

# BAPTIST HOSPITAL

**ECMO CARE PATIENT EDUCATION**



**TRANSITIONAL CARE  
INFORMATION FOR PATIENTS AND FAMILIES**



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This material provides information about Extra-Corporeal Membrane Oxygenation (ECMO), including what it is, why it is used and what typically happens during ECMO treatment. Use this information to help you understand what is going on with your loved one. If you have questions, please ask one of the ECMO specialists.

Dear Patient and Family,

At Baptist Hospital we care about your well-being and we understand that this is a difficult and overwhelming time for you. When you or a loved one is in the Critical Care Unit (CCU) it can be stressful and trying, not only for the patient, but for the family member. Our hope is that this pamphlet will help answer some of the questions you may have about Extra Corporeal Membrane Oxygenation (ECMO) and what it entails for your loved one.

This is just an overview so we invite you to contact us for any further questions that this pamphlet does not answer. If there is a topic you would like more clarification on, please reach out. All members of our extensive ECMO care team are more than happy to assist you. We are here for you in this time of need and throughout life's journey.

Sincerely and respectfully,

**Your ECMO Care Team**  
**Phone: 850.908.ECMO(3266)**

# WHO MAKES UP YOUR ECMO CARE TEAM

## **CRITICAL PATIENT CARE SPECIALTY TEAMS:**

Critical Care/Pulmonary Physicians  
Cardiothoracic Surgeons  
Interventional Cardiologists  
Perfusionists  
R.N. ECMO Specialists  
Physician Assistants  
Nurse Practitioners  
Cardiovascular Operating Room team  
Cardiac Catheterization Laboratory team  
Bedside Nurses  
Respiratory Therapists  
Pharmacists  
Physical Therapists  
Dietary-Clinical Nutritionists  
Cardiovascular Patient Education-Transitional Care Nurses  
Case Management and Social Workers  
Chaplaincy Services



# COMMONLY USED ECMO TERMS

## ECMO

Extra **C**orporeal **M**embrane **O**xygenation. This is the term for the treatment provided by the life support machine the patient is connected to.

## CANNULAE

Plastic tubes that the Cardiothoracic Surgeons place into the veins and arteries leading to and from the heart. The ECMO circuit will be attached to these cannulae to provide support for the unstable patient. **Cannulation** is the process of inserting the cannulae either surgically or percutaneously (through the skin). Cannulation can be done at the bedside in a true emergency.

## DECANNULATION

After careful assessment, when the patient is deemed to be recovered enough to potentially come off ECMO, they may be taken to the operating room to surgically remove the cannulae, or it may be removed at the bedside in CCU.

## OXYGENATOR

This is a component of the ECMO circuit that is the “artificial lung.” This device removes carbon dioxide **from** the blood and provides oxygen **to** the blood.

## PUMP

This component of the ECMO circuit is the “artificial heart.” This device propels blood through the circuit and back into the patient.

## ECMO FLOW

This term refers to how many liters of blood are being moved through the circuit, by the pump, per minute. Typically, the higher the flow rate, the more support the patient is requiring.

Many patients are recoverable and well enough to be weaned off of the ECMO circuit. We call this a **Bridge to Recovery**. Some ECMO patients may require implantation of a mechanical circulatory support (MCS) device. They must first be stable enough to undergo the operation. This is termed **Bridge-to-device**. The next step in treatment, if the patient is eligible, would be a transplant. If that is the case, the MCS device is a **Bridge-to-transplant** device. If the patient is not a transplant candidate, they may be put on an MCS device as **Destination Therapy**, where they will live long-term with the device. It is important to understand that ECMO is temporary and should not be confused with **Destination Therapy**.



# WHAT IS ECMO AND HOW DOES IT WORK?

**ECMO stands for Extra-Corporeal Membrane Oxygenation.** This treatment is used for infants, children and adults who have life-threatening breathing and heart problems. Meaning the heart doesn't pump enough blood, the lungs don't provide enough oxygen or both.

Breathing problems are referred to as respiratory problems. Heart problems are called cardiac problems.

**Extra** refers to something that is outside, and **corporeal** refers to the body. **Extracorporeal** means that the machine sits outside of your loved one's body. **Membrane oxygenation** means that the machine helps get oxygen into the body.

