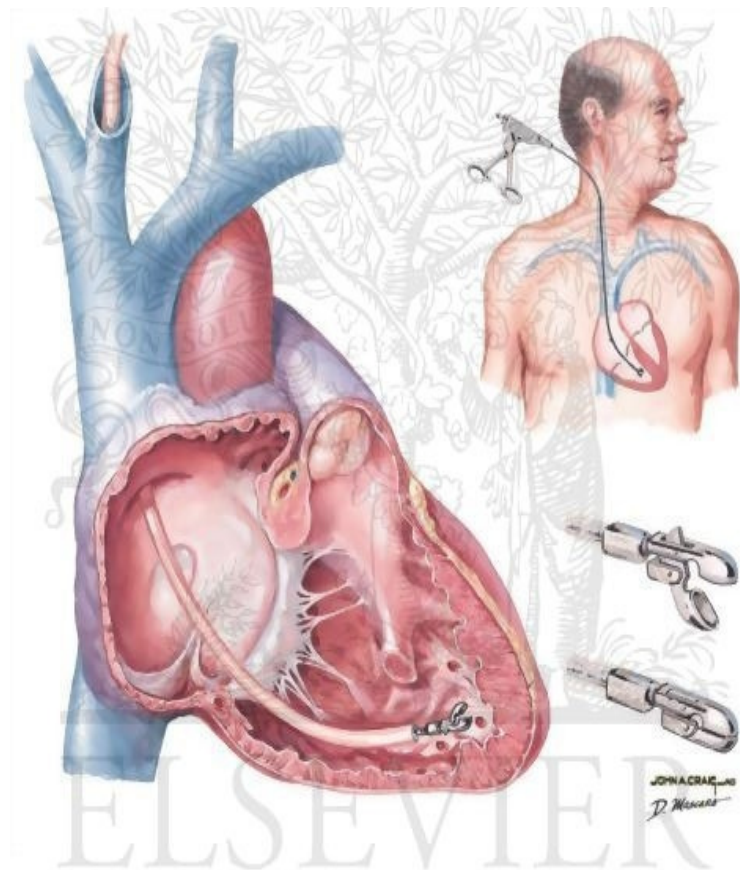
The big three:

- Cyclosporine - 1980s - revolutionized transplant
- Mycophenolate Mofetil(MMF)
- Prednisone

Goals of Immunosuppressants

- Reduce or eliminate rejection
- Prevent allograft vasculopathy
- Challenges:
 - Age of recipient
 - Renal status
 - Infections
 - Pre-operative VAD

Biopsy



Biopsy Results

- 0 No rejection
- 1 Mild rejection - usually not treated
- 2 Moderate rejection -always treated
- 3 Severe rejection - always treated and admit to hospital for monitoring

Side effects of Immunosuppressants

- Infection
- Renal Failure
- Hypertension
- Diabetes
- Cosmetic - hair growth, gum disease, puffiness
- Skin cancer

Life After Transplant



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Post Transplant Clinic visit

- Weekly clinics x 1 month
- Then Q 2 weeks x 3 months
- then monthly x 3 months (except at 4.5 months when Prednisone stopped)
- Blood work, biopsy, assessment by RN, MD, Pharmacist, Dietician and S/W, Psychologist prn
- Referral to Healthy Heart or Physio

