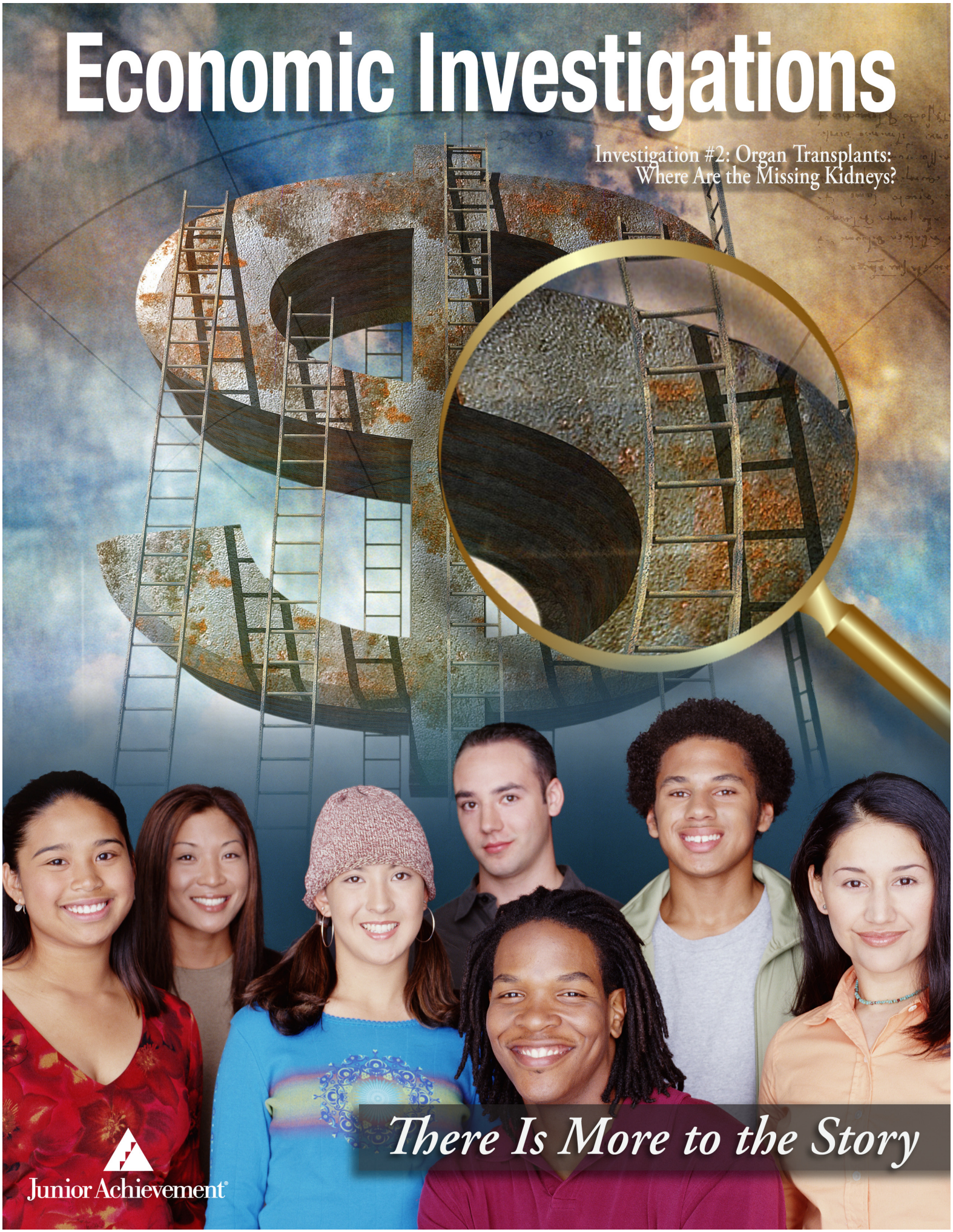
Economic Investigations

Investigation #2: Organ Transplants: Where Are the Missing Kidneys?



There Is More to the Story

Junior Achievement®

Economic Investigations: There Is More to the Story

"Economic Investigations: There Is More to the Story" was a National Science Foundation funded project, which began in September 2003. The Social Science Education Consortium (SSEC) of Boulder, Colorado, was the grantee agency. James Davis, Executive Director of the SSEC, was the project director, and Donald Wentworth, Professor Emeritus of Pacific Lutheran University, was project co-director.