## WHAT DOES ECMO DO?

**ECMO has two jobs:**

- To help the lungs — by getting oxygen into the blood and taking carbon dioxide out of the blood.
- To help the heart — by pumping blood to the organs.

**ECMO does not cure any health problem.** It is a short-term therapy to help the lungs alone or both the heart and the lungs. ECMO simply helps the body work and helps it heal. (Also see "How does ECMO work?" on page 7)

## WHEN IS ECMO USED?

ECMO is used with very ill people who have not gotten better with other kinds of medical help. It is used for people who might die if they weren't on ECMO. It is used only when there is a chance that a person could get better.

ECMO may also be used to help a person's medical condition become stable until another procedure can be done. For example, ECMO may be used for certain heart and lung transplant candidates.

Some of the conditions that may benefit from ECMO support are:

- Severe lung injuries and lung problems. Common lung problems include:
  - Severe asthma, pneumonia or influenza
  - Pulmonary embolus
  - Acute respiratory distress syndrome
  - Pulmonary hypertension
  - Congenital diaphragmatic hernia
  - Meconium aspiration syndrome

- Conditions that cause severe heart problems, such as cardiomyopathy
- Sepsis

ECMO is also commonly used for people after heart surgery.

## HOW DOES ECMO WORK?

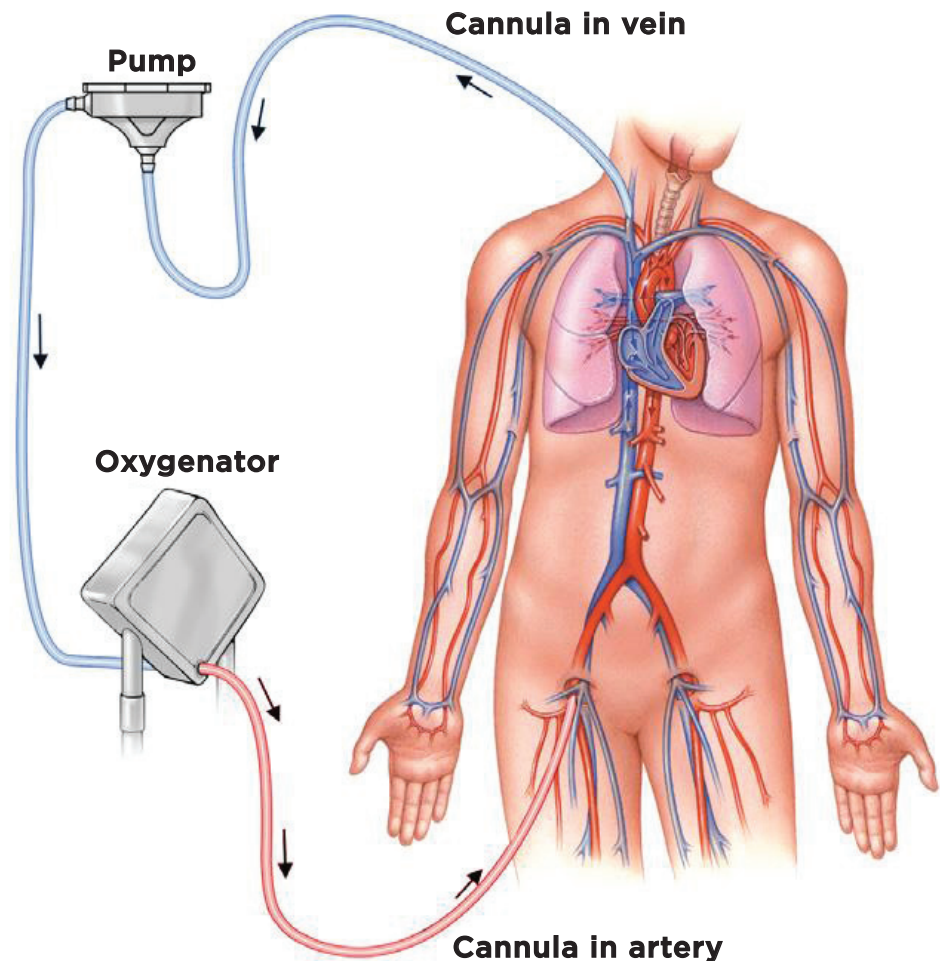
To prepare your loved one for ECMO, the physician places tubes, called cannulas, into specific blood vessels. These tubes are connected to the ECMO circuit.