Lifestyle changes after Transplant

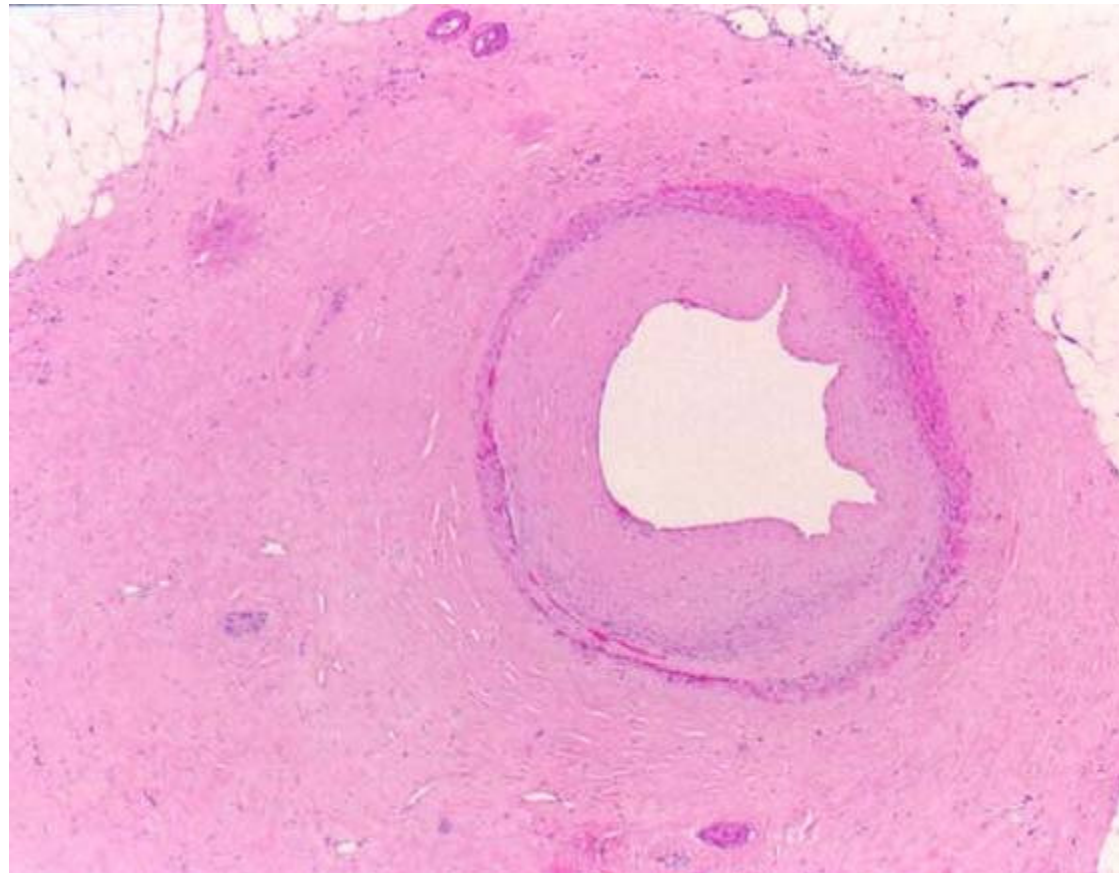
- Monitoring for infection and rejection
- Exercise and diet
- Sun exposure and skin cancer
- Travel
- Safe food handling
- Follow up with family physician

