

# Henry Ford Hospital-Detroit



**HENRY FORD HEALTH.**  
Transplant

# Good Morning, everyone!

**HENRY FORD HEALTH**  
Transplant

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I will be discussing Henry  
Ford Hospital's Lung  
Transplant Program from the  
initial patient referral to the  
transplant surgery

## Disclosures

- Clinical Educator – Henry Ford Hospital
- NBRC – Item Writer Credentialing Exams, Specialty Exams
- Program Committee Michigan Society for Respiratory Care
- HOSA committee Member – Michigan Society for Respiratory Care
- AARC Committees
  - Safe and Effective Staffing Guide
  - Clinical Education Taskforce Co-Chair
  - Blood Gas Lab Manager Micro Credential Co-Author
  - Manuscript Reviewer Respiratory Care Journal

# Outline

- History of Lung Transplantation
- Indications for Lung Transplant
- How a patient is evaluated and listed for transplant
- Organ offers and transplant coordination
- Patient education in the pre- and post-transplant phases
- Successful discharge of a recent transplanted patient
- Lifelong care of the post-transplant patients

## First Human Transplant

- First human lung transplant was performed June 11, 1963, at the University Hospital in Jackson, Mississippi by Dr. James D. Hardy
- He was granted permission to perform the surgery under certain conditions, one being the surgery be on the left side only (single lung) as it was judged to be technically easier
- April 15<sup>th</sup>, 1963, a 58 y/o man with left lung bronchial carcinoma was admitted. He was dyspneic at rest from advanced emphysema and borderline renal failure from glomerulonephritis. He also had obstructive pneumonia due to obstructive neoplastic occlusion of the left main stem bronchus
- At 7:30pm June 11, 1963a patient entered the emergency room in shock due to massive a massive myocardial infarction. Resuscitation efforts failed and the family allowed the donation of the patients left lung.
- The new lung worked properly for the subsequent 18 days.

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## First Human Transplant

- At autopsy the lung was well ventilated and there was no evidence of rejection.
- Vascular anastomoses were patent
- Between 1963 and 1978 approximately 38 lung, lobe or Heart/Lung had been attempted with no long-term success.
- Only 1 patient was discharged from the hospital
- Only 9 lived more than 2 weeks
- For this reason, interest in lung transplant decreased for the majority of the 70's

## SLTx Success

- The first long term success after a single lung transplant was performed on Tom Hall by a group out of Toronto on November 7, 1983
- Selection of candidates became much more difficult
- The Toronto group believed Idiopathic Pulmonary Fibrosis (IPF) was the ideal disease as these patients do not usually have pulmonary sepsis; furthermore, reduced compliance and increased vascular resistance of the native fibrotic lung would ensure that ventilation and blood flow would be diverted to the transplanted lung.
- Tom Hall was 58 with IPF and on oxygen 24 hours a day. He had very limited life expectancy and was transplanted on Nov. 7, 1983.
- He was discharged in 6 weeks, returned to work after 3 months.
- He died more than 7 years later of renal failure



*Attending the 30th Anniversary Celebration event Wednesday are (from left to right) Drs. Thomas Todd, Joel Cooper, Alec Patterson and Griff Pearson (seated), who worked on the first successful lung transplant. They're joined by Dr. Shaf Keshavjee (far right) Director, Toronto Lung Transplant Program.*

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# LUNG TRANSPLANTATION

*Let's first look at the first Lung Transplant at Henry Ford Hospital completed in 1994*

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# MONITOR

OCT. 31, 1994

A WEEKLY PUBLICATION FOR EMPLOYEES OF HENRY FORD HOSPITAL AND HENRY FORD MEDICAL CENTERS

## SYSTEM LAUNCHES \$150 MILLION FUND FOR FUTURE

A \$150 million fund-raising initiative designed to create a cornerstone for the System's continued advancement in patient care, research and medical education begins this week.

