ONE MANY GIFTS

RESOURCE GUIDE FOR TEACHERS

One Life…Many Gifts is a curriculum resource to educate senior secondary school students about the vital importance of organ and tissue donation and transplantation. It brings to life the drama, generosity and the life-saving promise of donation and transplantation.

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GLOSSARY

Anonymous donation
A living donor donates a kidney or part of a liver to someone the donor does not know. This is also referred to as a 'Good Samaritan' donor.

Antibody
A type of protein produced by the body in response to exposure to foreign 'invaders,' including a transplanted organ.

Antigen
A molecule that stimulates the immune system to produce antibodies and white blood cells.

Anti-rejection drugs
Medications that suppress a person's immune response so he or she is less likely to reject a transplanted organ. Also referred to as 'immunosuppressive drugs.'

Artery
Blood vessels that transport blood from the heart to the organs and tissues of the body.

Autoimmune hepatitis
The body's immune system reacts against its own liver cells, resulting in inflammation, scarring and eventually liver failure.

Biopsy
A medical procedure in which a small sample of tissue is taken so that it can be examined under a microscope. For transplants, it is performed to monitor the health of the organ. For a heart transplant biopsy, a catheter is inserted through a main blood vessel, down inside the heart. Tiny pieces of heart muscle are retrieved. By examining the cells, it can be determined if the transplanted organ is being rejected.

Blood group
A specific type of red blood cells that everyone has (for example, blood type A, B, O, or AB).

Brain death
The complete and irreversible loss of all brain function. There is no chance of regaining consciousness. This is also called 'neurological death.'

Cardiologist
A physician who specializes in the treatment of heart disease.

Catheter
A hollow tube that can be inserted into the body to drain fluid or, when put in a blood vessel, to administer fluid to the body. A catheter may be used during a biopsy.

CAT scan
A special X-ray that can produce a three-dimensional computer model of a patient's internal organs.

Cirrhosis
A condition that is characterized by extensive scarring of the liver. Scar tissue forms because of injury or long-term disease, and ultimately the liver fails to function normally.

Coma
A profound state of unconsciousness. A comatose patient cannot be awakened, fails to respond normally to pain and does not make voluntary actions. Coma may result from a variety of conditions (e.g., drug overdose, head injury, seizure), and some people can come out of a coma and regain consciousness, depending on the cause.

Creatinine
A waste product of muscle metabolism that is measurable in the blood. Normally it is removed by the kidney. When kidney function becomes abnormal, the level of creatinine goes up.

Cross matching
A blood test that mixes white cells and serum of two individuals to determine if they react against one another. It determines compatibility between a donor and recipient. If the donor's cells are attacked and killed, this is a positive cross match, meaning the donor and recipient are not compatible. A negative cross match means that the transplant can proceed.

Cyclosporine
A specific anti-rejection medication that is used in organ recipients.

Deceased donor
A person who has donated organs and/or tissues after death.

Dialysis
A method of treating patients who have kidney failure to clean the blood and remove waste and excess water from the body. There are two types of dialysis: hemodialysis and peritoneal dialysis. During hemodialysis (usually done at a hospital, 3 times a week), the patient's blood is passed through an artificial kidney machine. With peritoneal dialysis, fluid is exchanged in the abdominal cavity using a catheter (usually done at home during the day or through the night).

Directed donation
A donor or donor family designates the recipient who will receive the donated organ. This is not practised in Canada with deceased donation. Living donors, however, generally are donating to a specific person, such as a relative or close friend.

Donation after Cardiac Death (DCD)
After a decision has been made to withdraw life support from a person with a hopeless condition, the option to donate after death is discussed with the family. If consent is given, organs are removed after the heart stops beating (after cardiac death).

Dry run
A patient may be called and told to come to the transplant centre because a suitable organ has been located for them. Sometimes, just before the surgery, it is determined that the organ is not suitable, the surgery is cancelled and the patient returns home to wait for another call.

Ecstasy
This is a non-prescribed drug that is used to induce a state of trance-like elation. It is now known to cause acute liver failure, which may result in the need for a liver transplant.

Edema
Swelling of the body tissues (usually ankles and legs) as a result of retention of water.

End-stage disease
When organ function (kidney, heart, liver, lungs and so on) fails.

Heart valves
Within the heart, there are four valves that direct the flow of blood within the chambers of the heart. Donated valves are used to replace damaged or diseased valves.

Hepatitis C
A disease of the liver caused by the hepatitis C virus.

Hepatologist
A doctor who specializes in the treatment of liver disease.

Hormone
Chemical messengers that are secreted into the bloodstream to regulate body functions such as blood pressure and control of blood sugar (insulin).

Hypertrophic cardiomyopathy
A medical condition in which the heart muscle thickens, the inner chamber becomes smaller and the heart is unable to pump as much blood as the body needs.

Immune system
A sophisticated defence system that protects the body from 'foreign invaders,' such as viruses and bacteria. Transplanted organs are also recognized as foreign, and the immune system is mobilized to attack or reject the new organ.

Immune-suppressed
A patient's immune system is dampened or suppressed, usually by the administration of anti-rejection drugs.

Immunosuppressive drugs
Drugs that can suppress the immune system so that rejection is less likely to occur. Also referred to as 'anti-rejection drugs.'

Insulin
A hormone produced by the pancreas to regulate the level of glucose (sugar) in the blood. When the pancreas is unable to make insulin, Type 1 diabetes develops.

Islet cells
Specialized cells in the pancreas that produce insulin.

Jaundice
A yellowish discolouration of the eyes, skin and tissues of the body (a sign of liver failure).

Living donor
A person who donates a kidney or a portion of the liver to someone in need, usually a relative or close friend.

Multi-organ transplant
The simultaneous replacement of multiple organs, for example, liver, bowel and pancreas.

Nasogastric tube
This is also called a 'feeding tube.' It is placed in the patient's nose and down into the stomach to provide extra calories and nutrition.