The blood flows from the body in a loop, or a circuit, to the ECMO machine.

The pump acts like an artificial heart. It pushes blood through the ECMO circuit to an oxygenator.

The oxygenator acts like artificial lungs. It adds oxygen to the blood, and it removes harmful carbon dioxide.

The oxygenator may also warm the blood before the blood completes the loop and returns to your loved one's body.



# WHAT ARE THE DIFFERENT TYPES OF ECMO?

## THERE ARE TWO MAIN TYPES OF ECMO: VA (VENO-ARTERIAL) AND VV (VENO-VENOUS)

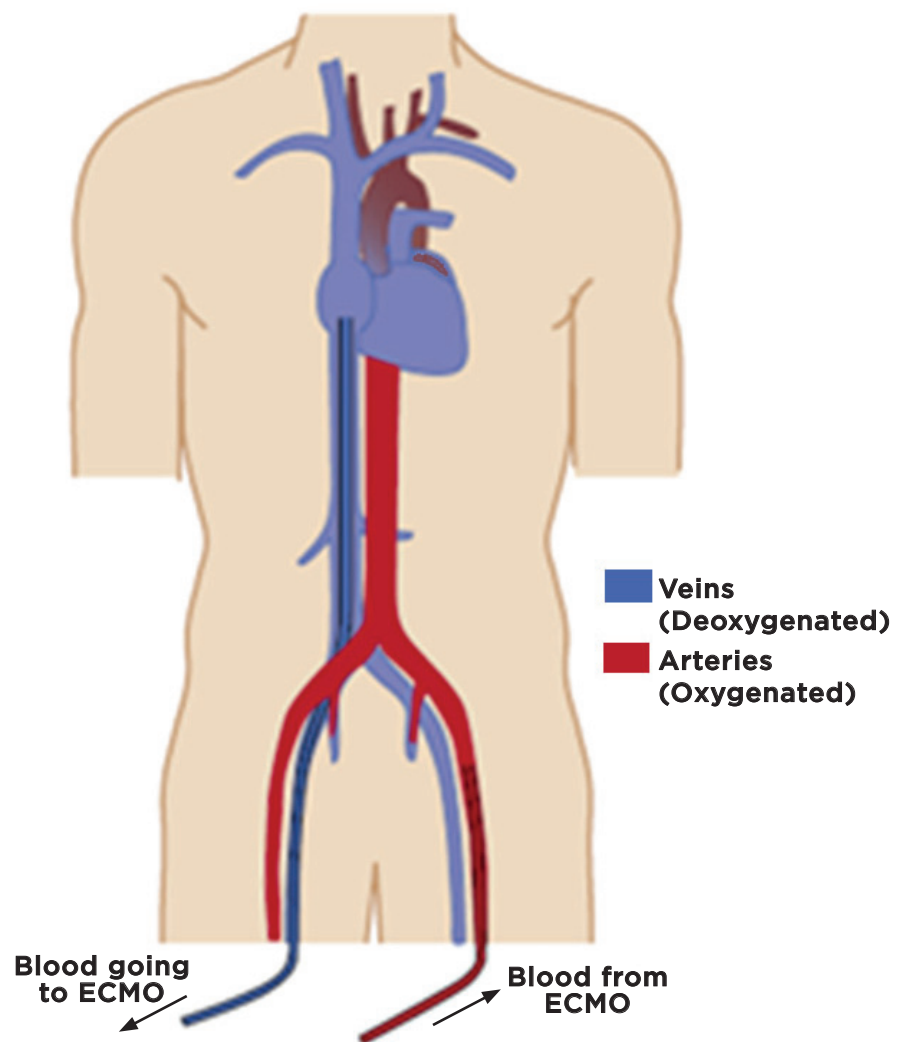
### VA ECMO

This form of ECMO is most similar to being on the heart-lung machine in the operating room. VA ECMO allows for full cardiac and respiratory support. The goal of therapy is to allow the patient's blood to be diverted from their heart and lungs, via cannulae, to the ECMO machine.

The ECMO machine functions as the patient's heart and lungs, allowing for these organs to rest and recover. A patient on VA ECMO will be cannulated in two different sites. The most common cannulation sites are the femoral vein and the femoral artery.

