"It is a sin to be good when you were sent to be great: Quality in trauma care"

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My talk today is entitled, "It is a Sin to be Good When You Were Sent to be Great," and I would like to address the topic of "quality" in trauma care. In the interest of full disclosure, I am an EAST member, and I have been privileged to have spent my entire career as a member of this organization. I am an EAST "guy," through and through. By the same token, I'm also a husband, a father, and a future patient, which is why this talk resonates with me.

The goal of my talk is to tell my personal story, so that it serves as a framework for my views on the topic of "quality." I would like to touch, just briefly, upon the role of some business principles in the building high-quality systems, and then I would like to issue a challenge to the trauma community to set a future direction for our specialty.

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My father is an industrial designer, which is a combination of an engineer and an artist. He would take mathematics and science, integrate them with aesthetics, and design products which were designed to suit the user, focused on safety, and were aesthetically pleasing. We had a mantra in my house growing up, that you "design systems to fit the user, not the other way around." My father's focus, which he instilled within me, was to look at products and systems critically, and identify examples of good product design. This viewpoint was ingrained in me at a young age, and our family would frequently would look at products and decide whether or not they actually worked on these principles.

My mother is a graphics artist, and she had a very strong drive toward simplicity and aesthetics. She typically sought inner peace through an understanding of Eastern philosophy, and she encouraged me to read about other philosophies. I subsequently integrated those viewpoints into the rigors of the science and math that I so adored growing up. My mother's perspectives helped to develop a balance within myself between analytics and a more philosophical perspective.

I attended the University of Michigan, where I obtained my undergraduate degree in Biophysics, and subsequently attended the Mount Sinai School of Medicine. I then completed my surgical residency at Abington Memorial Hospital. At each of these stops in my maturation as a surgeon, I entered into a very rigid way of thinking: specific patterns of thought, care paradigms, and protocols were all ingrained in me, just like they were in all of you. I was taught to accept much, and question little.

I then progressed to the Ryder Trauma Center, where Dr. Steve Cohn was my Fellowship Director. Dr. Cohn had a very different way of thinking: he encouraged us always to question the dogma with which we were trained. "Ask questions," and "be curious" were commonly heard during a day on service. As fellows, we were encouraged to ask questions about the things that were accepted in our daily care of the patient but were never really full codified in our minds. The "voo-doo that you do," was always grounds for another study, another hypothesis, another head scratch. Dr. Cohn instilled in all of his fellows a desire to do research, and to push boundaries of the questions that you might ask.

I took my first job at the University of Vermont, where Fred Rogers very generously allowed me to be the Trauma Medical Director. There, I began to try to ask questions about the care that we rendered: these questions stimulated my interest in "quality," although at the time, it was not described with that particular term.

At that time, the Chairman of the Department of Surgery was Dr. Steven Shackford, who had a very strong dedication to quality. While he was enamored with quality metrics, Dr. Shackford taught us that, in the middle of the night, when you are staring at the ceiling trying to figure out what to do with a patient, somehow you always knew the right thing to do. Somewhere, deep inside of yourself, there was a little voice that told you what the "right" thing to do was. I could never lay a finger on where that "voice" came from, but inevitably it spoke to me. I would always find myself saying that there was a kind of "Shackfordian Quality" that existed, an inner "this is the right path" meter, but it was something that I could never adequately describe. I did know that I trusted the voice to tell me how to take care of patients, and it reminded me never to take shortcuts.

The other point which Dr. Shackford always stressed was "the sacred pact between the surgeon and the patient." When you bring a patient to the operating room, he would say, it is the only time in someone's life when that a person would willingly make themselves completely defenseless, placing their fate into the hands of another.

Think about it. When you sit down with your financial advisor and you ask them for advice, you consider it, and you can say "yes," or "no," or "I will think about it." Nothing will happen without your assent. On the other hand, when you take a patient to the operating room, that person is putting themselves completely into your hands. They are defenseless and can do nothing to make their voice be heard. They have put their trust solely in the hands of their surgeon.