Nephrologist
A doctor specializing in the treatment of kidney disease.

Neurological death
The complete and irreversible loss of all brain function. Also called 'brain death.' There is no chance of regaining consciousness.

Organ donation rate
For comparative purposes, this is the rate at which the general population donates organs based on per million population. The more people who donate, the higher the donation rate.

Pacemaker
An electrical device that is inserted into the heart to stimulate it to beat regularly.

Presumed consent
This system presumes that a person wants to donate organs following death, unless that person had specifically made his or her objection known before dying. This is also called an 'opt-out' system because the onus is on the individual to declare that they do not wish to donate.

Red blood cells
Cells in the blood that carry oxygen to the body's tissues.

Rejection
A process in which the body's immune system recognizes that a transplanted organ is not one of its own, and produces antibodies and white blood cells that attack and injure (even destroy) the organ.

Retinopathy
An eye disease that causes blindness, and it can be a long-term consequence of diabetes.

SARS
(Severe Acute Respiratory Syndrome)
A lung infection caused by a virus. There was an international outbreak of SARS between November 2002 and July 2003.

Self-induced organ failure
A term to describe an injury to an organ caused by the personal lifestyle behaviour of an individual, e.g., liver failure from excessive alcohol consumption.

Split-liver transplant
A liver is divided into two parts, and each segment is then transplanted into a recipient so that one donated organ can save two lives.

Stem cells
These are primitive cells of the body that can transform into many different mature cell types.

Tissue typing
A blood test that determines the similarity or dissimilarity of specific proteins between a donor and a potential recipient. The proteins, called antigens, are important in initiating a rejection response.

Total parenteral nutrition (TPN)
The administration of high-calorie food intravenously to a person when the digestive system is unable to absorb nutrients.

Trillium Gift of Life Network Act
Legislation in Ontario that governs the donation of a person's body, organs or tissues for transplantation, medical education or scientific research.

Type 1 Diabetes
The pancreas stops producing insulin and a person needs to take insulin by injection to control his or her blood sugar.

Type 2 Diabetes
The pancreas makes insulin, but the body does not use it effectively. Also referred to as 'insulin resistance.'

Vein
Blood vessels that return blood to the heart.

Ventilator
A machine that artificially inflates the lungs of a person who is unable to breathe on his or her own.

Ventricular assist device (VAD)
A mechanical device that is inserted into a patient to take over the pumping action of the failing heart. The VAD can act as a 'bridge' to transplant, supporting the diseased heart until a donated organ becomes available.

White blood cells
These are cells in the blood that fight infection, and are involved in the process of organ rejection.

Xenotransplantation
The transplantation of an organ or tissue between different species, for example, pig to human.

APPENDICES

A. ORGAN AND TISSUE DONATION FREQUENTLY ASKED QUESTIONS

1. Where can I get registration info or more information about organ and tissue donation?

You can register your intentions through OHIP's donor registry. "Organ and Tissue Donor Registration Forms" are available at local OHIP offices and at www.giftoflife.on.ca

2. Why should I donate my organs and tissue? *Your decision to donate could save a life. There is a chronic shortage of organs and tissue in Ontario and the need for organs and tissue continues to outweigh their availability. Almost 1,700 Ontarians are waiting for an organ transplant and many others are waiting for a tissue transplant. One person dies every three days waiting for a life-saving organ transplant in Ontario.*

3. What organs and tissue can be donated? *Organs and tissue that can be donated include the heart, liver, kidneys, pancreas, lungs, small bowel, corneas, heart valves, bone and skin.*

4. Do transplants really work? *Transplants not only save lives; they also recapture productive lives. Outcomes continue to improve each year, so more and more transplant patients are living enhanced, productive lives.*

5. How do I express my wishes to become an organ and tissue donor? *You can register through OHIP, but be sure to talk to your loved ones. It's critical to share your decision with your family, as they will be asked for final consent to donate your organs after your death. Discuss your intentions with them.*

6. Can anyone donate? *Everyone is a potential organ and tissue donor. Age is less important than the health of the organs and tissue. The oldest Canadian organ donor to date was over 90 years of age while the oldest tissue donor was 102. Ultimately, the ability to become an organ and tissue donor depends on several factors, including the health of the organs and tissue at the time of death.*

It is important to keep in mind that the vast majority of organ donors have suffered brain death, or "neurological death." However, brain death only occurs in approximately 1.5–2% of all in-hospital deaths. With approximately 30,000 in-hospital deaths in Ontario each year, this equals a potential donor pool of about 450–600 individuals per year.

Subtract from that the number of people who are deemed medically unsuitable. Subtract from this number the number of families who decline to consent to donation, and we have an even smaller number of potential donors. Given how rare it is to be considered an organ donor, it is extremely important that people talk with their families about their desire to be an organ donor.

7. If I have cancer or another serious illness, can I still be an organ and tissue donor? *Even an individual with a serious illness can sometimes be an organ or tissue donor. For example, in the case of cancer, it would depend on the type of cancer and how long ago the person was treated. If you have a concern, talk it over with your doctor. Ultimately, the ability to become an organ and tissue donor depends on several factors, including the health of the organs and tissue at the time of death.*

8. Is donation confidential? *Yes. No one will know about your "gift of life" unless your family tells them.*

9. What if donation conflicts with my religious beliefs? *Most major religions support organ and tissue donation as an honoured and compassionate expression of generosity and love. If your religion restricts the use of a body after death, consult your faith leader. Restrictions may not apply if the donation could save another's life.*

10. If I have indicated my decision for organ donation, will everything be done to save my life? *The first and foremost concern for health-care professionals caring for critically ill patients is to do everything possible to save lives. The possibility of donation is considered only when all life-saving efforts have failed and brain death is declared.*

11. When does organ and tissue donation become an option? *Living organ donation may be an option for a healthy adult who has a family member or close friend in need of a kidney or liver transplant. With living donation, a kidney or portion of the liver is removed from the donor and transplanted into the patient in need of a new organ. On a few occasions, living donors have also donated part of their lung or small bowel.*
Deceased organ donation can take place when someone has been declared brain dead and a doctor has determined the organs can be used for transplant. This type of donation is referred to as donation after brain death.