Long term issues

- Malignancies
- Chronic rejection
- VAC

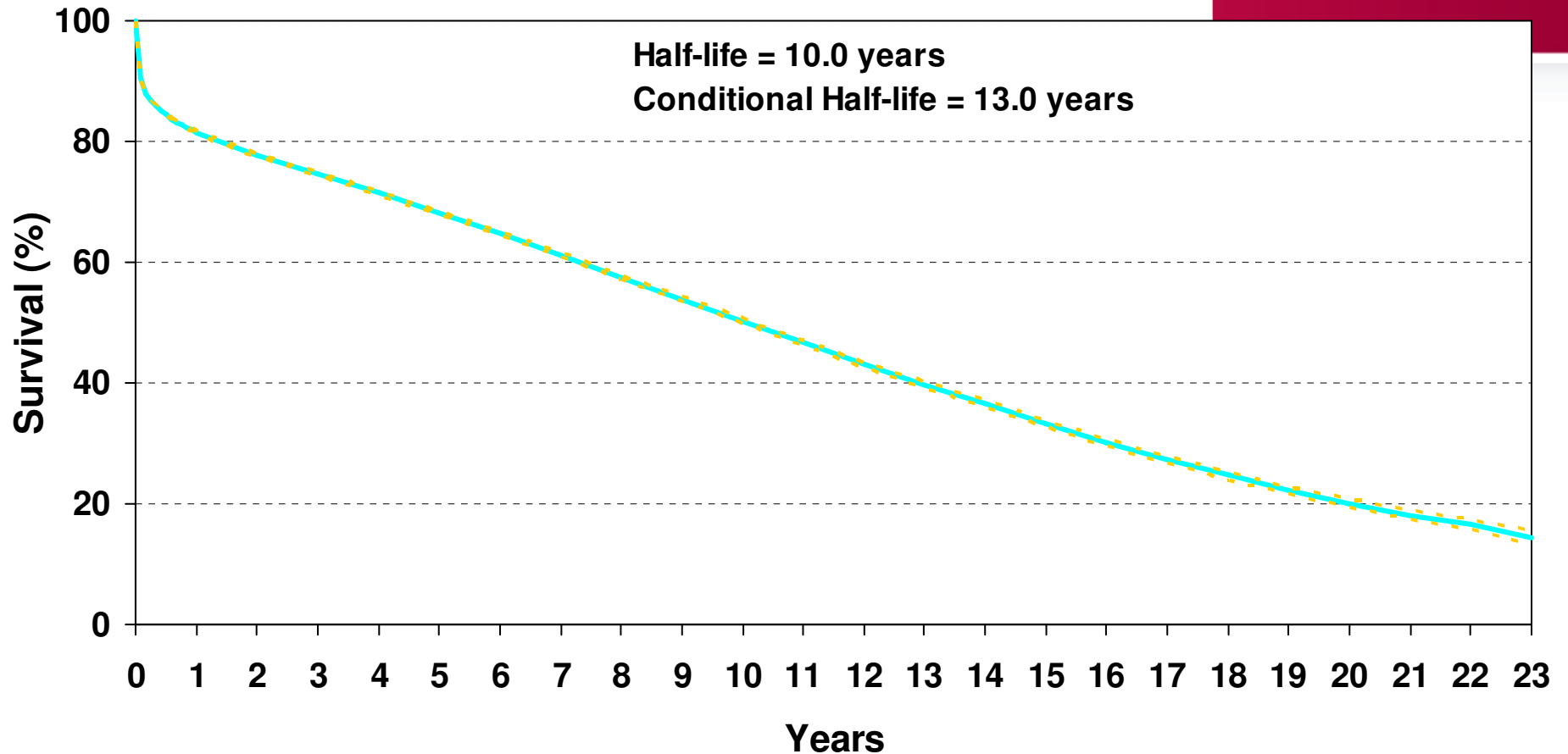
Chronic Rejection

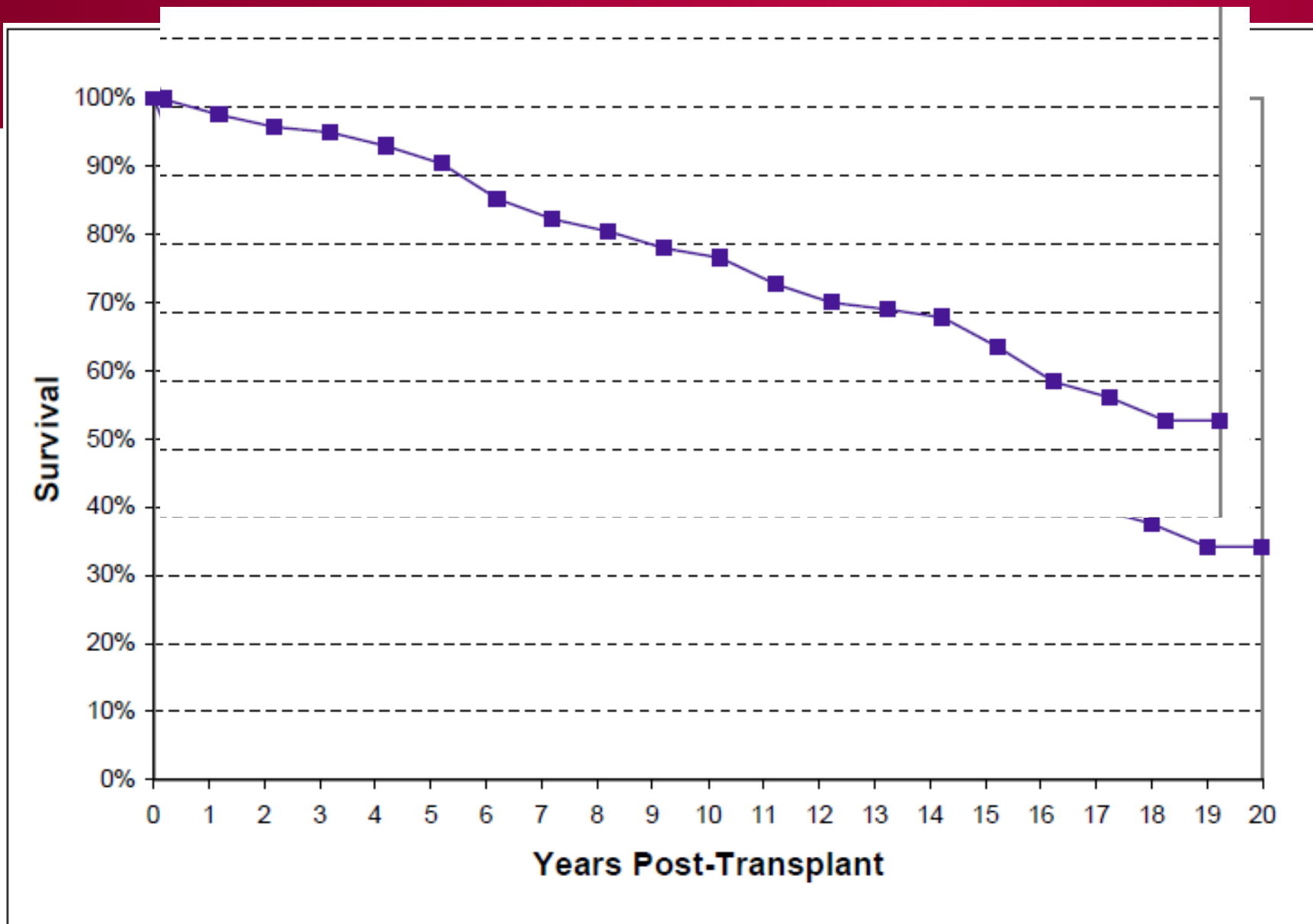
- Cardiac Allograft Vasculopathy (CAV)