The overall project goal was to help students achieve a deeper understanding of puzzling economics questions so they could explain and provide thorough, supported, and justifiable accounts of economic phenomena, facts, and data. Three objectives guided project development:

- Create a classroom laboratory orientation for the investigations similar to those students would encounter in a laboratory science course.
- Develop quantitative skills in students—more so than they would acquire in a standard high school economics course.
- Focus the investigations on intriguing economics questions to spark student and teacher interest.

The Investigations

Twelve investigations were created by teams of economics curriculum materials developers and high school economics teachers. The titles of each investigation identify its content area followed by the main question addressed in the investigation. The investigation titles are:

Microeconomic Investigations

1. Women's Wages: Do Women Earn Less Money Than Men?
2. Organ Transplants: Where Are the Missing Kidneys?
3. Minimum Wage: Does Raising the Rate Help Younger Workers?
4. Poverty: How Can a Family Be in Poverty and Not Be Poor?
5. Health Care: Who Should Pay the Cost?

Macroeconomic Investigations

6. Performance of the National Economy: How Do We Measure the Economy's Health?
7. Inflation: Are Higher Prices the Only Problem?
8. Employment and Unemployment: How Can Both Rates Rise at the Same Time?
9. Fiscal Policy: Can Congress Diagnose and Treat an Ailing Economy?
10. Monetary Policy: Can the Federal Reserve Diagnose and Treat an Ailing Economy?

International Investigations

11. African-U.S. Trade: What's in It for Africa?
12. Imports: Does American Employment Decline Because of International Trade?

Investigation and Field Test Results

The investigations were field-tested by high school teachers in the spring semesters of 2004 and 2006. Field test locations included Jefferson County Colorado; Milwaukee, Wisconsin; Sioux Falls, South Dakota; Scottsdale/Mesa, Arizona; and Plano, Texas. Based on this field test, the investigations were found to promote deeper student understanding of economic issues through the use of effective instructional methods. Students acknowledged that they learned a great deal from the investigations and teachers stated they would recommend the investigations to other teachers.

Cooperative Publishing Agreement

The Social Science Education Consortium has transferred the copyright of these investigations to JA Worldwide. JA Worldwide is making them available to teachers by posting them on the JA Worldwide website (www.ja.org) and distributing them in CD-ROM format. The investigations also will be posted on the SSEC website (www.socialscience-ed.org). Ultimately, the investigations will support the revised Junior Achievement high school program, *JA Economics.*

Authorship and Consultants

The project was fortunate to have an excellent group of authors and consultants. These individuals are listed below.

Colorado Development Team

Laura Burrow, Jefferson County Public Schools
James Davis, Social Science Education Consortium
Lewis Karstensson, University of Nevada, Las Vegas

Washington Development Team

Penny Brunken, Sioux Falls (SD) Public Schools
Donald Wentworth, Professor Emeritus, Pacific Lutheran University

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The economics consultant to the project was Norris Peterson, Professor of Economics, Pacific Lutheran University, Tacoma, Washington.

The project evaluator was William Walstad, Professor of Economics, University of Nebraska, Lincoln.

Nancy Baldrica, Excelsior, Minnesota, served in an editorial and desktop-publishing capacity on the project.

Field-Test Teachers

Below are the teachers who completed field tests during the second year of the project.

Arizona

Amy Willis, coordinator, Arizona Council of Economic Education
Dan Korzec, St. Johns High School, St. Johns, AZ
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Wisconsin

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Investigation # 2:
Organ Transplants:
Where Are the Missing Kidneys?

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Investigation #2: Organ Transplants: Where Are the Missing Kidneys?

Introduction

Shortages of Organs

Over the past 50 years, transplanting organs (such as kidneys, livers, hearts, and lungs) has become a widespread practice. Better techniques and medications have greatly improved the success rates of transplant procedures. Yet, the current policies for distributing transplantable organs have had unexpected results. For decades, the number of patients needing organ transplants has been greater than the number of organs supplied. In 2002, more than 6,000 people died waiting for organs. In 2003, there were more than 80,000 people on the organ waiting list: but by June of that year, only 12,500 transplants had been performed. The result was that many people died before a transplantable organ became available.

Student Comprehension

This investigation helps students identify the issues related to organ transplants and market shortages:

- What is the current policy regarding distribution for organ transplants?
- What are the results of the policy?
- How might an economics-based approach affect the supply of organs and save more lives?