Another option is donation after cardiac death (DCD). DCD offers families the option to donate when brain death criteria have not been met, and the decision to withdraw life-sustaining treatment has been made. DCD patients have no hope of recovering, and they will die within minutes or hours after being disconnected from life support.

Once their heart stops beating, they are taken to the operating room for organ donation.

Tissue donation can take place in most cases when someone has died, as long as the tissue is determined suitable for transplant by a doctor. With tissue donation, there is no need for blood flow to be maintained by artificial ventilation after death.

12. What if I change my mind? *If you change your mind, let your family know of your decision. If you registered with OHIP, contact them about your change of decision.*

13. What is "whole body donation"? *If you cannot or do not wish to donate organs, you may want to support teaching and research activities at a medical school by considering whole body donation, an important gift to the training of professionals in health-related disciplines. For more information about whole body donation, please call the anatomy school of your choice or the Office of the Chief Coroner at 1-877-991-9959.*

14. Can I donate my organs and tissue, and then give my body to medical science? *If you give your body to medical science, your organs and tissue will not be available for transplantation. Similarly, if you donate organs or tissue, you cannot donate your body to science.*

15. Does organ and tissue donation affect funeral services? Can I have an open casket? *Recovery of donated organs and tissue is carried out with surgical skill, respect, and dignity, and does not change the appearance of the body. It does not interfere with funeral practices and no one will know about your gift of life unless your family tells them.*

16. What happens after the organs and tissue are removed? *The body is released to the family or funeral home. Every effort is made to schedule the recovery of organs and tissue in a timely fashion. There may be a 24-36 hour delay due to the required surgery.*

17. Does the donor's family have to pay for the cost of organ donation? *No. The donor's family neither pays for nor receives payment for organ and tissue donation. All costs related to donation are paid for by the organ procurement program or transplant centre. Only the funeral expenses remain the responsibility of the donor's family.*

18. Can I choose which organs and tissue I want to donate? *You may indicate your decision to donate all organs and tissue or only specified organs and tissue.*

19. Can I designate the recipient of my organs or tissue? *Donated organs and tissue are given to individual recipients based on need, blood type, genetic match and other criteria. "Directed donation," as it is known, is not practised in Canada. Only through living donation can the recipient be designated. Living donation may be an option for kidney, liver or lung transplants. If you are interested in being considered as a living donor, discuss this with your doctor.*

20. Who will receive my organs and tissue? Will they stay in Ontario or Canada? *The hospital will contact Trillium Gift of Life Network (TGLN), which keeps a list of everyone in Ontario who is waiting for an organ transplant. TGLN will match the tissue and blood type of the donor to an individual(s) on the waiting list. If a match is found, the individual(s) who for medical reasons most needs a transplant will receive the donated organs. If the medical urgency is the same, the individual on the waiting list the longest will receive the organ. If there is no suitable match, a cross-reference is made across Canada and possibly in the United States if need be.*

21. I already signed my donor card or registered in another Canadian province. Do I have to sign up again in Ontario? *Organ and tissue donation is a provincial program, so you should sign up again when you move. But the most important thing to do is talk to your family and loved ones about your wishes so that they can understand and respect them in the future.*

22. Can my family override my wishes and if so, why? *When you register through OHIP, you give doctors permission to recover your organs and tissue upon death. This does not mean that the doctors must recover your organs. Out of respect for the wishes of grieving families, hospital staff will talk with the next of kin about their feelings regarding donation and what their loved one would have wanted. That is why it is important that you talk with your family and loved ones about your wishes and your decision to give the gift of life.*

B. MYTHS AND MISPERCEPTIONS – ORGAN AND TISSUE DONATION QUIZ

Please complete this 20-item True or False quiz, which will capture any misperceptions you may have about organ and tissue donation and transplantation. When you have finished, score the test. Each item is worth one point for a total of 20. Multiply by five, and you will have a final grade. Take the test home to your parents or to other adults living with you. Ask them to take the test too. Who turned out to be more knowledgeable, you or the adults?

1)
If you register your consent with ohip, you can be certain that your organs and tissues will assist a person who needs your gift in the event of your death.

TRUE **FALSE**

2)
If you have registerd consent and are hospitalized, doctors may not help you as much as they could because they want to have access to your organs for very ill patients.

TRUE **FALSE**

3)
Only people who are younger than 65 can be organ and tissue donors.

TRUE **FALSE**

4)
Most religions support organ and tissue donation after death.

TRUE **FALSE**

5)
With modern technology, all of our organs and tissues can now be retrieved and transplanted in patients who need them.

TRUE **FALSE**

6)
In Canada, you can receive financial remuneration as a *thank you* for your gift of an organ.

TRUE **FALSE**

7)
At any one time, only one organ can be transplanted into a patient.

TRUE **FALSE**

8)
In order to consent to being an organ and tissue donor, you must be 16.

TRUE **FALSE**

9)
If you have been drunk more than a few times, or if you have smoked marijuana, taken ecstasy, or used one of the hard drugs, you cannot be an organ donor.

TRUE **FALSE**

10)
Canada does not allow transplantation with living donors; all transplants must be undertaken with deceased donors.

TRUE **FALSE**

11)
The oldest Canadian organ donor was over 90; the oldest tissue donor was over 100 years old.

TRUE **FALSE**

12)
Members of my family can refuse to donate my organs, even if I have registerd with ohip that I want to be a donor.

TRUE **FALSE**

13)
I can donate my body to medical science or I can donate my organs and tissue; I cannot do both.

TRUE **FALSE**

14)
The organ donor has to arrange with his or her family to pay for the costs of retrieving organs after his or her death.

TRUE **FALSE**

15)
If I register to be an organ donor after I die, I can specify which person receives my organs.

