**Problem**

**What**

Problem(s)  
Risk of rejection of "marginal" kidneys

**When**

Operations using new techniques performed November 2010 to November 2011

**Where**

Different, unusual, unique  
United Kingdom  
Transplant kidneys  
Normothermic perfusion

**Impact to the Goals**

Patient Safety  
Reduction of risk of rejection of transplanted organ

Employee Impact  
1

Compliance  
1

Organization  
1

Patient Services  
Increased availability of donor kidneys

Property, Realty, Mls  
Transplant kidneys

Labor, Time  
Reduction of people on waiting list

**Frequency**

Estimates increase of 500 kidneys/year

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**Analysis**

**Basic Level Cause Map**

Start with simple Why questions.

- **Patient Services Goal Impact**
  - Increased availability of donor kidneys
  - Use of "marginal" transplant organs

- **Property Goal Impact**
  - Increased availability of donor kidneys

- **Labor Goal Impact**
  - Reduction of people on waiting list

**More Detailed Cause-and-Effect**

The procedure involves flushing donated kidneys, which would previously have been rejected as unsuitable for transplant, with oxygenated blood (normothermic perfusion). This can allow use of some damaged kidneys, such as those from the elderly or those with high blood pressure or diabetes. It decreases the risk of a marginal organ being rejected. It is believed that this could increase the availability of organs by about 500 a year in the United Kingdom, reducing the number of people on transplant waiting lists by about 10%. (There are more than 6,400 kidney patients waiting for a transplant in the UK.)

So far, 17 organs have been through the procedure and have been successfully transplanted, between November 2010 and November 2011. They are all functioning well. The success of this procedure can be examined in a Cause Map, or visual root cause analysis. Positive impacts to the goals can be examined in the same way that negative impacts are - by identifying the impacts and asking "why" questions to identify the causes. Due to this procedure, the patient safety goal has been impacted by reducing the risk of rejection of transplant organs. The patient services and material goal has been impacted by increasing the availability of donor kidneys. And, the "labor" goal has been impacted by reducing the amount of time people wait for donor kidneys.

Beginning with these impacts and asking "why" questions, we can identify that the procedure is allowing the use of previously marginal organs by allowing treatment outside the recipient body and reducing the risk of rejection. This increases the number of organs that can be used, and since there are still more organs needed than available, this reduces the amount of time on the waiting list.

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**Solutions**

Although this procedure should increase the number of organs available and reduce time on the waiting list, it still will not provide enough organs for everyone who needs one. Donor outreach to increase donors and family understanding of the life-saving organ donation process is still needed.

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**KIDNEY TRANSPLANTS**

**Increased usability of donor kidneys**

"Normothermic perfusion allows us to gradually reintroduce blood flow to donor kidneys outside of the body and in a controlled way. This reverses much of the damage caused by cold storage while offering us a unique opportunity to treat the organs with anti-inflammatory agents and other drugs before going on to complete the transplant procedure."

- Professor Mike Nicholson, Leicester General Hospital

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**Cause Mapping**

Problem Solving • Incident Investigation • Root Cause Analysis

**Step 1 Problem**

What's the Problem? Why did it happen? What will be done?

**Step 2 Analysis**

**Step 3 Solutions**

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For a free copy of our Root Cause Analysis Template in Microsoft Excel, used to create this page, visit our web site.

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