In this investigation, students are asked to examine the supply and demand for organs. They study the incentives influencing the behavior that results in a shortage of organs. They examine how new incentives might cause shifts in supply that could result in a new market equilibrium that would save more lives.

Concepts

Supply
Demand
Market Price
Incentives

Objectives

After completing this investigation, students will be able to:

- Use economic reasoning to analyze the market for transplantable organs;
- Predict how people might respond to changes in incentives; and
- Analyze various policies to determine whether they would increase the supply of transplantable organs.

Economic Principles

All economic systems have to make decisions about how goods and services are distributed. Market systems depend on price and the laws of supply and demand to distribute goods and services. When the quantity demanded exceeds the quantity supplied for ordinary goods and services, prices are raised to induce suppliers to increase their quantity of supplies. However, some markets are more controversial than others, due largely to concerns regarding whether the public or the private sectors should be involved in producing particular goods and services. Oil-drilling leases, public-school voucher programs, and New York City apartment-rental fees are a few of the more widely debated market systems.

The market for transplantable organs is complex and emotionally charged. It has been marked by many years of shortages, which have resulted in more than 6,000 deaths per year. What can economic thinking contribute to the debate over how to improve the system and save lives? Many economists suggest that the only way to solve the problem of organ shortages is to change the incentive structure for potential donors. They maintain that allowing payments or other remuneration for organ donation would encourage more people to donate organs after death, and would, thus, save many lives.

Investigation

Description
Students are introduced to the current policies governing transplantable organs in the United States. They are asked to examine the gap between supply and demand. They analyze supply and demand diagrams illustrating legal and illegal markets for kidneys. Then they examine how reward policies could encourage families to donate the transplantable organs of deceased family members, which would result in increased supply and more saved lives.

Time Required: 60 minutes

Materials

Visual #1	A Brief History of Organ Transplants
Visual #2	The Problem: Too Few Transplantable Organs
Visual #3	Demand and Supply for Transplantable Organs, 2003
Visual #4	Current U.S. Policy for Organ Transplants
Visual #5	How the Transplant System Works
Visual #6	The Economic Approach to Improving the Supply of Transplantable Organs
Visual #7	Supply and Demand in the Kidney Market
Activity #1	The National Commission to Increase the Supply of Transplantable Organs

Procedure

1. Tell students this investigation will examine a serious problem in the United States. Explain that they will study how current policies governing the distribution of transplantable organs cost thousands of Americans' lives each year. Tell them they will use supply and demand graphs to determine how changes recommended by many economists might solve the problem.

2. Display **Visual #1 – A Brief History of Organ Transplants.** Provide a brief overview of events in the development of organ transplants.

3. Explain that the market for transplantable organs has been marked by controversy, and that an elaborate system developed to distribute transplantable organs around the nation has been marked by critical shortages. Display **Visual #2 – The Problem: Too Few Transplantable Organs,** and discuss the statistics that are presented.

4. Display **Visual #3 – Demand and Supply for Transplantable Organs, 2003,** to provide further information on the gap between demand and supply of transplantable organs.

5. Ask students why they think there is a shortage of transplantable organs.

   Answer: Accept a variety of answers. Students might note that people are unaware of the problem, that people are reluctant to admit they'll die one day, or that people are uneducated about how their organs could be useful to someone else. Stress that when chronic shortages exist, economists usually suspect that the price of the good or service is set below the market price.

6. Display **Visual #4 – Current U.S. Policy for Organ Transplants.** Stress that the current system forbids providing any "valuable consideration" to organ donors. In other words, family members cannot be compensated in any way for the donation of a deceased family member's organs. The current system depends on the altruism — unselfish actions — of families.

7. Display **Visual #5 – How the Transplant System Works**. Explain that patients who need an organ transplant are placed in a pool and may eventually be matched to an organ provided by a deceased donor.

8. Ask students why they think the federal government developed a policy that would not allow compensation for transplantable organs.

   Answer: Accept a variety of answers. Students might identify concerns that compensation for transplantable organs would provide an incentive for family members to hasten the death of an ill family member. Students might suggest that the idea of compensation for transplantable organs seems ghoulish and repulsive. They may wonder why families would want to donate their organs to strangers.

9. Point out that, while the market for transplantable organs might seem strange, we do use market price as the incentive to producers to supply nearly all the goods and services we want. We even pay people to donate blood. Ask students what might happen if we depended on altruism to motivate farmers to produce our food or for builders to produce our homes.