Additionally, if a patient becomes unstable immediately following open heart surgery, the cannulae may be placed directly into the heart for faster access. When this happens, the patient may come to the CCU with their chest open to allow the heart to be further rested.

### VA ECMO (Femoral/Groin Cannulation)





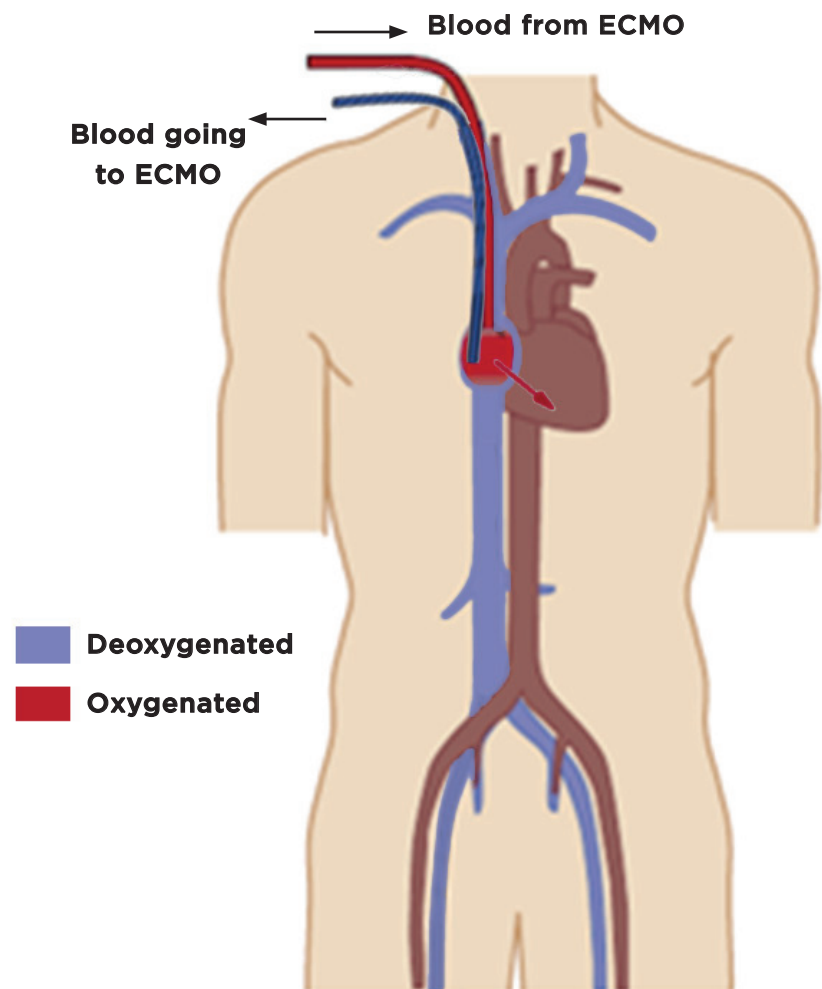
## VV ECMO

This form of ECMO only provides respiratory support. VV ECMO requires the patient to have adequate cardiac function. Most commonly in this institution, VV ECMO is initiated at the bedside by percutaneously inserting a special cannula into the right internal jugular vein of the neck.

This cannula has two openings, allowing for it to drain blood from the heart and return it to the heart through a single cannulation site. The ECMO circuit will oxygenate the blood, remove carbon dioxide and return the blood to the right side of the heart.

Typically VV ECMO patients, due to the nature of their illness and the time it takes for lungs to heal, can be dependent on the machine for weeks at a time.

## VV ECMO (Right Internal Jugular/Neck Cannulation)



# WHAT ARE THE RISKS OF ECMO?

**THE DOCTOR WILL DISCUSS WITH YOU THE RISKS OF ECMO THAT ARE SPECIFIC TO YOUR LOVED ONE'S HEALTH CONDITION.**

## **SOME GENERAL RISKS OF ECMO INCLUDE:**

- Bleeding. People on ECMO receive medication that thins their blood called anticoagulant medication.
- Nerve problems, such as a stroke or seizure or other injury.
- Blood clots, leading to a stroke or an embolism. An embolism is a blood clot that travels in the body. It could block or limit blood flow to an organ.
- Infection.
- More swelling or problems with blood flow to some organs.
- Problems with or failure of the ECMO machine.
- Death.

