

**ASTS Presidential Address**  
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**May 4, 2010**

It is truly an honor and the highlight of my professional career to stand before you as the 36<sup>th</sup> President of the American Society of Transplant Surgeons.

This morning, I'm going to discuss the role of statistical information in transplantation. Many of you will not be surprised at my choice of topic, given my longstanding interest in the intersection of statistics and medicine, and given my dual roles as a transplant surgeon and as a health services researcher. And I know that I'm not alone in trying to bring the best science to my interactions with patients and families. Although medicine is both an art and a science, we tend to practice more of its art and seem to ignore much of its science. In choosing to talk about statistically-based information, my goal is to give you an increased awareness of how statistics can help each of us to help our patients.

When you're sitting in an exam room in the clinic with a patient, how do you react when she asks, "Doctor, what do you think? What are my chances if I choose treatment A vs. treatment B?" The results of a recent study may come to mind as you struggle to answer challenging questions like these. The patient may even turn things around by quoting numerical information that they've found online, placing you in the position of agreeing or not. A good modern day example involves a famous patient known to everyone in this room.

Steve Jobs had a very uncommon liver condition. His challenge: identify transplant centers that would offer him a place on their waiting list, where the likelihood of getting a transplant was high, and where the post-transplant results were excellent. An unachievable and mythical place like Lake Wobegon?

No, all of these data were available to Mr. Jobs, just as they are to anyone with an internet connection. But since he had a rare condition, it was necessary to cross-reference the programs' attributes against their experience with his particular rare malady. This could only be accomplished in private discussions between Mr. Jobs and his doctors. That his transplant eventually took place in Tennessee is a matter of public record, and since it was made public there has been much debate about whether he received special treatment.

Did Mr. Jobs have more ability than the average patient to evaluate the numbers and understand them? Perhaps. After all, he's a very smart guy and the CEO of Apple Computer. Was he more available to meet with multiple transplant surgeons? Sure! Unlike the average patient, he has lots of money and access to a Gulfstream jet.

In the end, both the statistics and the surgeon saved Steve Jobs' life, because they processed all of the available information, from the statistical to the interpersonal and made rational choices that each of us would have likely made in the same situation. Like a beacon shining in the night, the information in transplantation can illuminate the dark path for us and for our patients.

Now imagine not having access to any statistical information as you sit with a patient who is at risk to die from a life threatening disease and asks, "What should I do?"

In 1722 patients all over England were doing just that. Smallpox was sweeping through the country with devastating consequences. Physicians had heard of a procedure that terrified their patients as much as it gave them hope. The so-called treatment involved making an incision into the patient's arm and inserting pus from the skin lesion of a victim with active smallpox. It was hoped that the inoculum would result in a mild case of self-limited disease and subsequent immunity. But, not always. Some died as a result of the inoculation. And the inoculated smallpox itself was contagious to others. No one knew how well this worked, as only isolated case reports had been reported in the Philosophical Transactions. Patients certainly had no access to statistics, and neither did their doctors.

That is, until Dr. Thomas Nettleton, a physician in the small Yorkshire town of Halifax, decided to do something novel. He counted. He thought like a businessman and applied what he called the Merchant's Logick: "Stating the Accounts of Profit and Loss to find on which side the Ballance Lyes with respect to the Publick, & forming a Judgement accordingly." Simply put, he wondered how many patients would live or die with the procedure and how many would without undergoing it. By the end of 1722, he counted only one death amongst 61 inoculum recipients in Halifax against one-fifth of those who contracted natural smallpox. It was a sublimely simple but compelling comparison, and although it may seem trivial to us, it was extraordinary in its time. Statistical information had had its first opportunity to play a role in the practice of medicine.

It would take nearly 100 years after Nettleton to move to the next major stage – determining whether an observed difference between two medical treatments was simply a chance finding based on a small number of patients. That was accomplished in 19<sup>th</sup> century France by Jean Civiale, a surgeon who advocated a new technique of bloodless surgery for the removal of bladder stones. Annual publication of surgical success rates had become a popular form of medical marketing by the early 19<sup>th</sup> century. In order to strengthen his case, Civiale convinced the French Ministry of Public Instruction to fund a comparative effectiveness research study on an enormous European-wide scale that would have been unimaginable to his 18<sup>th</sup> century predecessors. His report, with a sample size of over 5700 cases, was truly a landmark achievement in the conduct of observational research, marking an important milestone in the internationalization of research and the public funding of data collection and analysis. It could have been called the European Registry of Bladder Stone Surgery.