TRUE **FALSE**

16)
If I decide to become a donor, I will not be able to have an open casket for my funeral service.

TRUE **FALSE**

17)
Almost 1,700 people in Ontario and more than 4,000 people in Canada are waiting for an organ transplant.

TRUE **FALSE**

18)
When I make a decision to become an organ donor, there is no opportunity to change my mind later in my life.

TRUE **FALSE**

19)
Of all the Canadians who die each year, only a very small percentage can be considered as potential organ donors.

TRUE **FALSE**

You are now ready to check your answers, and tally up your score.

MYTHS AND MISPERCEPTIONS – ORGAN AND TISSUE DONATION QUIZ ANSWERS

1) FALSE

When you sign a donor card, you give doctors permission to recover your organs and tissue upon death. This does not mean that the doctors *must* recover your organs. Out of respect for the feelings of grieving families, Trillium Gift of Life Network or hospital staff will talk with the next of kin about their feelings regarding donation and what their loved one would have wanted. That is why it is important that you talk with your family and loved ones about your wishes and your decision to give the gift of life.

2) FALSE

It is a very common fear among potential donors that you may find yourself lying in a hospital bed, with doctors hovering outside the hospital room – waiting for you to die so that they can retrieve your organs. This situation never happens. Your doctors' responsibilities rest with you exclusively. They will be doing their absolute best to save your life. It is only when all life-saving efforts have failed, and death is declared, that the possibility of organ donation is considered.

3) FALSE

Everyone is a potential donor; age does not exclude you from becoming an organ or tissue donor. The health of your organs and tissue at the time of death is the most significant factor in making a judgement about your candidacy as a donor.

4) TRUE

Culture and religion play a significant role in end-of-life experiences, including how people respond to illness, how grief is demonstrated, what rituals are important at the time of death and which members of the family are present.

Most major religions support organ and tissue donation as an honoured and compassionate expression of generosity and love. Beliefs about tissue donation vary as some groups may consider tissue donation life enhancing, and distinguish it from organ donation, which is more often life-saving. Please review the section on Religious Perspectives for a detailed list of faith perspectives on the issue.

5) FALSE

Modern technology has not yet reached the stage where all organs and tissue can be retrieved from our bodies. As of 2008, only the following organs can be used for transplantation – the heart, kidneys, liver, lungs, pancreas and small bowel. The following tissues can be transplanted – bone, cornea, heart valves, islet cells and skin.

6) FALSE

Canada has universal health care. That means that you will never receive a bill for any medical expenses that are covered by OHIP. A transplant, if you need one, will be given to you without cost. There is legislation in place that prohibits you from buying or selling any organ or tissue. No money can change hands: organ donation is a *gift* of life. If you are a living donor (i.e., you donate a kidney or part of your liver to another person in need), you may be entitled to a reimbursement up to a maximum amount of $5,500 for reasonable out-of-pocket expenses associated with the donation.

7) FALSE

Usually, a person receives only one organ. In special circumstances, two, three or even four organs are required for a patient to live. Multiple-organ transplants are rare and extremely complicated, but they are possible.

8) TRUE

In order to legally sign a donor card or register your donation wishes through OHIP, you must be 16 years of age.

9) FALSE

All deceased patients are *considered* potential organ donors regardless of their past alcohol or drug use. Families are asked to complete a medical/social questionnaire about their loved one to assess whether past behaviour may have had an impact on the health of the organs. The transplant team will assess the health of the organs for medical suitability as well as the results of the medical/social questionnaire prior to accepting any organs.

10) FALSE

Many hospitals in Canada that perform kidney transplants have living donor programs. A living donor is typically someone who is a family relative or who is 'emotionally related' to the recipient and who satisfies various matching criteria – such as blood type. Living donors can donate one kidney, leaving them with one healthy kidney. Living donors can also donate a piece of their liver to someone in need.

11) FALSE

There are several different ways you can secure a donor card. You can call Trillium Gift of Life Network (TGLN) in Toronto. There is a local and a toll-free provincial phone number: (416) 363-4001 or 1-800- 263-2833. TGLN will send you a donor card. You can also download a donor card from the TGLN website at www.giftoflife.on.ca

A donor card is also sent to you in the mail when you are sent a notification of your driver's licence renewal. You can also register at any OHIP office, when you are renewing your health card.

12) TRUE
Organ and tissue donors can be senior citizens. What matters is the health of the organs and tissues, not a person's chronological age.

13) TRUE
However, it is extremely rare that a family will override a donor's wishes. It is more common to have a situation in which family members *do not know* what a loved one would have wanted, and they are reluctant to take an action without explicit authorization. It is possible, however, to contradict a person's final wishes, which is why it is so critical that discussions about donation take place within the family so that everyone is clear about what should be done in the event of an unexpected death.

14) TRUE
Yes, you have to make a choice; you can donate your organs and tissues to assist people who are waiting for an organ or tissue. If you make that decision, you cannot also donate your body to medical science for research. A whole body donation is an important gift to the training of professionals in health-related disciplines. You can call the Office of the Chief Coroner for additional information: 1-877-991-9959.

15) FALSE
There is no cost to your family or your estate for any procedures required in the preparation of your body for organ retrieval.

16) FALSE
Donated organs from deceased donors are allocated through a central registry managed by Trillium Gift of Life Network where all potential recipients are listed. Match checks are conducted to determine who is suitable, based on blood type, size of organ and other genetic considerations. Organs are generally allocated to the sickest patient who is a compatible match and has been waiting the longest. In Canada, *directed donation* (where a donor, prior to death, or the donor family specifies a particular recipient to receive an organ) is illegal.

It should be noted that living donation is allowed for kidney, liver and lung transplants and the living donor is typically emotionally related to the recipient and it is directed in this way.

17) FALSE
Even if you choose to be a donor, you can still have a funeral with an open casket. Recovery of donated organs and tissue is undertaken with surgical skill, respect and dignity. The procedure does not change the appearance of the body and no one will know about your gift of life unless your family shares that information with visitors.