## **WHAT HAPPENS IF THEIR ORGANS ARE NOT HEALING?**

There is a significant chance that despite our greatest efforts, your loved one may not improve. Our specialty team of CCU physicians, recognizes that there are times when certain medical treatments can be considered futile in that they will not contribute to the patient's well-being or achieve agreed-on goals of care.

When there is no agreement on the futile nature of treatment(s), steps will be taken to seek to reach a consensus about whether the continued treatment(s) are futile and thus will be withheld or withdrawn.

At all times we will seek to provide compassionate care and to minimize patients' pain and suffering.

Palliative Care shall never be considered medically futile and shall not be withheld except upon the express direction of the patient or family.

## **COMING OFF ECMO**

How long a person is on ECMO depends on the person's medical condition and how he or she responds to ECMO treatment.

The amount of ECMO support may be reduced for short periods of time. This is called weaning. This allows the health care team to see whether your loved one's lungs (and heart) are recovering.

The ECMO may be removed in the CCU or the operating room.

This may be done when:

- The heart or lungs recovered and are working well.
- A more appropriate treatment is identified.
- Your loved one:
  - Develops uncontrolled bleeding or problems with clotting.
  - Doesn't seem to benefit from ECMO support any longer.

# WHAT KIND OF MEDICATIONS ARE NEEDED?

## MEDICATIONS

Sedation and pain medication are given through an IV. These help your loved one feel more comfortable and calm.

- Your loved one may sleep while under sedation. When asleep, he or she may not move much, although some movement is normal. Movement may not mean that your loved one is in pain.
- **Even though your loved one can't talk due to the sedation, he or she may be able to hear you. Please talk to your loved one. Hearing your voice may be very comforting.**
- Your loved one may be awake some of the time he or she is on ECMO. This time may allow him or her to help with therapy.

The health care provider will give your loved one a blood thinner to help prevent blood clots. Members of the care team will watch your loved one's lab results closely. The physician may change the amount of blood thinner over time.

## BLOOD PRODUCTS

Your loved one is getting blood products while on ECMO. These are often called blood transfusions. Transfusions help make sure that your loved one has enough blood to:

- Carry oxygen to the body.
- Prevent bleeding. The plasma and platelets in blood help blood to clot.

## FLUIDS AND NUTRITION

Your loved one will get fluids through an IV. The body needs fluids to help it heal. He or she may also get nutrition through an IV or a feeding tube.

## TESTS AND MONITORING

While your loved one is on ECMO, tests will be done to watch, or monitor, his or her condition. These tests may include:

- Blood tests — Blood tests monitor the body's electrolytes, the number and kinds of blood cells, the oxygen and carbon dioxide levels, and the level of medications such as blood thinners. Electrolytes are chemicals, such as sodium and potassium, that the body needs to work well. Blood tests may also show whether your loved one has an infection.
- X-rays — X-ray images are used to check on the condition of the heart and lungs and to see the placement of the tubes.
- Echocardiogram — An "echo" is an ultrasound of the heart. It sends sound waves into the body to learn how well the heart is working. The echoes that bounce back from the heart make a picture of the heart that the providers can record and examine.
- Ultrasound — An ultrasound gives pictures, or images, of internal body parts.

# HOW WILL MY LOVED ONE APPEAR?

## INFORMATION FOR FAMILY AND FRIENDS

Your loved one may look very swollen or puffy. This is normal, since he or she may be getting a lot of fluids and blood products. Your loved one may also look pale, and his or her skin may be very cool. He or she has a breathing tube in his or her mouth and is sedated. Because of this, he or she can't talk to you.

Your loved one is connected to many machines. And there are a lot of tubes (see illustration next page) coming out of his or her body. It may seem like a lot of equipment, but each piece is needed to watch and treat your loved one and to keep him or her as comfortable as possible.

Some tubes connect your loved one to the ECMO machine. Other tubes and machines may include:

### **DIALYSIS**

A machine that helps the kidneys remove waste and toxins from the body.

### **VENTILATOR OR RESPIRATOR**

A machine used to help with breathing.

### **NASOGASTRIC (NG) TUBE**

A tube placed in the nose or mouth that goes down to the stomach.

An NG tube helps drain the stomach, gives nutrition or does both.

You may see two NG tubes in place.

### **DRAINAGE TUBES**

Tubes in the chest that remove, or drain, fluid and waste.