Called the *Fund for the Future*, the approximately six-year effort has three major purposes:

- To endow chairmanships and professorships that will provide long-term funding for academic endeavors. These endowments will furnish annual supplemental support for research, innovative teaching and clinical practice. The System currently has 28 chairs with a commitment of \$1 million or more that were created by donor gifts. Five of these are advance gifts to the *Fund for the Future*. The Fund seeks to bring the total number of endowed chairmanships and professorships to 50.
- Create a Trustees' Fund for seed money for research projects, improvements in technology, community outreach programs

and new operating systems. An example of a project that will be supported by the Trustees' Fund is the development of a Center for Health Promotion and Disease Prevention designed to improve the health status of System patients. The Trustees' Fund also is expected to support expansion of research programs.

• Fund capital programs to upgrade and renovate existing facilities, including the Detroit Campus and ambulatory care sites. The fund also would be used for community partnership projects and information services.

The initiative will be launched at a dinner Thursday, Nov. 3, at the Ritz-Carlton Dearborn. The keynote speaker will be former U.S. Surgeon General C. Everett Koop, M.D. "The *Fund for the Future* is not only a unique and extraordinary endeavor, it also is an essential one," said Gail L. Warden, System President and Chief Executive Officer. "In an era

## BUILDING ON THE VISION

of decreased resources and declining payment for services, it will allow us to continue our national role as an innovative leader in health care, in teaching and in research."

Douglas T. McClure, Chairman, Board of Trustees, agreed. "The Fund not only will enable the System to make even greater contributions to medical education and research, but also will permit it to enhance its health care delivery and disease prevention activities for the benefit of all citizens of metropolitan Detroit," he said. The theme of the initiative is "Building on the Vision," referring to the vision of Hospital founder Henry Ford.

"Henry Ford implemented some very innovative concepts, such as the group practice system of care, when he founded the Hospital," said Collette Murray, Corporate Vice President, Philanthropy and Community Development. "That kind of foresight has placed the System at the forefront of many major trends in health care delivery today. But we know that there will be many new challenges in the future, and they will require tremendous resources."

The initiative will be led by Honorary Co-chairmen Mr. and Mrs. William Clay Ford and General Campaign Chairman Theodore H. Mecke, Jr. ♦

## LUNG-TRANSPLANT PATIENT IN GOOD CONDITION

TRANSPLANT TEAM MEMBERS (FROM LEFT) MICHAEL BASHA, M.D., NORMAN SHERMAN, M.D., AND ROBERT HIGGINS, M.D., CHECK IN ON JACQUETTA BROOKS.

The first lung-transplant patient in metro Detroit was in good condition and continuing to recover at Henry Ford Hospital, as of press time Friday. Surgeons performed the history-making single-lung operation Thursday, Oct. 20, on Jacquetta Brooks, a 57-year-old woman from Carlisle, Mich. Robert Higgins, M.D., Surgical Director, Thoracic Organ



Transplant Program, and Norman Sherman, M.D., Division Head, Cardiac and Thoracic Surgery, headed the transplant team. "Lung transplants have become an effective therapy for

end-stage heart and lung disease," Dr. Higgins said. "They are no longer considered experimental." The Hospital is one of two medical centers in Michigan

