

## Minimum surgery volumes in hospitals: Are the outcomes better in hospitals that do more operations?



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In the last three decades many researchers have addressed the topic of whether or not there is an association or link between the number of operations and the quality of the outcomes. The idea seems logical: practice makes perfect, as the saying goes. It is therefore theoretically possible that patients in hospitals where surgery is done more often could do better than in hospitals with little experience. This does not mean that increasing the volume of surgery in a particular hospital would automatically lead to better outcomes.

Minimum volumes for some types of operations have been set in Germany since the beginning of 2004. The operations include, for example, liver and kidney transplantation, some complex procedures on the pancreas, and total knee replacement. The aim of setting these minimum volumes is to ensure and improve quality.

There are still unanswered questions about a range of operations. How much practice does a surgeon need? Are 10 operations a year enough, or does it need to be 100? Is there some point at which overload becomes a problem?

What's more, introducing minimum volumes for surgery can also have disadvantages, which can be important if there are no proven benefits. For example, hospitals that do not do the minimum number of procedures are not then allowed to offer the service. Patients might then have to travel further if their local hospital cannot do the operation any more.

Researchers from the German Institute for Quality and Efficiency in Health Care (IQWiG) studied whether or not there was evidence of an association between the number of operations and the quality of outcomes for four procedures. For percutaneous coronary angioplasty (PTCA or balloon angioplasty) and surgery for abdominal aortic aneurysm they analysed the international medical literature. For another two operations, total knee replacement and coronary artery bypass, they analysed data on outcomes in German hospitals. German hospitals have had to release that data since 2004. The hospitals prepare and release these data themselves, so the quality of the data is not completely clear to external researchers.

**Balloon angioplasty (PTCA):** This procedure is often used for coronary artery disease or heart attack. It involves inserting a catheter (long thin tube) and using a balloon at the tip to slowly widen out the artery. This can improve the flow of blood through the artery. For some years a stent (small metal device) has then been left in the artery, which is meant to prevent the artery closing up again.

For PTCA the researchers found that when the volume of PTCA was higher in a hospital, the mortality was lower for people who had just had a heart attack. There might be a reduction in mortality and bypass operations if both the doctor and the hospital are doing larger numbers of PTCAs. However, for planned PTCA when the person has not just had a heart attack, there is still no clear answer.

**Abdominal aortic aneurysm:** This condition involves an aneurysm (bulge) that can develop if there is a weak spot in the aorta (large blood vessel) in the abdomen. The biggest concern is that this aneurysm could burst, which could lead to dangerous internal bleeding.

There are two types of operations for this condition: one is a conventional open surgery, in which the abdomen is opened with a large incision. In a newer procedure a stent is inserted to stabilise the weak area.

For operations on abdominal aortic aneurysms, the researchers looked first at mortality after the operation. The analysis showed that on average, fewer patients died in hospitals that did more operations in comparison with those that did less. However setting a minimum volume for the procedure was still not possible, because the results came from studies in hospitals outside Germany. It was not possible to see, for example, how serious the aneurysms were or how often the patients also had other health problems. The studies only looked at the older, open type of abdominal operation and not the newer type of surgery.

**Total knee replacement:** In this procedure a knee that has been damaged by arthritis or injury is replaced with an artificial joint.

In the case of knee replacements, the researchers did establish a link between the number of operations and the quality of outcomes. With knee replacement, the researchers considered how many patients did not have enough mobility or movement in their knee after the operation. They also looked at the rate of infection.

In terms of knee mobility, there was not enough evidence to set a specific minimum volume for the operation. The risk of having knee movement problems at first reduced as the number of operations rose, but once a hospital was doing more than 500 operations a year, the risk of problems started to rise.

The analysis of outcomes for infections had different results: as the rate of knee replacements increased, there was a very small reduction in infections. These conflicting results made it difficult for the researchers to set a specific minimum volume for knee replacement.

**Coronary artery bypass (CABG):** When a person has coronary artery disease, it means that there has been a narrowing or blockage in the major blood vessel in the heart, which reduces the amount of blood flow to parts of the heart. In a bypass operation, surgeons use a piece of blood vessel from somewhere else in the body, such as a leg, to sew in a kind of bridge across the blockage. That bridge is called the bypass. The aim is to ensure that the heart keeps getting enough blood.

The IQWiG researchers found no association between the volume of surgery and the quality of outcomes of a bypass operation. All the German hospitals reported doing at least 166 bypass operations a year.

## Sources

Institute for Quality and Efficiency in Health Care (IQWiG). *Development and application of models to calculate threshold values for minimum quantities for total knee joint endoprosthesis*. Final report, Commission B05/01a Version 1.0. Cologne: IQWiG. December 2005. Full text (URL: <http://www.iqwig.de/index.download.0c86b19df3bbf2bd981902d89aefaaa7.html>) (German only)

Institute for Quality and Efficiency in Health Care (IQWiG). *Production of an evidence report on the relationship between the quantity of operations performed in patients undergoing elective surgery of an abdominal aortic aneurysm and the quality of outcome*. Final report, Commission Q05/01-A Version 1.0. Cologne: IQWiG. May 2006. Full text (URL: <http://www.iqwig.de/index.download.e6632ccecbd2bf369e988c2152835199.html>) (German only)

Institute for Quality and Efficiency in Health Care (IQWiG). *Development and application of models to calculate threshold values for minimum quantities in coronary surgery*. Final report, Commission B05/01b Version 1.0. Cologne: IQWiG. June 2006. Full text (URL: <http://www.iqwig.de/index.download.94e80411ddf4b9c21b917e2412e33975.html>) (German only)

Institute for Quality and Efficiency in Health Care (IQWiG). *Production of an evidence report on the relationship between quantity of operations performed in patients undergoing percutaneous transluminal coronary angioplasty (PTCA) and the quality of outcome*. Final report, Commission Q05-01B Version 1.0. Cologne: IQWiG. June 2006. Full text (URL: <http://www.iqwig.de/index.download.c04c2589755cb075b3be8207036ac0c6.html>) (German only)

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