HEART TRANSPLANTATION

Kaplan-Meier Survival (1/1982-6/2008)

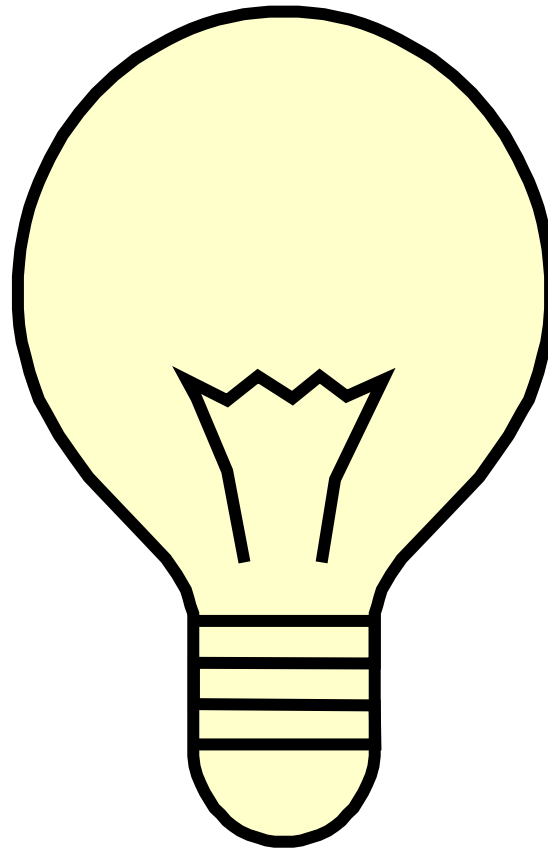




Half life = 14 years

Conditional Half life = >19 years

Questions?



Sun Run Star