   Answer: Stress that if we depended on altruism to motivate producers, we would face chronic shortages in nearly every market, including markets for such necessities as food and housing.

10. Display **Visual #6 – The Economic Approach to Improving the Supply of Transplantable Organs.** Discuss the objections and the benefits of such a policy.

11. **Display Visual #7 – Supply and Demand in the Kidney Market**. Explain that this graph illustrates supply and demand in two markets for kidneys – an illegal market and a legal market. Ask the following questions:

    - Can you identify and explain the meaning of the supply curve?
      Answer: S_k is the supply curve for kidneys. It characterizes the behavior of kidney donors. The positive slope suggests that donors would be willing and able to donate more kidneys at a higher price and fewer kidneys at a lower price.

    - Can you identify and explain the meaning of the demand curve?
      Answer: D_k is the demand curve for kidneys. It characterizes the behavior of kidney recipients. The negative slope suggests kidney recipients would be willing and able to purchase more kidneys at a lower price and fewer kidneys at a higher price.

    - If we allowed a legal kidney market, where would the equilibrium or market price be according to this graph?
      Answer: The market is in equilibrium at the intersection of $S_{k \text{ and }} D_{k,}$ or at E_1. At this point of equilibrium, P_1 is the market price for a kidney and Q_1 is the quantity.

    - If we allowed a legal kidney market, what would be the quantity provided according to this graph?
      Answer: Q_1 is the quantity of kidneys exchanged (purchased and sold) in the market. The quantity of kidneys wanted by recipients is equal to the quantity of kidneys made available by donors. The model here suggests that all recipients who want and can afford to pay the price for a kidney will be able to get one.

12. Explain it is currently illegal to buy and sell kidneys in the United States. How does this look graphically? **Display Visual #7** again. Ask the following questions:

    - What is the price of kidneys on this graph when there is no legal market as it is today?

Answer: Today's policy is the equivalent to setting the price for kidneys at P_0, a zero price.

- What is the quantity supplied and demanded at P_0?
  Answer: At P_0, the market is in *disequilibrium*: The quantity of kidneys supplied by donors is $0Q_2$, while the quantity of kidneys demanded in the market is equal to the quantity Q_2Q_3.

- Are there enough kidneys to go to those needing them?
  Answer: No. There is a shortage.

13. Conclude the discussion by pointing out that the current zero-price policy makes the kidney market illegal and results in a shortage of kidneys. The same policy ensures shortages of other transplantable organs. Also, the current zero-price policy results in more deaths due to kidney failure than would be the case in a legal market.

14. Explain that the way to approach this problem is to begin to allow some forms of compensation for transplantable organs. Distribute **Activity #1 – The National Commission to Increase the Supply of Transplantable Organs.** Divide students into groups, and allow them time to discuss each of the policies. Then discuss group answers with the whole class.

Answers to Activity #1

1. Provide a tax deduction for families who donate the organs of a deceased family member.
   _X_ Increase in supply
   ___ No change in supply

2. Provide a payment to members of families who donate the organs of a deceased family member.
   _X_ Increase in supply
   ___ No change in supply

3. Create a new agency that will make transplantable organs available to citizens in certain regions of the country.
   ___ Increase in supply
   _X_ No change in supply

4. Develop new rules that will provide organs to people who are the sickest first.
   ___ Increase in supply
   _X_ No change in supply

5. Pay the donor's funeral expenses for the family.
   _X_ Increase in supply
   ___ No change in supply

Closure

Ask students to summarize the main points of the investigation on transplantable organs.

- What is the current policy regarding organ transplants?
- What are its important consequences?
- What would economists propose as a policy to change the supply of organs and save more lives?

Answers:

- The current policy regarding organ transplants depends on altruism as the motivation for donating the organs of a deceased family member.
- The current policy leads to the death of approximately 6,000 Americans per year.
- Economists suggest that a new policy should be sought that would provide some form of compensation for organ donation.

Multiple Choice (3)

1. How do market systems see to it that people get the things they wish to have?
   a. Prices
   b. Rules
   c. Subsidies
   d. Taxes

2. When government policies set the price for transplantable organs at zero, what is most likely to happen?
   a. Widespread surpluses of transplantable organs will occur because the price is set below the market price.
   b. Widespread shortages of transplantable organs will occur because the price is above the market price.
   c. Widespread surpluses of transplantable organs will occur because the price is set above the market price.
   d. Widespread shortages of transplantable organs will occur because the price is set below the market price.