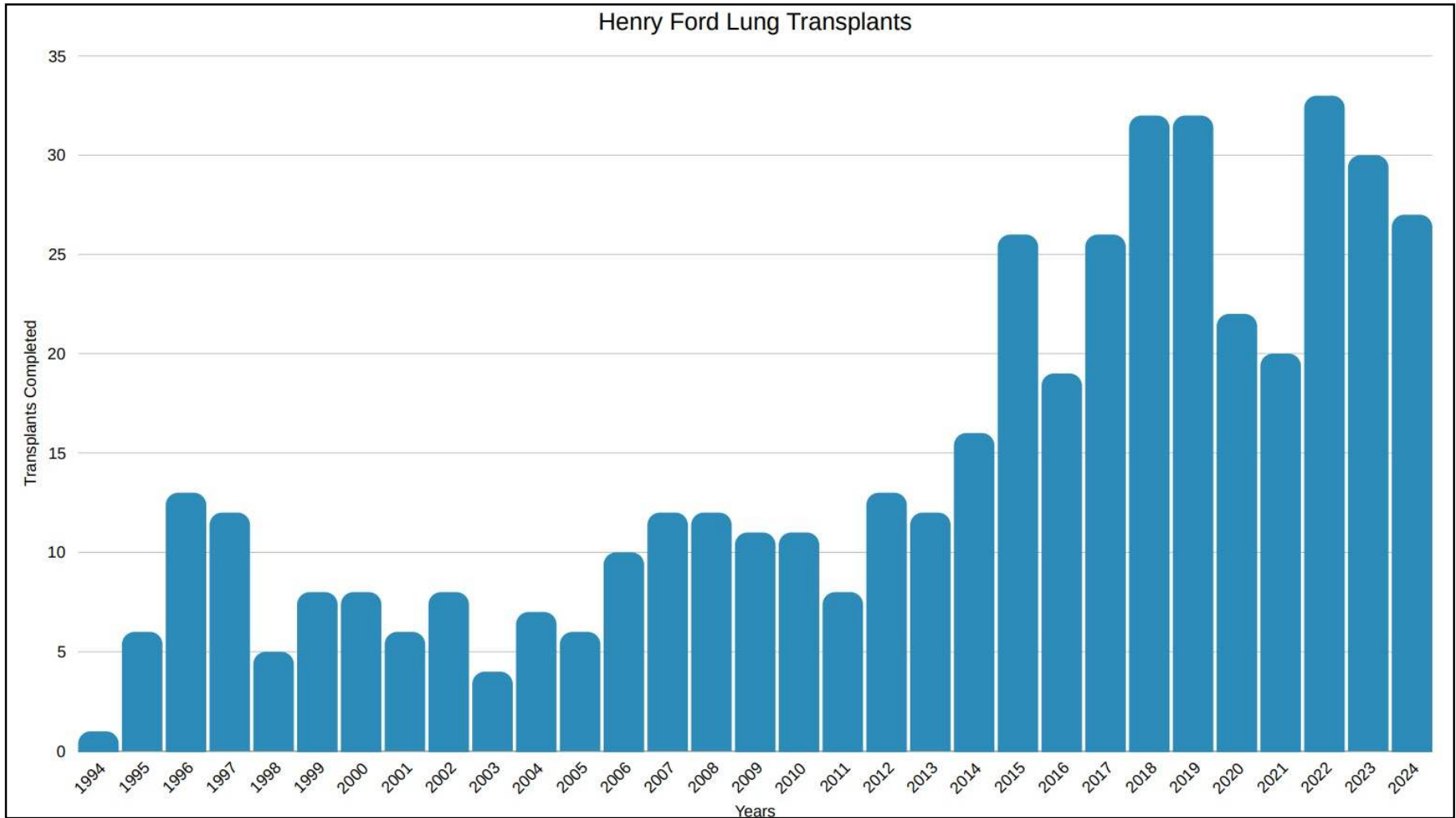
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- ▶ Patient Philanthropist
- ▶ Sweet Success
- ▶ Horsing Around
- ▶ Eastern & Downriver Regions
- ▶ Elevator QTI
- ▶ Cuban Aid



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# General Guidelines to Patient Selection

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- Untreatable end-stage pulmonary disease of any etiology
- Limited life expectancy usually less than 3 years
- Satisfactory psychosocial profile and support system
- No current nicotine or substance abuse
- Adequate insurance coverage for the procedure and for the post-transplant care

# Lung Transplantation: Relative Contraindications

- Obesity BMI >35
- Severe malnutrition BMI <19
- Severe symptomatic osteoporosis
- Colonization with highly resistant organisms
- HIV
- Hepatitis B or C
- Extensive thoracic surgery

## Lung Transplantation: Absolute Contraindications

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- Active TB
- Malignancy
- Tobacco, drug or alcohol dependency
- Significant coronary artery disease or left ventricular dysfunction
- More than 2 organs dysfunction Example: We can transplant Lung/Heart, Lung/Liver, Lung/Kidney. A third organ would be too high risk for the patient.

## Lung Transplantation Co-morbidities:

Ventilator  
dependency

Nutritional  
status

Previous  
thoracic  
surgery

Corticosteroid  
use

Chronic  
infection

Prior  
malignancy

Coronary  
artery  
disease

Reflux

Osteoporosis

## Nutritional Status



Nutrition assessment in all overweight and underweight candidates.