In Dr. Shackford's Presidential Address to the Western Trauma Association in 2001, he asked that organization "How then shall we live?"[1] and he described the privilege of being a physician and a surgeon. The themes of Dr. Shackford's address still ring true today—it is a refection on service and sacrifice, and describes the foundation of our call to medicine. Dr. Shackford's "sacred pact" forms the underpinnings of everything that we do as surgeons, and he felt strongly that it is our absolute duty, as surgeons, to respect it.

I then moved to the Medical University of South Carolina, where I continued to be a Trauma Medical Director. At that point in time, I began to develop an increasing dependence and reliance upon TQIP data to drive my practice. At the same time, I began to have more interactions with my Chief Quality Officer for the first time, who is Dr. Danielle Schuerer. One of the more memorable conversations I had about quality was with Dr. Schuerer, who is an internist. During one of our meetings, she said "You know what? As internists, we can make some mistakes: we can inappropriately dose a beta-blocker, or forget to order an aspirin. Surgeons, though, can really screw people up when you make a mistake. Your margins for error are smaller, and the consequences of your mistakes are greater." When I reflected upon that thought, I realized that she was absolutely correct. "Quality," for surgeons cannot be an afterthought. I was fortunate to become the Medical University of South Carolina's Associate Chief Quality Officer over Perioperative Services, and I began my "formal" education in quality systems.

In 2017, I assumed the role of the presidency of EAST, and I was told immediately to "start thinking about your speech." As I reflected upon my year and my career, I began to think about what I ultimately called a "series of unfortunate events." These "events" lead to my personal meditation into the definition of "quality," where "quality" fits within our obligations to our patients, and its role in the care of the injured.

The first unfortunate event was the publication of the National Academy of Sciences, Engineering and Medicine report, entitled "A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury."[2] The report, which nobly called for us to "achieve zero preventable deaths after injury," should function as a tipping point for our profession. It notes that the military burden of death in Iraq and Afghanistan was about 6,850 servicemen, about a thousand of which were deemed preventable. On the civilian side, about 30,000 deaths per year were deemed to be preventable with optimal trauma care. The sheer numbers of "preventable deaths" astounded me.

The other component of the report that bothered me was its request that the White House set a national aim of "achieving zero preventable deaths……when leadership takes ownership of trauma care and the data is used for continuous reflection and improvement, we can achieve this."[2]

"When leadership takes ownership?" Ask yourself, "why aren't we taking ownership?" Quite frankly, that statement embarrassed me. The report continues on to say "The absence of any higher authority to encourage, coordinate, collaborate, and standardize an alignment in trauma care across and within military and civilian sectors has resulted in variations in practice and suboptimal outcomes for injured patients and a lack of national attention and funding directed to trauma care." Clearly, there is no question: there is a leadership vacuum within our specialty, and the NASEM report challenged our leadership abilities to the core.

The second event was more local, and occurred when my CQO asked me to explain the PE rates on our trauma service, which were in the bottom decile in our TQIP report. I knew we started everybody on prophylaxis, and our average time to

start was about one day, and about 95% of our patients were chemoprophylaxed, but we had high PE rates.

My response was very simple. "If you sneeze on my service, we get a CT Scan of your chest…..we find PEs because we look for them. Doesn't this vigilance reflect good, high-quality care?" Inherently, I knew that we were measuring, and reporting, the wrong thing. To me, this was an example of "quality" metrics without thought.

The third event occurred during our ACS-COT site visit, and, as many of you who have been through this process can attest, we did months of preparation. We took a lot of time and effort to track metrics that, quite frankly, were not reflective of the care that was being rendered on our service. We actually created processes to measure metrics that the COT required us to track, in areas that were not problematic for our program. I knew where our problem areas were, but they were not being looked at during the verification process. Instead, I spent time figuring out ways to "check the boxes" for our visit. Where we really measuring "quality" in the verification process?

The other thing our program did was the standard trick that we all employ: we meticulously developed our list of "asks," and we got ready to leverage all of these "weaknesses" with my administrators. It was as if Santa Claus was coming, and we had to get our list ready. Was this good "quality," using the COT as leverage to fix my problems every three years?