18) TRUE
Unfortunately, the numbers of waiting patients are very high, and becoming even more critical with each passing month. It is heartbreaking for families and for surgeons to know that an operation could save a life, but there are no available organs to make that possible. The patient dies, waiting. Yes, almost 1,700 people in Ontario are waiting for an organ, and more than 4,000 are sitting on waiting lists across Canada. In Ontario, one person dies every three days waiting for a life-saving transplant.

19) FALSE
There is no obligation placed on you to continue with your decision to give the *gift of life*. You can change your mind; just let your family know about your changed wishes.

20) TRUE
Only people who die in a hospital on a ventilator can become organ donors. This is necessary so that the organs are in the best possible condition and the transplant is more likely to succeed. And only 1.5–2% of people who die in hospitals die in this way. This results in only approximately 450–600 people in Ontario each year who are even considered to be potential donors. If someone dies at home or in the community, tissues (for example, eyes) can be donated, but not organs.

That is the end of the quiz. Tally up the points that you scored. Quiz your family and friends and remember to share your donation wishes with your family to make sure your wishes are known and respected.

C. ADDITIONAL INFORMATION FOR TEACHERS ABOUT LIVER TRANSPLANTATION: JANET, CHRIS AND ANGELA

CAUSES OF LIVER DISEASE AND THE ROLE OF LIFESTYLE CHOICES:

The liver, which is the largest organ in the body, performs many important functions. It is responsible for normal blood clotting, changing food into energy for growth and activity, metabolizing drugs and chemicals to purify the blood, producing bile to aid the digestion of fat and vitamins, and balancing the levels of proteins and hormones in the body. Liver failure means the liver is no longer capable of performing these functions.

There are many causes of liver failure, and here the most common are discussed.

Viral causes: Worldwide, **hepatitis (B and C)** is the most common cause of liver failure. The hepatitis C virus may be transmitted through transfusions that use contaminated blood (**as in Angela's situation**) or through intravenous drug abuse that uses contaminated needles or infected needles used for tattoos.

Alcohol and other toxins: When most people hear about someone with liver disease, they often think alcoholism is the cause. Certainly, alcohol excess is a common cause of liver failure in North America. However, it is important to emphasize that patients with alcoholic cirrhosis are not commonly transplanted. All transplant programs require reassurance that patients with liver disease due to alcohol will not return to alcohol consumption after the transplant. Most programs require a six- to twelve-month period of abstinence from alcohol and the participation in an alcohol rehabilitation program. As a result, only a very small percentage of patients with alcohol-induced cirrhosis actually receive liver transplants. A number of other substances are toxic to the liver, including certain drugs such as ecstasy. Even when taken in small amounts, these substances can lead to severe liver damage (**as happened with Chris**).

Autoimmune/inherited causes: A third important category of liver failure includes autoimmune-type liver diseases, such as primary sclerosing cholangitis, primary biliary cirrhosis, and autoimmune hepatitis. "Autoimmune" implies that the body's own immune system has turned against the liver. Not much is known about why the body would suddenly turn against its own organ, which is **what happened in Janet's case**. Over the years, the constant damage to the liver by the immune system leads to cirrhosis and liver failure in much the same way that viruses and toxins cause the liver to fail. The liver may also be damaged by inherited diseases, such as hemochromatosis.

Lifestyle choices can play a significant role in acquiring certain liver diseases. For instance, hepatitis B and C can be transmitted via shared needles used for intravenous drug abuse. Tattoos also run the risk of transmitting hepatitis if sterile needles are not used. Alcohol excess damages the liver. Sometimes, transplantation can be avoided if lifestyle changes are made. For example, abstaining from alcohol may prevent further progression of liver cirrhosis. Avoiding tattoos and IV drug abuse reduces the possibility of acquiring the hepatitis C virus and the potential need for a liver transplant.

THE SUCCESS OF LIVER TRANSPLANTATION:

Since the 1980s, results with liver transplantation have steadily improved. **One-year survival rates of 85–90 percent are expected. Many liver recipients are doing very well 20 years after their transplant.** For most recipients, their quality of life returns to the level it was prior to their illness. They are able to return to their jobs and generally lead very normal lives. A number of factors affect the success rate of liver transplantation. An important one is the patient's health at the time of transplant. Patients who are in a coma from their liver disease and require urgent liver transplantation have a one-year survival rate less than 50 percent. On the other hand, patients who are healthy enough to live at home without requiring hospitalization fare much better.

THE WAITING PERIOD:

Waiting time can vary from a few hours to several years. The length of waiting time depends on how critically ill a patient is, the blood type, and the patient's size. When a donated kidney becomes available for transplantation, it is allocated to the recipient who has waited the longest and is also blood and tissue compatible with the donor.

Blood matching is essential and many patients on dialysis machines have become sensitized to many potential donors because of blood transfusions they have received over the years. As a result, they may have antibodies in their system that would quickly attack the transplanted kidney. The possibility of that happening is excluded by "cross matching" the recipient's blood with a sample from the donor. In addition, the closer the tissue match between donor and recipient, the less chance there is of rejection. **Tissue matching is more important for the kidney than other organs.** For other organs, size matching is very important. It would be impossible for the heart of a two-year-old donor to be transplanted into a 35-year-old, 70 kg. recipient and expect it to support the circulation of the much larger recipient. Similarly, the lungs from an adult of average size could not be transplanted into a five-year-old child because the chest cavity simply would not be large enough. **So for certain organs, some size matching between donor and recipient is important in determining how the organs are allocated.**

Unfortunately, patients in serious heart failure and liver failure cannot be supported over months and years by dialysis machines as patients with kidney failure can while they are awaiting transplantation. Therefore, the priority on the waiting list for organs (such as the heart and liver) will be largely dictated by how sick the potential recipients are on the waiting list, in addition to time waiting and blood group compatibility with the donor. **The overall objective, however, is to transplant the patients who are the sickest and who have been waiting the longest.**

DECEASED AND LIVING DONORS:

Almost any individual is a potential liver donor after death, but medical tests will determine if organs can be used. There are no age limitations as the health of the organ is more important than the person's age. However, when someone dies at home or in the community, he or she cannot donate organs although tissues can still be donated. Also, if a person has a pre-existing disease, the liver might not function properly or a disease could be transmitted to the recipient. **Sometimes living donors can donate a portion of their liver.** For example, a parent can donate part of his or her liver to a child. In this situation, the donor must be willing and medically fit with a liver segment that is the right size for the child. A living donor can donate the larger right half of his or her liver to a suitably sized adult recipient. It is very major surgery for the donor.