### **ARTERIAL LINE**

A small tube, or catheter, placed in the wrist or groin. It is used to get blood samples and to check blood pressure.

### **INTRAVENOUS (IV) CATHETERS**

Small tubes inserted into veins. Often called "IVs," they are used to give fluids, blood products, pain medication, antibiotics, sedation, all of these or some of these. (Sedation is an anesthetic. It helps your loved one be more comfortable while on ECMO.)

### **URINARY CATHETER (FOLEY CATHETER)**

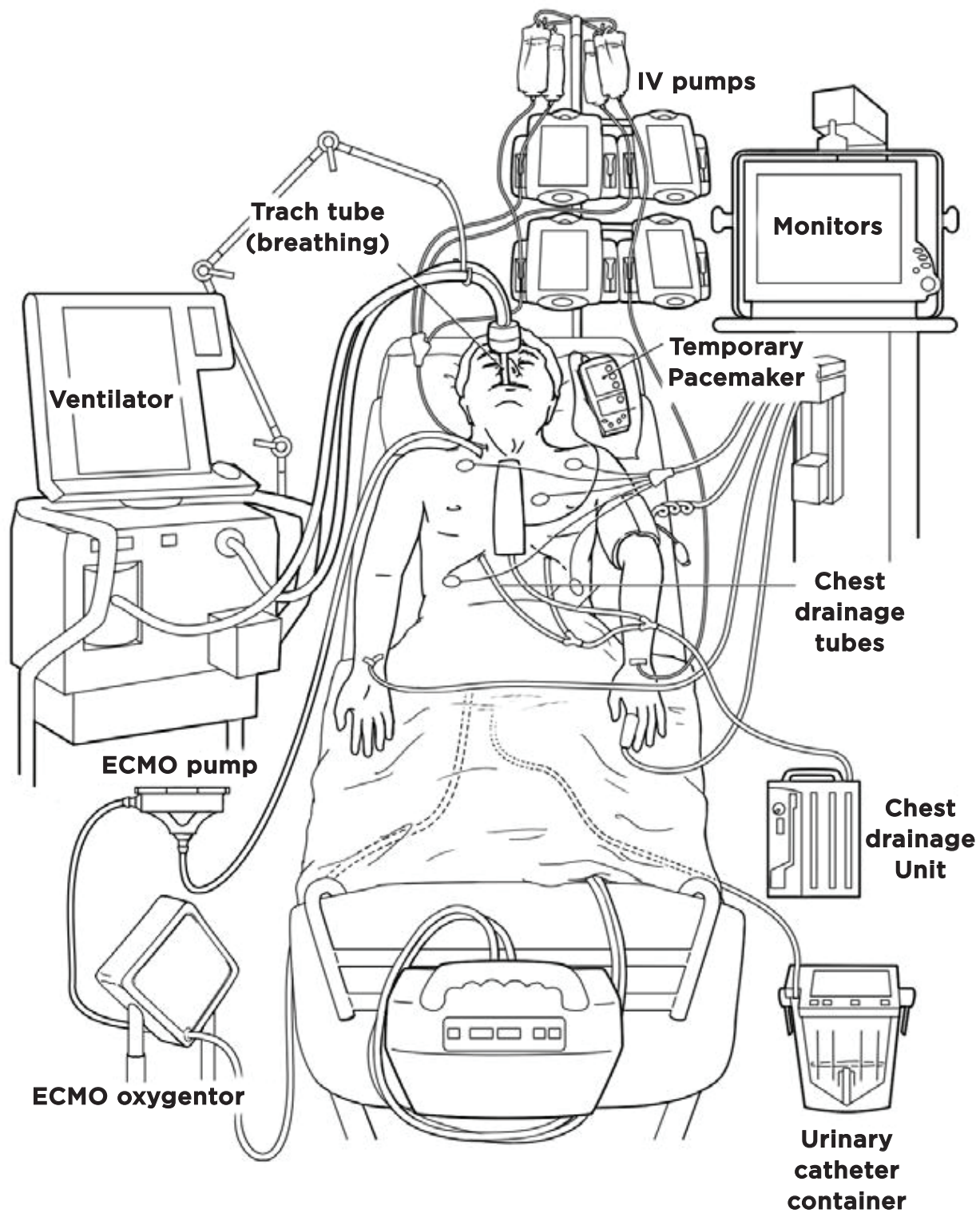
A tube inserted into the bladder to drain urine.