Obesity; BMI  $<35$  to be listed with ongoing weight loss to goal of BMI  $<30$ .



Malnourished; BMI  $>17$  to be listed with all underweight individuals (BMI  $<17$ ) getting a feeding tube if unable to gain weight.



Pulmonary rehabilitation essential

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## Recipient Age

Upper age limit has not been established.

Age > 75 unlikely to be a candidate.

Age considered with individual patient comorbidities and overall performance status.

In 2017- 33% of all transplants occurred in age >65.

While older individuals have higher 1 year mortality than younger individuals, there is no survival advantage at one year in those > 60 versus >70.

# Role of Pulmonary Rehab

Pulmonary rehabilitation is a physician prescribed, supervised, exercise program. It is designed for people who have lung disease and are short of breath.

It is a 6 to 12 week (18-36 sessions) education and reconditioning program that is designed to help you breathe better, improve your overall health, strength, and quality of life.

# Role of Pulmonary Rehab

We focus on endurance training, muscle strengthening, breathing retraining, and flexibility. You will work at your own pace and perform exercises that will benefit you.

Benefits include Improving your breathing, strength, endurance, quality of life, confidence, and independence. Be able to do your daily activities with less shortness of breath and fatigue.

# Role of Pulmonary Rehab

To do more of the things that you enjoy. Learn your limitations. Meet people with the same or similar lung condition and/or symptoms.

At HFH, we also work with pre-lung transplant patients to get them stronger for their surgery and work with the post-op lung transplant patients to improve their muscle strength, endurance and quality of life.

# Timing of Referral

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**COPD/Alpha 1**- FEV1 <25%,  
rest oxygen, hypercarbia



**Pulmonary Fibrosis**- at time of  
radio- graphic diagnosis



**Sarcoidosis**- FEV1 <1.5 L  
(50%pred.), Stage IV  
radiographic ILD, NYHA  
III,PH,O2



**Pulmonary Hypertension**-  
failure of medications, increasing  
pressures



**Cystic  
Fibrosis/Bronchiectasis**-  
FEV1<30% 6MW <400 m,  
recurrent infections, decline in  
lung function

# Timing of Referral: Emphysema

- BODE Index of 5 to 6
- $FEV_1 < 25\%$  predicted
- $PCO_2 > 50$
- $PaO_2 < 60$
- Pulmonary hypertension and cor pulmonale

# BODE Index

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B=Body Mass Index

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O=Degree of Airway Obstruction

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D=Dyspnea

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E= Exercise capacity measured by a 6 minute walk

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**Range score of 0-10 with scores above**

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**7 having mortality rate of 80% at 4 years**

**Table 2.** Variables and Point Values Used for the Computation of the Body-Mass Index, Degree of Airflow Obstruction and Dyspnea, and Exercise Capacity (BODE) Index.\*

Variable	Points on BODE Index			
	0	1	2	3
FEV <sub>1</sub> (% of predicted)†	≥65	50–64	36–49	≤35
Distance walked in 6 min (m)	≥350	250–349	150–249	≤149
MMRC dyspnea scale‡	0–1	2	3	4
Body-mass index§	>21	≤21		

## Modified Medical Research Council (mMRC) dyspnea scale

- 0: I only get breathless with strenuous exercise.
- 1: I get short of breath when hurrying on level ground or walking up a slight hill.
- 2: On level ground, I walk slower than people of the same age because of breathlessness, or I must stop for breath when walking at my own pace.
- 3: I stop for breath after walking about 100 yards or after a few minutes on level ground.
- 4: I am too breathless to leave my home, or I am breathless when dressing.