3. According to most economists, the best way to reduce the shortages of transplantable organs would be to:
   a. Increase public awareness by means of a major advertising campaign.
   b. Establish a new agency to replace the United Network for Organ Sharing (UNOS).
   c. Establish a legal market of some sort for transplantable organs.
   d. Reduce the "red tape" now required by the U.S. Department of Health and Human Services.

ANSWER KEY

Multiple Choice (3)
(Answers are shown in bold.)

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    - d. Reduce the "red tape" now required by the U.S. Department of Health and Human Services.

Essay (2)

1. Explain how a system of paying people for organ donations ultimately would result in lower costs than those created by the current system of voluntary organ donations.

2. If an artificial kidney were created, how would it affect the current organ donation system and the potential compensation for an organ donation?

ANSWER KEY

Essay (2)

1. Explain how a system of paying people for organ donations ultimately would result in lower costs than those created by the current system of voluntary organ donations.

   Answer: Providing payments to organ donors would reduce medical costs. Often people waiting for an organ donation are quite ill and are incurring expensive medical bills while receiving treatment in the hospital. Some patients die waiting. If potential organ donors were provided financial compensation, organ transplant recipients would receive their organs faster, thus reducing hospital/medical costs.

2. If an artificial kidney were created, how would it affect the current organ donation system and the potential compensation for an organ donation?

   Answer: In both systems, the creation of an artificial kidney would provide a substitute good. Economic principles indicate that as the price of artificial kidneys decreased, the demand for natural organs would decrease.

A Brief History of Organ Transplants

1954 The first successful kidney transplant was performed in the United States.

1967 The first successful liver transplant was performed in the United States.

1983 Cyclosporine, the first of several drugs to treat organ rejection, was introduced.

1984 The United States passed the National Organ Transplant Act (NOTA) to regulate the market for organs in the United States.

1986 The United Network for Organ Sharing (UNOS) received the first federal contract to operate the Organ Procurement and Transplantation Network (OPTN).

UNOS launched an Internet-based transplant information database system for matching and management of transplant data.

Source: UNOS website www.unos.org

The Problem:
Too Few Transplantable Organs

- In 2002, there were nearly 25,000 organ transplants.
- In 2002, there were more than 12,700 organ donors.
- More than 80,000 people currently await organs.
- In 2003, more than 6,000 people died waiting for organs.

Source: UNOS website www.unos.org

Investigation #2 – Visual #3

Demand and Supply for Transplantable Organs, 2003

Organ	Quantity Demanded	Quantity Supplied
Kidney	55,751	7,394
Pancreas	1,445	265
Kidney/Pancreas	2,418	419
Liver	17,320	2,772
Intestine	164	62
Heart	3,682	1,041
Lung	3,895	541
Heart/Lung	181	13
Total	**84,856**	**12,507**

Source: UNOS website www.unos.org

Current U.S. Policy for Organ Transplants

- The Organ Procurement and Transplantation Network (OPTN), established by the National Organ Transplant Act (NOTA) of 1984, created an organ distribution system.

- OPTN manages a system to collect, store, analyze, and publish data about patient waiting lists, organ matches, and transplants.

- The organ transplant system forbids providing "valuable consideration" to organ donors, including any sort of payment.

- The U.S. organ donation system depends on altruism—unselfish concern for others—to obtain organs for transplants.

How the Transplant System Works

- Under contract with the U.S. government, the United Network for Organ Sharing (UNOS) maintains a centralized computer network linking all organ procurement organizations and transplant centers.
- After being referred by a doctor, a transplant center evaluates a patient for a possible transplant.
- If the center determines that the patient is a transplant candidate, they will add her or his name to the national patient waiting list for organ transplant.
- The patient is **not** placed on a ranked list at that time. Rather, the patient's name is added to the pool of patients waiting.
- When a deceased organ donor is identified, a transplant coordinator accesses the UNOS computer. A computer program compares each patient in the pool to the donor characteristics and identifies compatibility.
- The computer generates a ranked list of patients for each organ that is procured from that donor in ranked order, according to organ allocation policies.
- The organ is offered to the transplant team of the first person on the list.
- Once a patient is selected and all testing is complete, surgery is scheduled, and the transplant takes place.