The final event occurred when my c-suite came to me and offered to "help" our trauma program by developing a call coverage model for salary support. I was asked "How many surgeons do you think you would need to run your service?" I sat down with a spreadsheet and ruminated. I used all of my experience and everything my mentors had taught me about staffing models, put it into an elaborate formula, and I developed a proposal.

The response from my C-Suite? "Super! Now show us the literature to back up your staffing claims." With the aid of one of our fellows who was doing his MHA project, we quickly found that there was no literature. My unpublished, back of the envelop calculations were the only thing that I could find to help substantiate my claims. I quickly realized that the trauma community had a big problem.

This entire scenario reminded me of a passage in *Tao of Pooh: "*Knowledge and experience do not necessarily speak the same language, but is not the knowledge that comes from experience more valuable than the knowledge that doesn't?"[3] Sometimes it seems fairly obvious that administrators need to get out from behind the desk and speak to the clinicians who are providing the care. The Japanese have a term for this, Genchi Genbutsu, which translates into "Go to the source to find the facts, to make correct decisions." My administrators seemed not to understand the problems that they were trying to address.

Thinking over these events, I was left with a series of questions. Are we not trying to put an end to preventable deaths? Why doesn't the objective data that we have match my subjective opinion of what a "quality" system is? Why doesn't Optimal Care of the Injured Patient track metrics that correlate with my perception of quality? Why do I have to wait every 3 years for the COT to come for me to get the leverage that I need to do the right thing? Aren't quality and staffing linked? As I began to think about this talk, and I considered these "unfortunate events," I began to ask myself the larger question: what really is "quality?"

In consumer products, we know good "quality" when we see it. There are some products that we will buy over, and over again, because they are "high-quality" products. If you are at home and you drink a Coke, that Coke will taste exactly the same as one you open if you travel across the country. The consistency, and the quality of that product, is startling.

Many of us will walk across the street, and some of you will run across, to get a cup of coffee at a Starbucks. Why? Because you know that, every time, it will be a "high-quality cup of coffee." It is consistently good and, if it is not, we know that they will endeavor to make their product to your liking.

Think about Apple Computer. Have ever seen an empty Apple store? You want to go in, you want to play with the products, to touch them, to interact with them. There is a "wow" quality about their electronics, the sleek design, and a functionality that makes them incredibly popular. Most consumers are wiling to pay a premium for an Apple product.

How about Porsche? Why are their cars so coveted? It is because of the aesthetics of the vehicle, the way that the car integrates with the driver, and the driving experience. We know that the controls will be in the correct location, the cockpit was "designed to fit the user, and not the other way around." Porsche automobiles are high-quality vehicles that are desired by many, and the company manages to dominate an incredibly competitive market year after year.

We know good quality when we see it, but it remains difficult for us to define. In *Zen and the Art of Motorcycle Maintenance,*[4] Robert Pirsig, explores the metaphysics of quality. Pirsig explains that just because we can't define quality, it doesn't mean that it is non-existant: "Life, if we didn't have quality, wouldn't really be worth living, because there would be no value or purpose at all. Quality exists even though we have trouble defining it."

I think I understood what "quality" is, at least in consumer products, but what is it in health care? Masaaki Imai, who wrote, *Kaizen: The Key to Japan's Competitive Success*,[5] asked this question in the context of a consumer marketplace: "are your workers proud enough to buy what they build?"

We can take Imai's question, and reframe it in the context of health care: "are your staff members proud enough to receive care at your facility?" If your answer is yes, then I want you to ask yourself this question: "would you be proud to have the person sitting next to you receive care at your center, without giving him or her any special treatment?"

We all know what happens. If one of our professional colleagues was brought into our trauma bay tomorrow, we would all be incredibly attentive, because we would want everything to be perfect. Ask yourself: Why is that person sitting next to us so different than our regular patients? The answer is because we're so concerned about the "quality" of their care.

In his book *Crossing the Quality Chasm*,[6] James Corrigan wrote about the influence of the emphasis of "quality" on health care, and he pointed out that societal and economic influences are driving continuous quality improvement in health care. Unfortunately, there remains a gap between the quality of care that our system delivers, and that which it was capable of achieving. What Corrigan pointed out was that this "gap" was not a

consequence of the individual providers within the health care system. Rather, the fault resulted from the "failure of health care organizations to incorporate known improvement measures into the processes of care."[6] Corrigan's book was written in 2001, and I believe this premise still holds true 17 years later.