# Timing of Referral: Idiopathic Pulmonary Fibrosis

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- Median survival from the time of diagnosis is 3-4 years
- Pace of decline variable and often stepwise
- Acute exacerbations have high mortality
- Referral to a transplant center should occur at diagnosis

# Sarcoidosis

- Systemic disease characterized by noncaseating granulomas in various organ systems
- Lungs are most often involved organ, followed by skin, eyes, liver, heart and rarely the nervous systems
- Usually a benign disease without long term disability
- Rarely will progress to lung failure with oxygen dependency

# Timing of Referral: Sarcoidosis

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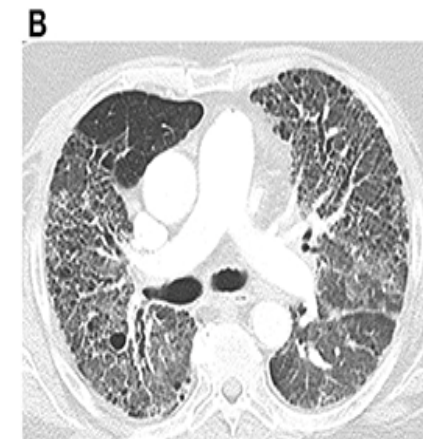
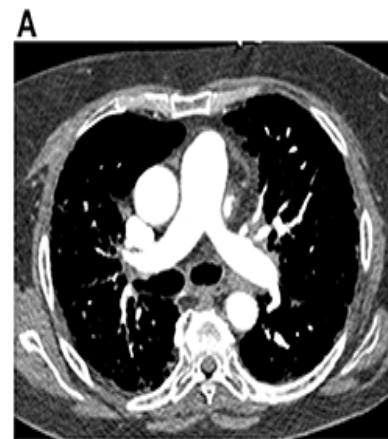
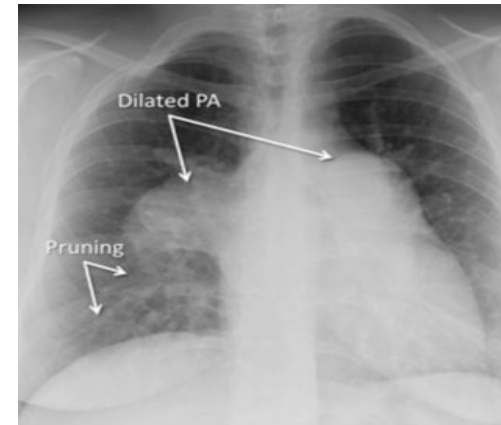
- NYHA functional Class III or IV and any of the following:
  - Hypoxemia at rest
  - Pulmonary hypertension
  - Elevated right Atrial pressure > 15 mm Hg

## Defining NYHA Functional status

- This is a system used to categorize the severity of heart failure based on a patient's physical limitations.
- **Class 1:** Patients have slight limitations on physical activity. Ordinary physical activity does not cause undue fatigue palpitations shortness of breath or angina.
- **Class II:** Patients have slight limitations on physical activity. They are comfortable at rest, but ordinary physical activity results in fatigue, palpitations, shortness of breath, or angina.
- **Class III:** Patients have marked limitations on physical activity. They are comfortable at rest, but less than ordinary activity causes fatigue, palpitations, shortness of breath, or angina.
- **Class IV:** Patients have symptoms of heart failure even at rest. Any physical activity increases discomfort

## Pulmonary Hypertension

- In 1991 median survival at diagnosis 2.8 years
- Prognosis is now related to improvement in NYHA class with maximal medical therapy
- Recent advances with medical therapies have made the disease manageable for most individual without transplant



## Timing of Referral : Primary Pulmonary Hypertension

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- Persistent NYHA Class III or IV on **maximal medical therapy**
- Low (350m) or declining 6-minute walk test
- A diagnosis of pulmonary veno-occlusive disease
- Cardiac index of  $<2$  L/min/m<sup>2</sup>
- Right Atrial pressure  $> 15$  mm Hg

## Cystic Fibrosis

- Autosomal recessive disease
- Advances in medical therapy has resulted in many individuals living well into adulthood without transplant



# Timing of Referral: Cystic Fibrosis

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- FEV1 < 30% of predicted or rapidly declining lung function or FEV1 > 30% (females and patients < 18 years) with any one of the following
  - O2 requirements
  - Hypercapnia
  - Pulmonary hypertension
  - Functional status, six - minute walk < 400 meters
  - Life threatening hemoptysis