Source: UNOS website www.unos.org

The Economic Approach to Improving the Supply of Transplantable Organs

New Policy: *Allow some form of compensation to family members who donate deceased family member's organs.*

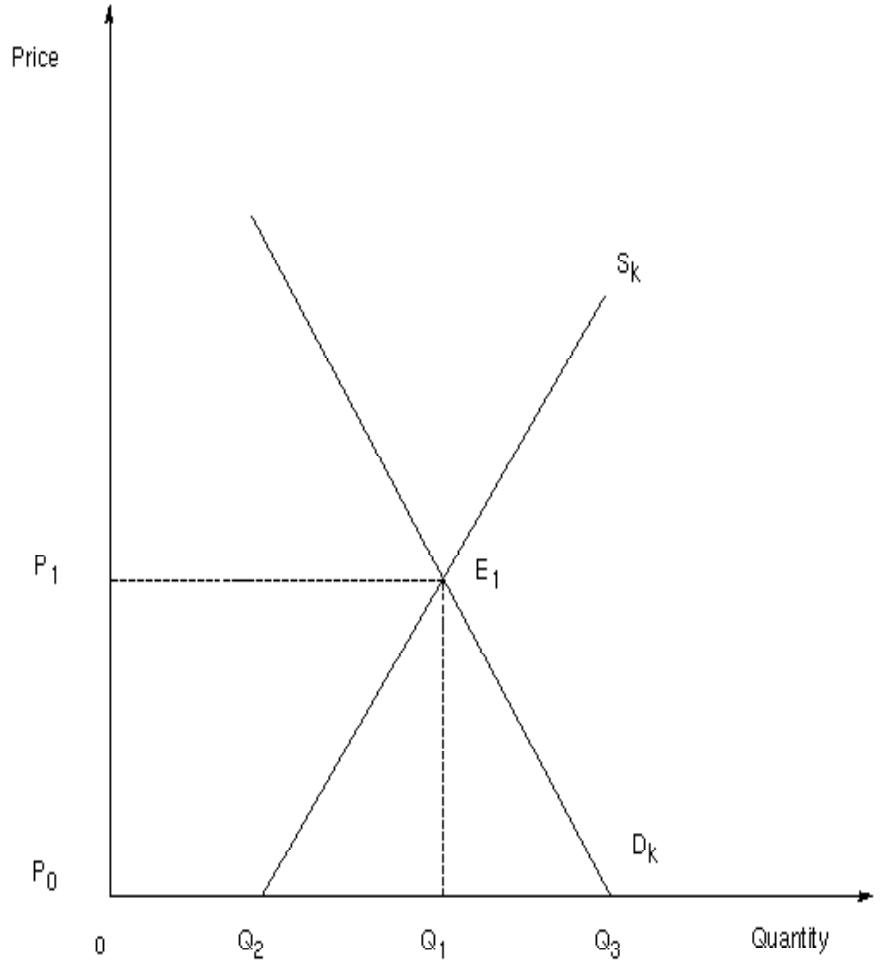
Objections to Allowing Compensation for Organs

- Discourages voluntary donation of transplantable organs.
- Encourages families to make hasty decisions regarding the passing of ill family members.

Benefits to Allowing Compensation for Organs

- Increases the supply of organs.
- Saves lives.
- Reduces the difficulties caused by the complicated distribution system.

Supply and Demand in the Kidney Market



The National Commission to Increase the Supply of Transplantable Organs

Directions: You are a team of economists at a leading national think tank, well-know for its innovative ideas about improving health care. The American Medical Association has appointed your team to examine how alternative policies might influence the supply of transplantable organs.

- Read each situation below.
- Predict whether the policy in each case would likely result in an increase in the supply of transplantable organs.
- Mark your answer, and be ready to explain it.

1. Provide a tax deduction for families who donate the organs of a deceased family member.
   ___ Increase in supply
   ___ No change in supply

2. Provide a payment to members of families who donate the organs of a deceased family member.
   ___ Increase in supply
   ___ No change in supply

3. Create a new agency that will make transplantable organs available to citizens in certain regions of the country.
   ___ Increase in supply
   ___ No change in supply

4. Develop new rules that will provide organs to people who are the sickest first.
   ___ Increase in supply
   ___ No change in supply

5. Pay the donor's funeral expenses for the family.
   ___ Increase in supply
   ___ No change in supply