

## 3 Questions: David Jones on heart problems

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Graphic: Christine Daniloff

(PhysOrg.com) -- With a universal health-care law set to cover all United States citizens starting in 2013, many experts are now wondering how medical costs can be contained.

David Jones, an MIT associate professor of the history and culture of science and technology, has a distinctive perspective on the subject. In addition to his PhD in the history of science, Jones received his MD from Harvard in 2001 and worked as a doctor before coming to MIT. He is currently writing a book about the history of cardiac procedures that explores, among other things, the rise in popularity of those interventions despite clinical evidence that their effectiveness is limited. MIT News asked him about his ongoing research about heart medicine.

**Q. Is cardiac bypass surgery an over-used procedure in the United States — and if so, what is the evidence for this?**

A. No surgical operation has been studied more carefully than [coronary artery](#) bypass grafting. Research has clearly identified particular groups of patients who benefit from the procedure, in terms of both relief of symptoms and prolongation of life. However, there is dramatic variation in the rate at which coronary artery bypass grafting is performed from place to place within the United States, despite a relatively consistent prevalence of the disease. This variation is even more striking internationally: Surgeons in Canada and the United Kingdom perform coronary artery bypass grafting at much lower rates than their colleagues in the United States, again without differences in the frequency of disease or evidence that Americans live longer or better lives as a result. The problem may be even larger with a related technique, [coronary angioplasty](#), in which cardiologists use balloon-tipped catheters to open obstructed coronary arteries. Although experts disagree about the numbers, somewhere between 20 percent and 80 percent of angioplasties are done in patients who will receive no survival benefit. These disconnects raise many questions about how resources should be allocated and about how these decisions should be made.

**Q. As a historian, you've been conducting original research about the rise in popularity of bypass surgery. When did the procedure take hold as a standard treatment, and why has it remained so common?**

A. Surgeons first described the technique of coronary artery bypass grafting in 1968. It quickly became a popular treatment: By 1977,

100,000 were performed each year. The procedure peaked in the mid-1990s, at over 600,000 operations each year. Its early popularity was based on its physiological rationale. Doctors and patients believed that coronary artery disease was a problem of supply and demand: As atherosclerotic plaques grow, they choke off the flow of blood and oxygen to cardiac muscle. [Bypass surgery](#) seemingly made perfect sense: It provided a way of getting blood past those obstructions. Surgeons could use post-operative X-ray techniques to show that they had increased blood flow to the heart. This disease model — and this visual evidence — appeared so logical that surgeons were immediately convinced that bypass surgery must be effective. Skeptics, however, wanted to assess the surgery by using randomized clinical trials, the usual gold standard for determining the efficacy of medical treatments. As those trials have been done, they have usually shown that the surgery provides a survival benefit only to a small subset of patients.

This has triggered an ongoing debate about the role of visual and statistical standards of knowledge in medical practice. Imagine a common scenario: A cardiologist performs angiography revealing that a patient has an 80 percent obstruction of a major coronary artery. Randomized controlled trials suggest that this patient will not obtain a survival benefit from either angioplasty or bypass surgery. But it is extraordinarily difficult for either a patients or a doctor to do nothing, knowing that the plaque is there and might someday cause a problem. One cardiologist has called this the "oculostenotic reflex": If you see a stenosing lesion [a narrowing] in a coronary artery, you feel obligated to intervene.

**Q. Apart from these diagnostic issues, how do the financial incentives of surgery affect the frequency of bypass procedures?**

A. In the early years of bypass surgery, physicians had significant conflicts of interest. Some, paid on a fee-for-service basis, made millions of dollars each year. Competition from angioplasty, however, changed the dynamic, and now interventional cardiologists [who perform angioplasty] have a higher average salary than cardiac surgeons. Reformers hope they can contain these procedures by putting physicians on salary, but this will not solve the problem: As long as surgeons and cardiologists bring substantial revenue streams into hospitals, they will continue to have high salaries and considerable institutional power. Such conflicts of interest are less direct, but still very present. At many medical centers, angiography, angioplasty, and bypass surgery provide one-third of the revenue. Lowering reimbursements, through reform of Medicare or health insurance, could have a major impact on medical practice, but would have other major consequences, since medical centers have become so dependent on the revenue from these procedures.

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