TREATING PATIENTS WITH LIFESTYLE-INDUCED ILLNESS:

When the question of giving a liver transplant to someone who has abused alcohol is posed to the general public, the answer is often "no." Alcoholism is looked down upon by our society. If the first question seemed straightforward, to put a slightly different perspective on things, one could ask, "Should we give heart or lung transplants to people who have smoked cigarettes?" Or even, "Should we give transplants to people who do not exercise enough?" What about performing other types of surgeries on patients who have made these lifestyle choices? For example, should coronary artery bypass be performed in patients who overeat? We can't imagine that a drunk driver would be denied emergency surgery to remove a ruptured spleen following a motor vehicle accident. **What determines how far we should go in treating patients with lifestyle-induced illnesses? Does the cost matter? There is no right or wrong answer to these questions. Clearly, society is expending resources every day on people who make lifestyle choices that put their health at risk.**

THE DECISION-MAKING PROCESS:

Important decisions such as these are made at two levels. First, decisions are made as to which patients are accepted on the waiting list. Second, with each liver that becomes available, a decision must be made as to which candidate will receive it.

When patients with end-stage liver disease are referred by their local physicians to a transplant centre for assessment, a multi-disciplinary process begins. Over the course of about a week (much shorter if the patient is critically ill), the patient undergoes multiple blood tests, x-rays and other investigations. **The patient is independently assessed by all members of the**

transplant team, including surgeons, liver specialists, an anaesthetist, a transplant coordinator, a social worker and often a psychologist. The goal of the assessment is to **answer three key questions: First,** is the patient sick enough to need a transplant? **Second,** is there a medical reason, such as cancer, that transplantation should not be performed? The answers to the first two questions are often straightforward based on medical test results. The **third** question, however, is not as easy to answer: Does the patient possess the internal motivation and external support that are required after transplantation? **If we're dealing with the problem of supply and demand with available organs, we will certainly want the "investments" to do well.**

In answering the third question, lifestyle factors are often considered. We would certainly want to avoid giving a liver to someone who will abuse alcohol once again or who will return to intravenous drug abuse. Thus, in cases such as with Chris, all members of the transplant team need to gauge for themselves how likely the lifestyle choice of illicit drug use will remain a problem. This is very often not a simple "yes" or "no" answer, and team members may have differing opinions.

When the liver becomes available, the waiting list is reviewed by the transplant coordinator and a surgeon. **The most critically ill patients get first consideration.** Next, if there are no critically ill patients who will die within 24 hours, a recipient with the same blood type as the donor should be selected if at all possible. Another important consideration is that the donor and recipient be approximately the same size. Finally, all these factors being equal, the patient who has waited the longest has priority. **Given that lifestyle factors, compliance and support systems have been discussed before patients are listed for transplant, these factors do not require consideration at this time.**

NOT ENOUGH ORGANS FOR ALL PATIENTS:

If the liver is failing, whether from viral, toxic or autoimmune/genetic causes, and it is the only organ failing, replacing it with a healthy one is a means of treating the disease. Of course, it is important to emphasize that some types of liver failure are best treated with medications rather than a transplant.

The crucial point is that ***there are not enough organs available to treat all patients dying of liver failure.*** In an ideal world, with an unlimited supply of donated livers, it might be possible to treat all severe liver disease with a transplant. At the current time, **about 20 percent of patients on the waiting list will die before an organ becomes available.** For this reason, careful consideration goes into who is selected for the waiting list, and who receives priority when an organ becomes available. In Canada, the supply of organs from deceased donors remains constant at approximately 350 to 400 each year, yet the waiting list increases progressively. This problem is only becoming worse with time.

ASSESSMENT TOOLS

PORTFOLIO ASSESSMENT

Portfolio

The Portfolio will be used for students to track the work that they do in this unit. The content of the Portfolio will vary depending on the activities that students have chosen to do, but all students will have their completed surveys, their final journal reflection, and the process work and final products for their individual and group "Over to You" activities in it.

Through their Portfolios, students reflect on their growth in knowledge and understanding of the ideas and issues involved in transplantation and donation; students also develop their capacity for self-assessment. Portfolios promote metacognition and provide clear evidence of student progress.

The Portfolio will include:

1) The students' completed surveys (pre and post)
2) The process work and final products for their individual and group "Over to You" activities.
3) The Reflection on My Learning (metacognitive activity)
4) A final journal reflection where students will comment on:
   - What they learned from their study
   - What steps they will take regarding your own decisions on donation and talking to their families, and
   - Anything else they wish to comment on about organ and tissue transplantation and donation.
   - Any suggestions they have to convince people to consider organ/tissue donation
   - What they found most engaging about the curriculum,
   - What they would add to this curriculum or what they would change about it
5) A "Continue, Start and Stop" analysis of the curriculum content and activities which students will complete to capture their suggestions for improvement of the resource materials.

The Portfolio can be used both to informally assess the work the students have done and to provide a basis for the final summative evaluation of the journal reflection. The content of the pieces included in the portfolio will vary depending on the selections that students have chosen to work on and the activities that they have chosen to do.

The portfolio is intended to be a record of students' growing awareness of the life-saving importance of organ/tissue transplantation and donation. Students can use these notes on the topics of transplantation and organ/tissue donation when they discuss their wishes with their families and the broader community.