### **INTRA-AORTIC BALLOON PUMP (MCS)**

A balloon placed inside the body's main artery, the descending aorta. It helps the heart by pumping blood.

### **IMPELLA (MCS)**

A catheter is placed as a temporary ventricular support device in patients with depressed heart function to improve cardiac output.



**Common medical machines used for a person on ECMO**



# HOW CAN I HELP MY LOVED ONE?

People on ECMO are very sick. **Always wash your hands before you go into the room.**

**If you have a cold or another illness, consider waiting to visit until your symptoms are gone.**

If you need to, wear a mask to prevent the spread of germs. If you are not sure whether you should visit someone in the CCU, talk to a member of the health care team before you visit.

While your loved one is on ECMO, you can help with his or her care. You may want to:

- Spend time with your loved one. Talk about familiar, happy news in a reassuring voice.
- Gently hold your loved one's hand or touch an arm softly.
- Bring in soothing music to play in the room.
- Bring in a special comfort item, such as a blanket, photos or other familiar items.
- Keep a journal of your loved one's progress. This also may help you better understand what is happening.

## TAKE CARE OF YOURSELF

Having a loved one on ECMO can be very difficult.

While you are here with your loved one, please be sure to take care of yourself physically and emotionally.

**The following ideas may help.**

- Get enough rest to wake up feeling refreshed.
- Make sure you eat regular meals and drink plenty of healthy fluids.
- Ask other family or friends to sit with your loved one so you can get out of the hospital for a while.
- Talk to a health care professional about how you are doing. Ask a member of the health care team to help you connect with a chaplain or mental health specialist.
- Ask a member of the health care team about relaxation techniques and easy exercises that may help you lower your stress. Many of these ideas can be done in your loved one's hospital room.

- Accept help at home and locally. Allow your friends to help with needs at home, such as keeping up with your family's laundry, taking kids to events, caring for the yard or driveway and sidewalks, and making meals as needed.
- Ask someone to be the family spokesperson. This person contacts family and friends with updates as needed. Ideally, this would not be the spouse or significant other or a child.
- Consider using a website such as CaringBridge ([www.caringbridge.org](http://www.caringbridge.org)) or CarePages ([www.carepages.com](http://www.carepages.com)). These websites help people share their loved one's medical updates with family and friends. Using one of these sites may save you from spending hours on the phone telling your loved one's story. Doing that can become emotionally tiring for the caregivers.

### **FOR MORE INFORMATION**

If you have questions after reading this information, please ask a member of the ECMO care team.

### **CARE CONFERENCES**

The ECMO care team holds regular care conferences to discuss your loved one's condition. If it is appropriate, you may be able to attend the care conferences. Ask a member of the team if you are interested.

Your ECMO care team may be reached at: 850-908-ECMO(3266)

References: © 2017 Mayo Foundation for Medical Education and Research. Adapted by Baptist Health Care with permission. All rights reserved; UAB Medicine and Extracorporeal Life Support Organization (ELSO).







**QUESTIONS/NOTES:**

Ruled lines for taking notes.



# YOUR ECMO CARE TEAM

## THANK YOU FOR CHOOSING OUR BAPTIST HEALTH CARE TEAM FOR YOUR CARE.

It has been our honor to serve you. The team listed below participated in your care:

_____/_____/_____	/	/
Your Critical Care/Pulmonary Physicians		
_____/_____/_____	/	/
Your Cardiothoracic Surgeons		
_____/_____/_____	/	/
Your Interventional Cardiologists		
_____/_____/_____	/	/
Your Perfusionists		
_____/_____/_____	/	/
Your R.N. ECMO Specialists		
_____/_____/_____	/	/
Your Physician Assistants		
_____/_____/_____	/	/
Your Nurse Practitioners		
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Your Cardiovascular Operating Room team		
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Your Cardiac Catheterization Laboratory team		
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Your Bedside Nurses		
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Your Respiratory Therapists		
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Your Pharmacists		
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Your Physical Therapists		
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Your Dietary-Clinical Nutritionists		
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Your Cardiovascular Patient Education-Transitional Care Nurses		
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Your Case Management and Social Workers		
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Your Chaplaincy Services		



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