# Lung Transplant Candidate Evaluation

Routine Txp labs	PRA 1.____ 2.____	ABO 1.____ 2.____	Urine nicotine	Urine tox	Peth
PSA (male)	Chest x-ray	Sputum CX	Complete Pulmonary Function test	6mw	O2 dose
RA ABG (with FIO2 documented)	EKG	Echocardiogram (right heart protocol with a bubble study)	VQ scan	CT chest	Dermatology

## Continuation of testing

CT abd/pelvis

Bone Density

Carotid doppler  
(60yrs+)

Gastric  
Emptying

Heart  
Catherization

Mammogram  
(female only)

Pap Smear  
(female only)

Colonoscopy  
(50yrs+)

Dental  
Clearance

Psychology  
Evaluation

Social Work  
Evaluation

Family meeting  
(done by SW  
and  
coordinator)

Cardiothoracic  
surgery  
Evaluation

Transplant  
Infectious  
disease

Pulmonary  
Rehab

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# Selection Committee Meeting

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- All lung transplant team members meet to discuss each candidate after the evaluation is complete.
- The team is multidisciplinary made up of Pulmonologists, Cardiothoracic Surgeons, Psychologist, Social worker, Dietician, Financial Coordinators, Mid-level Practitioners, (Physician assistants, Nurse Practitioners) and Coordinators.
- Decisions include turn down, listing or follow up at intervals
- All candidates receive written notification of the selection decision

# Listing a patient in UNOS

Listing performed by two RN's with a verification before submission.

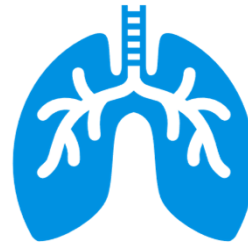
A CAS (Composite Allocation Score) number will be assigned based on data which predicts how sick the patient is and how likely they are to survive 5 years after the transplant.

# Listing a patient in UNOS

The CAS score is 0-50. 0 with higher scores implying you are sicker and will receive a transplant faster. Transplantation happens when a match is found.

Donor location affects the score and is added to the score when a donor is found. This helps to facilitate local donation.

# The Lung Offer



The phone call: The coordinator will be reached by our life share team to say that that lungs have been accepted for a specific patient.

Coordinator will review what the lung offer is: There are 4 different types of offers.

## 4 Types of Lung Offers



DONOR IS  
BRAIN DEAD



INCREASED  
RISK CRITERIA



POSITIVE FOR  
HEPATITIS C



DONATION AFTER  
CARDIAC DEATH

# Brain Dead Donor



- This patient is legally declared brain dead, but on life support to maintain vital functions.
- Patients' family elects to choose to donate patient's organs when they are withdrawn from life support.

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# Increased Risk Donor



- Donor with behaviors that increase the risk of infections like HIV and Hep B.
- An increased risk donor doesn't mean that the organ has an infectious disease.
- All donors are screened for HIV and Hep B to ensure they are negative at the donor hospital.
- Patients who receive increased risk organs are tested within the first 1-3 months and again at 1 year to ensure they have remained negative.
- This DOES NOT affect how well the lungs will work.
- The risk transmission of HIV and HEP B from a negative donor organ is <1%.

# Hepatitis C Positive Lung Offer



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- Donor is positive for Hepatitis C.
- Hep C positive lungs are being offered to recipients who do not have Hep C.
- We do this because Hepatitis C is not only treatable but now curable with a course of oral medication that starts immediately following detection in the blood stream and lasts for 12 weeks.
- The advantages of accepting such an organ is that the donor is usually younger.
- The wait time is shorter.
- This type of offer has increased transplants nationally by 10%.
- The patient has a the choice of accepting an offer from a Hepatitis C or increased risk donor.

# Donation After Cardiac Death Donor



- This patient would be on life support. Patient or family have decided to remove patient from life support due to irreversible brain injury.
- All the recipient hospitals would send their teams to meet at designated area at the donor hospital.
- The patient would need to expire within a designated timeframe of extubation for organ retrieval.