REFLECTION ON MY LEARNING

Name: _____ Date: _____

In the spaces below, comment on what you have learned and what decisions you have made as a result of working with the One Life...Many Gifts *curriculum.*

1) My knowledge about organ/tissue donation and transplantation:

I learned

_____

_____

_____

_____

I decided

_____

_____

_____

_____

2) In thinking about my role as a group member

I learned

_____

_____

_____

_____

I decided

_____

_____

_____

_____

3) I learned that I need to talk to my family about

_____

_____

_____

_____

4) I got the following answers to questions that I had about transplantation and donation:

_____

_____

_____

_____

5) Other thoughts:

_____

_____

JOURNAL REFLECTION

Name: _____ Date: _____

In this final journal reflection, comment on the following:

- what you learned from your study,
- what steps you will take regarding your own decisions on donation and talking to your families, and
- anything else you wish to comment on about organ and tissue transplantation and donation.
- any suggestions you have about how to convince people to consider organ/tissue donation
- what you find most engaging about the curriculum,
- what you would add to this curriculum or what you would change about it.

"CONTINUE, START AND STOP"

After completing your work on the *One Life…Many Gifts* curriculum, comment on the curriculum content and the "Over to You" activities. Use the back if you need more space.

Continue:

Start:

Stop:

Additional comments or suggestions:

ANNOTATED BIBLIOGRAPHY

Balch, Phyllis A. *Prescription for Dietary Wellness*. Second Edition. New York: Penguin Group (USA), 2003.

This paperback is highly readable and very informative. Although it contains some recipes that adolescents are unlikely to use, there is very practical advice on how to prevent illness by changing the way you eat. There is a section on super foods, *as well as one chapter on the foods that present a significant threat to our personal health. Sugar, saturated fats and caffeine are all on the must-use-sparingly list.*

Bliss, Michael. *The Discovery of Insulin*. Toronto: University of Toronto Press, 2000.

In this excellent description of the discovery of insulin, Michael Bliss has produced a splendid book that reads like a novel. It is rich in detail and contains much original material that was previously unknown. The personalities of the discoverers – Banting, Macleod, Collip and Best – are as much of the story as the discovery itself. Immensely readable, it stands as the definitive account of one of the most dramatic events in the history of medicine.

Ganeri, Anita. Paper Engineer: Iain Smyth. *Alive: The Living, Breathing Human Body Book*. New York: DK Publishing, 2007.

If there is one book that you are going to read about the human body, Alive: The Living, Breathing Human Body Book *should be your very first choice. There are pop-ups, fold-outs and fibre optics. You will see all of your organs in three dimensions. In one section dedicated to the skeleton, a life-size human skull literally pops up into your face, grinning. But there is more: the cover of the text lights up, showing brain activity. The absolute best section is the one dedicated to the respiratory system. Under the ribs, and under the lungs, sits the heart. As you turn the page, you can hear the heart beating. The paper engineer for this text is given a larger credit than the author, and that is completely fair. You will see more of the digestive tract than you would ever want to examine. We all know that our body has to remove its wastes so that we are not poisoned, but this book shows you everything you would want to know – and a little more.*

Graci, Sam. *The Food Connection*. Toronto: Macmillan Canada, 2001.

The book can be read selectively; you do not need to read it from cover to cover. The chapters that are most useful are the ones in which you can assess your own health (Chapter 9), the ones that explore the power of various foods (Chapters 6, 7 and 8) and the challenge to live seven days on the world's best diet (Chapter 17). You can also examine the ten tips for living longer and healthier (Chapter 20) and – if your skin and hair are not as smooth and silky as you would like them to be – there is even a list of the bioenergetic foods that will allow you to have a radiant complexion and shiny locks.

Maté, Gabor Dr. *When The Body Says No: The Cost of Hidden Stress*. Toronto: Alfred A. Knopf Canada, 2003.

Dr. Maté's book is groundbreaking, not because he is sharing information that is not already known in the medical field, but because he is a lucid chronicler of the costs of chronic stress on the body's systems. Using snippets of stories from real people's lives, Maté outlines the impact of suppressed emotions and various physical stressors on the brain, the immune system and many of our organs. By following Maté's Seven A's of Healing, each of us can protect our health before the body says, "No! I can't go on. I am going to stop you – with a heart attack, ulcerative colitis, irritable bowel syndrome, cancer or a complete collapse from physical exhaustion." You may think that you have very little stress in your life, or you may assume that you are managing your stress by relaxing and working out. Even if you are coping well, the suggestions Dr. Maté makes are extremely helpful for times when you do feel overwhelmed by the many demands of daily living.

McMillan, Beverly. *Human Body: A Visual Guide*. Richmond Hill: Firefly Books, 2006.

The text promises that it will provide a comprehensive visual guide to the human body. Not only does the book meet its mandate, it exceeds any expectation you might have for an illustrated text. The book is clearly written in accessible language; the design of the text is aesthetically pleasing and reader-friendly. Most impressively, there are 500 full-colour photographs and illustrations. Everything you could possibly want to know about the human body, and more, is included in this relatively inexpensive hardcover book. Human Body *is the only reference book you will need, in the classroom or at home.*

Nestle, Marion. *What To Eat*. New York: North Point Press (a division of Farrar, Straus and Giroux), 2006.

If there is only one book you can afford on issues of nutrition and healthy eating, this should be your first choice. There are more than 500 pages of highly informative writing on a topic where there is often more heat than light. Everything is covered – produce, dairy, meat, fish, all the packaged, processed and snack

foods, with an entire section on beverages. Nestle writes well; it is hard to think of a quasi-textbook as a page turner, but this book meets the standard. Nestle has received the food world's highest honour, a Lifetime Achievement Award from the James Beard Foundation. She includes anecdotes and stories in the text, and makes sure that each topic does not exceed a half-dozen pages.