To convince naysayers like François Double, a prominent but skeptical physician of the day, who rejected as evil the suggestion that statistics be used to "turn clinicians into scientists", the Académie des Sciences de Paris create a panel specifically to examine Civiale's study, and more importantly, to frame the debate between the relative merits of physician experience versus statistical quantification as a guide to medical therapy. Under the leadership of the eminent Siméon-Denis Poisson, later famous for describing the Poisson distribution, the report of the academy's panel, issued October 5, 1835, hailed Civiale's work as a major advance. If Thomas Nettleton had been alive in 1835, he would have been awed by the scale, scope, and rigor of Civiale's work.

The trickle of statistical information that began in Nettleton's time and expanded in the 19<sup>th</sup> century has now made us feel like we're drinking from a firehose of data. With around 20,000 medical journals being published, it's no wonder that physicians are swamped. An alarming countertrend is that journal reading by physicians has dropped by more than a third in recent years, and almost three-quarters of doctors report perusing as few as two journals per month. Two-thirds only read the abstracts.

Partly in response, the American Board of Surgery and other specialty boards have developed requirements for Maintenance of Certification that are increasingly quantitative and data-driven. Board-certified surgeons must now report every three years on the success of our efforts to stay current with advances in our field and demonstrate that we are monitoring our practices and our outcomes. The American Society of Transplant Surgeons recognizes the challenge and the opportunity that this represents for us to play a leadership role in understanding the appropriate use of statistical information in the 21<sup>st</sup> century practice of transplantation and is working to help ASTS members fulfill these requirements in the areas of quality and outcomes monitoring and continuing education. Many other ASTS initiatives, from the Academic Universe Curriculum to our ASTS State-of-the-Art Winter Symposia, from the projects of our Scientific Studies and Standards Committees to our Business Practice Services, incorporate a profound sensitivity to the power of data in transplantation and the continuing challenge of using them wisely in all aspects of our profession.

Using statistical information to make individual medical decisions is not always clear or easily accomplished. One problem with statistics based on large cohorts of patients is that they tell you how things will turn out on average for patients with certain characteristics, but they don't necessarily tell you how they will turn out for the particular patient sitting in front of you. As I often tell my patients, "This procedure has a 90% chance of success for patients like you, but as far as your particular outcome, my

crystal ball is cloudy. I can't tell with certainty if you are one of the 90 or one of the 10, so at the end of the day you'll either be 100% alive or 100% dead. Although that's not 100% satisfying, for me or for my patient, our inability to precisely predict the future shouldn't dissuade us from using solid numerical information as a guide to treatment choices. I start with the best available data, and then factor in the unique attributes of each individual patient's case. That's my definition of good medical judgment.

By the 1990s, the desperate shortage of organs led to relaxation of the requirements for accepting deceased donor kidneys for transplant, and the so-called expanded criteria donor with defined characteristics was born in 2002. It is a matter of common sense and a logical tautology that higher risk organs are associated with worse outcomes. The more critical question is analogous to the adage about the bird in the hand being worth two in the bush. In other words, does receipt of an expanded criteria organ result in a longer lifetime than waiting longer, hoping for a better offer before death intervenes.

In 2005, our group at the SRTR studied over 100,000 kidney transplant candidates and determined which patients have a significant life-extending benefit from expanded criteria kidneys. Our results were published in the Journal of the American Medical Association and have been widely cited. There is a diagram in the paper that shows how to decide whether a patient benefits by including expanded criteria kidneys in their donor pool by answering just four questions. We were pretty excited about the opportunity to provide the transplant community with this clear and compelling information to guide their decision making. Yet it is humbling to stand before you today and tell you that our work has not had the impact on practice that we expected. Morgan Grams and colleagues from Johns Hopkins, in the most recent issue of the American Journal of Transplantation, and in a presentation during this meeting, strongly confirmed our findings about the value of these transplants. However, they noted that since the publication of our paper, listing practices have remained just as widely varied as they were prior to 2005. As you can see, there have been over 14,000 of these transplants performed in the past 10 years. And thousands of patients are still dying every year on the waiting list. But, among patients predicted to benefit from an expanded criteria kidney, the proportion actually listed for one remains stuck at exactly 50%. In some parts of the United States, all the patients are listed for an expanded criteria donor kidney despite the fact that only 50% benefit from one. In other areas, none are listed. These wide disparities haven't changed. And finally, right down at the transplant center level, the median change in listing practice was 0%.

I am really baffled by this lack of change. In our own program, we plugged the algorithm right into our practice, and when we talk to patients about it and describe where they fall in the diagram, it makes sense to them. Our own program's practices changed a lot, and we feel that our patients are better served by using the data in a logical and consistent manner.

It's clear that there are lots of patients around the country who would benefit from an expanded criteria kidney, but who are not getting access to this lifesaving form of therapy. Perhaps there were unique circumstances that favored a recommendation against it. Maybe it was recommended and the patient decided against it. But some reasons have nothing to do with what may be best for an individual patient. The transplant team may think that their program's results or reputation will be placed at risk, even though their patients would get a transplant more quickly and have a longer lifetime. Although cherry picking donors usually fails to help a program's results relative to what would be expected, the costs of providing an expanded criteria kidney to a patient are certainly higher. So, I'm not naïve, and recognize that external forces do play a role in decision making by transplant programs, but we need to direct our attention elsewhere to address these external problems, because patients who are denied more timely and appropriate transplants are surely victims in this scenario.