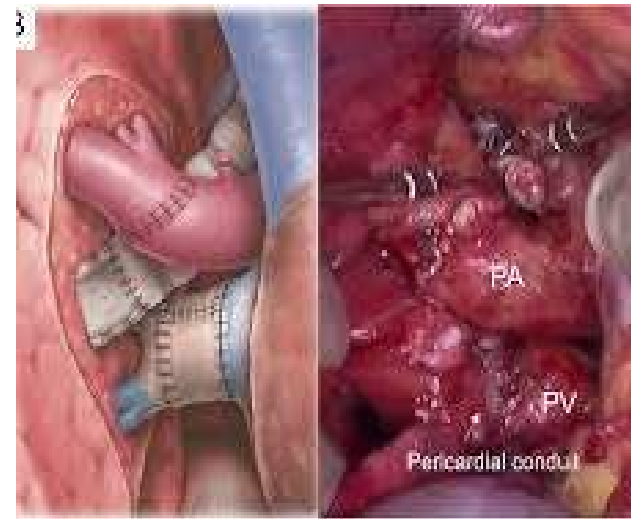
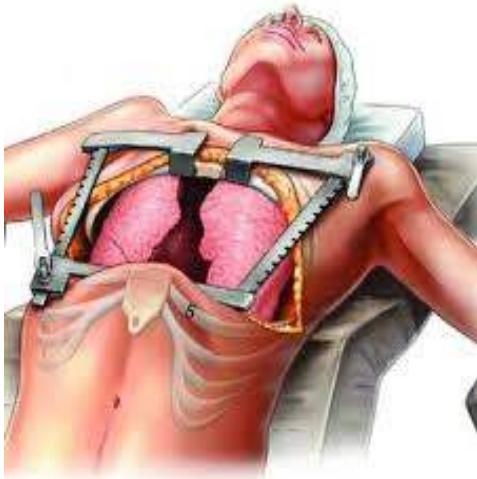
# Transplant

- Many individuals are involved in coordinating a lung transplant
- Gift of Life, Nurse Coordinators, Immunologists, Cardiac Surgeons and Anesthesiologists all play a vital role the day of transplantation
- The patient will be contacted with an offer and instructed to come to the hospital if they are not already admitted.
- Coordination to procure the lungs would be in progress. Only once the surgeon is at the donor hospital and lung are inspected is there a final go on the transplant. If upon inspection, the lung are not felt to be of good quality the transplant will be cancelled.
- Both the patient and family will be updated routinely throughout the process of procurement and transplantation.

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# Clam Shell/Anastomosis



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# Life After Transplant

- Rehab begins in the post-op phase and continues as an outpatient
- New lifelong medications
- Infectious precautions
- Clinic follow-up with transplant team for the rest of your life
- Maintain relationship with PCP....very important
- Health maintenance must be kept up to date
- Return to work, depending on individual factors

# GENERAL HEALTH GUIDELINES

## Encouraged

- Frequent hand washing
- Carry Hand Sanitizer
- Good dental hygiene
- Careful skin care (SPF 50)
- Diet and regular exercise
- Intimacy
- Attend support group
- Primary care physician
- Clean all fruits and veggies well.
- Wear a mask in large crowds

## Discouraged

- Tobacco, alcohol, other drugs
- Gardening, working with plants or soil
- Swimming in ponds, lakes, or rivers
- Cleaning up after pets
- Absolutely no birds!!
- No Well Water/Hot Tubs
- No unpasteurized food products, Grapefruit juice.
- Avoid raw or undercooked eggs/meat/seafood

# Considerations when caring for a post-transplant patient



**Immunosuppression:**  
Extra precautions necessary - wear a mask when caring for a transplanted patient



**Environment of care:**  
Vaccines, sick family members, cleanliness of household



**Aspiration:** Sleep positioning, food consistencies, feeding tubes



**Airway management**  
(e.g., trach), chest PT and airway clearance



**Spirometry:** What is the patient's baseline? Has it changed by more than 10%?



**New medications:** Any new medication must be cleared by transplant pharmacy



**Acute signs of distress,** what constitutes an emergency



**When to call a coordinator**

# Questions?

# Thank You

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