Krop, Jozef J. *Healing the Planet One Patient at a Time: A Primer in Environmental Medicine*. Alton: KOS Publishing Inc., 2002.

This text will have particular appeal for readers who are interested in the connection between our planet's health and our own. Dr. Krop presents very interesting information on the various chemicals in our environment, including the toxins in our homes. Particularly useful is the chapter on food and nutrition; the issues of food sensitivities, cravings, allergies and supplements are all worth your attention. As a reader, you will learn all about environmentally caused illnesses, and you will be given the information you need to get and stay healthy.

Todd, Thomas Dr. *Breathless: A Transplant Surgeon's Journal*. Renfrew: General Store Publishing House (613-432-7697) or (1-800-465-6072).

As the title suggests, this book documents a transplant surgeon's life in the operating room. If you are considering a career in the sciences or in surgery, this first-person account of a transplant surgeon's working life is great reading.

Transforming Lives, *www.legacyoflife.co.uk/thebook.html*
This resource book features dozens of stories of people whose lives have been changed irrevocably by the receipt of an organ. It also features interviews with donor families, with people who struggled with their own grief and, at the same time, thought of others who could use a precious gift of life.

Walker, Richard. *How the Incredible Human Body Works*. New York: DK Publishing, Inc., 2007.

The human body is explored in a series of six fold-out double pages. Each of the fold-outs explores one key body system. For readers who enjoy amusing anecdotes and little-known facts, this is your text. All the information is accurate; the illustrators take extra care to keep you entertained while you are reading. An excellent glossary explains words that you may have heard, but do not know the exact meaning of – like histamine, toxin, peristalsis, collagen, synovial joint, ventricle, etc.

Walker, Richard. *dkonline human body*. New York: DK Publishing, Inc., 2007.

The entire human body is explored, including the skeletal framework, all of the body's moving parts, the body's muscles, the five senses, human reproduction, digestion and absorption, our respiratory system, the brain, waste removal, chromosomes and DNA – everything you would want to know about the human body. What makes the text particularly useful is its design: the illustrations are clear and interesting. The most important feature of the text is the constantly updated web directory that allows access to the best sites for every topic related to the body. You can download more than 100 free images. This trade paperback is included in the curriculum resource package, and is also available in most bookstores.

Warnod, Veronique and Carole Emile. *How your Heart Works*. London: Cassell & Co., 2002.

Every aspect of the heart is covered: how it looks, what it does and how heart disease develops and progresses. Diseased arteries are shown and heart attacks are explored, along with the risk factors that could lead to cardiac problems. Everything you would want to know about how to look after your heart, including a section on assessing and reducing your risk of heart disease, is explored in this compact, well-written text.

Weil, Andrew. *Eating Well for Optimum Health: The Essential Guide to Food, Diet, and Nutrition*. Random House, 2000.

Almost everyone knows about Dr. Andrew Weil. He is something of a guru in the field of wellness. In this book, Weil gives both the facts about human nutrition and the reasons why food choices maximize our body's capacity to heal itself. More and more illnesses are being connected to a person's compromised immune system, a system that requires rest, exercise, and the proper fuel – the food we eat. You may or may not want to use Weil's comprehensive list of recipes, but it will be very illuminating to read the principles of eating well, and the limitations of fast foods. Weil's theory is that making modest changes in diet can help most of the common health concerns. As a teenager, you are now in an optimal position to prevent health problems in middle age. Although your 30's and 40's feel like they are light years away, the health decisions you make now impact directly on how well you will be feeling as you age. You can purchase the book as a paperback, or as an audio book – an easy listen on the subway, or in a car.

Winston, Robert. *Body: An Amazing Tour of Human Anatomy*. DK Publishing, Inc., 2005.

Winston's book claims that the human body is amazing. It is, and the graphic tour of various cells, organs and systems all confirm the complexity and the beauty of our intricately designed anatomy. No reader will be disappointed by the fantastic illustrations; an accompanying CD adds to the value of this text.

One Life…Many Gifts is a curriculum resource to educate senior secondary school students about the vital importance of organ and tissue donation and transplantation. It brings to life the drama, generosity and the life-saving promise of donation and transplantation.

Funding for this project has been provided by the provincial Ministry of Education and the Ministry of Health and Long-Term Care. This project would not have been possible without their support or the generosity of an anonymous Ontario resident whose contribution ensures that students in the province understand the life-saving promise of organ and tissue donation and transplantation. The Steering Committee sincerely thanks all of our supporters.

The development of this curriculum has been co-sponsored and coordinated by the Trillium Gift of Life Network, the Multi-Organ Transplant Program at London Health Sciences Centre and The Kidney Foundation of Canada.

Educating secondary school students and their families about the need for organ and tissue donation and the success of transplantation was originally initiated in the London region in 2000. With funding received from The Kidney Foundation of Canada, the Multi-Organ Transplant Program at London Health Sciences Centre had the vision to develop a unit of study, *One Life…Many Gifts*, working with both the Thames Valley District School Board and the London Catholic District School Board. The original program was used in Healthy Active Living Education, Grade 11, Open (PPL30) in Ontario's curriculum. The curriculum resource before you builds on the vision and foundation provided by this original program and the Steering Committee gratefully acknowledges the dedication and pioneering effort of all those involved in the original program.

This curriculum is dedicated to the many Ontarians who have given the gift of life through the donation of organs and tissue and to the many others who will in the future.

For more information on the *One Life…Many Gifts* curriculum program please contact the Director of Communications, Trillium Gift of Life Network at 1-800-263-2833 or visit: www.onelifemanygifts.ca

Medical health-care professionals from the field of organ and tissue donation and transplantation and educational advisors were involved in the development and implementation of the *One Life…Many Gifts* project.

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Ontario
Trillium Gift of Life Network
Réseau Trillium pour le don de vie

London Health Sciences Centre

The Kidney Foundation of Canada
The foundation of kidney care.

ONE LIFE... MANY GIFTS