Because I'm a scientist, I must accept the theoretical possibility that our analyses were flawed and that our recommendations were misguided. But I don't think that's the case. There must be other reasons why practices have not changed, even at the extremes. Apparently, it's not sufficient to simply produce and publish statistical information and sound recommendations in high quality journals. We must do a better job translating those recommendations into best practices. And I don't just mean my studies. Failure to understand and apply new information in clinical practice is widespread in medicine, extending far beyond the field of transplantation. The Institute of Medicine, in its 2001 report entitled "Crossing the

Quality Chasm”, noted that less than 50% of patients in the United States receive proven treatments for common diseases. Yes, less than 50% of patients in the United States receive proven treatments for common diseases. We must squarely face this challenge in transplantation.

We live in quantitative times, our daily lives suffused with numbers, data and metrics, statistics and calculations, predictions and observations. From the global scale to the individual human perspective, from birth until death, from health to disease and, hopefully, back to health, we look to numbers and statistics for support, for justification, for encouragement, and for hope. In transplantation, we also face the inescapable tension between individual patient loyalty and concern for the public good, in the face of an inadequate donor supply for all. We judge ourselves by a high standard. We’re held to a high standard by our patients. And, in transplantation, we’re evaluated by entities outside the patient-physician relationship, as the tableau of our everyday miracles continue to capture regulatory, payer, and media attention.

Statistics are certainly not a crystal ball, telling us the right course of action in every case, but we ignore them at our peril and at our patients’ peril, and risk returning to the past. Our challenge for today and the future is to embrace statistical information, at its intersection with our solemn Hippocratic Oath to our patients, and to use statistics to help illuminate the path for ourselves and for our patients.

It has been a great pleasure and a profound honor to serve as the President of the American Society of Transplant Surgeons. The year has been filled with challenges great and small, and I have enjoyed every minute of it. I have many more to thank than I have time for, so I apologize to all who are not mentioned by name. I want to start by saying that I would not be here without the love, unqualified support, and guidance that I have received my entire life from my parents, Milt and Margy Merion. I am thrilled that you are both here today. I have been fortunate to have many surgical mentors, but two deserve particular mention. I met Jerry Turcotte when I was a third year medical student in 1977. During the ensuing years, he taught me on the surgical services, hired me as a surgical intern, and was responsible for my spending two years with Sir Roy Calne in Cambridge. I learned the craft of transplantation from Sir Roy, and had the extraordinary benefit of his keen investigative and creative mind. I returned to Ann Arbor, where Dr. Turcotte hired me 25 years ago as a faculty member in the Department of Surgery. I will be forever indebted to both of them. My accomplishments as ASTS President have been made possible by an extraordinary Executive Committee, Council, committee chairs, and all of our past presidents, who have given of their time and their insight to the important missions of the ASTS. Our Executive Director, Katrina Crist, Associate Director Kim Gifford, and the rest of the ASTS National Office staff work tirelessly on behalf of our 1600 members. I have the utmost respect for your passion and your professionalism and couldn’t have done it without you. I want to acknowledge our corporate partners, whose support powers many of our activities. I offer my thanks to Joren Madsen, President of our sister society, the American Society of Transplantation, for a remarkable year filled with collaboration and cooperation between our two great organizations. My surgical division at the University of Michigan, led by Jeff Punch, is a transplant surgeon’s dream team. Thank you all for supporting the Delta Airlines Professor of Surgery. Deb Richards, who took this picture, is always behind the scenes and watches my back as my ace administrative assistant at the University. My team at Arbor Research Collaborative for Health is filled with smart, energetic, and passionate people whose research is focused every single day on improving the lives of patients by tackling the toughest problems in analysis of organ failure and transplantation data. Bob Wolfe and Fritz Port have played a seminal role in developing my understanding of statistics in medicine. And finally, I’d like to thank my wife and children, who have put up with me during all the years before and after becoming a transplant surgeon. Our younger daughter, Sarah, is in college in Buenos Aires and can’t be here today, but I’m happy that our older daughter, Al, and David, her husband of seven weeks, are here from Los Angeles. Thank you for sharing this day with me.

And, if I were going to thank only one person in the world, it would be my wife, Debbie, who has made the biggest sacrifices for my success, and who, from the age of 14, has been my best friend, my confidant, my biggest fan, and the love of my life. I love you, Deb! Thank you to every member of the American Society of Transplant Surgeons for bestowing upon me the privilege of this year and of this day.