Corrigan went on to identify six major aims of health care: safety, timeliness, effectiveness, efficient, equitable, and patient-centeredness. These six aims seem very reasonable, even today, and I am sure that we would all agree that they would mark a high quality health care system.

But how do we understand, and define, "quality" in the context of our view from the bedside? Why is that the quarterly scoresheets that we get from TQIP, or our monthly HCAHPS reports, do not seem to encompass either Corrigan's "Six Aims," nor our perception of a high quality system? Why do those reports seem so disconnected from that little voice in our head, our "Shackfordian Quality?"

I returned to *Zen and the Art of Motorcycle Maintenance* for answers. Pirsig identifies two, distinct, types of quality. There is "static quality," which is anything that has a repeated arrangement to it, where there is a pattern that persists long enough to be noticed within the flux of immediate experience. For you and I, this loosely translates into "quality" that can be measured and presented as data. This is the church within which I have worshipped in for the last 15 years, with my intense reverence for my trauma registry, my trauma program manager's reports, and my TQIP dataset.

But Pirsig also identified another type of quality. "Dynamic quality," is something that's not fixed or determinate, and, quite frankly, it can't be defined. This is the thing that we can't quite figure out what it is, and a true understanding of it can only come from experience. This type of quality comes from years at the bedside, knowing what to do, and knowing when your system is functioning at its best to deliver care that you innately know is high "quality."

To me, finally, Pirsig's definition completes the "quality" picture. On one hand, there is "static quality," which is objective, and comprised of the data that we covet. This is TQIP. On the other side is "dynamic quality," which is subjective. This is experience, and knowing when you have done "the right thing." This is that "Shackfordian Quality" that we all talked about, and felt, back in Vermont.

The key lies in marrying these two "quality aspects" together, and making them work in concert with each other. We have to look not only at objective quality, the data that we have, but the experience of what we know works. Once we embrace this concept, our "quality" system becomes complete. As Pirsig states: "A real understanding of quality doesn't just serve the system, or even beat it or escape it. A real understanding of quality captures the system, tames it, and puts it to work for one's own personal use while leaving one completely free to fulfill his inner destiny."[4]

I would takes some liberties with Pirsig's words, and change them over to a form of "Zen and the Art of Trauma Care:" A real understanding of quality doesn't just serve the system, or even beat or even escape it. A real understanding of quality captures the system and tames it and puts it to work for one's **patients**' use while leaving one completely free to fulfill **our promise to our patients**.

Suddenly, our mediation on quality begins to make sense. We now know where we need to go. So how do we get there? How do we get to a high-quality, high-value system?

Unfortunately, we have a big problem at baseline: trauma is the perfect storm for medical errors. We have incomplete patient histories, unstable patients, time-sensitive decisions, we have concomitant and competing tasks, multiple disciplines get involved in the care of a single patient, we have long hours, and we have junior personnel working after hours in busy emergency departments. In his 2006 paper, Gruen et al.[7] postulates that these factors combine to create an ideal breeding ground for medical errors to occur. "Despite the obvious importance of error management in health care, preventable deaths are still occurring at a rate of 2 to 22 percent in trauma care."[7] Interestingly, Gruen's 2006 estimates jibe exactly with what the 2017 NASEM report calculates for an error rate.

Clearly, we have a problem, as our preventable error rate has not declined in 11 years, despite the fact that trauma providers pride ourselves on our "Trauma Operations Process Committee," and our "Trauma Improvement Committees," and our rigid attention to our TQIP reports. There is no question in my mind that we need to do better: "It's a sin to be good, when you were sent to be great." I don't think there is anyone in our profession that just wants to be good. We all want to be great in the care of our patients.

So how do we get there? How do we go from good to great? I think that we need to look towards the those companies in the business world who succeed in very highly competitive markets, and use their quality techniques in health care. We have to let business guide us. We have to turn to the industrial engineers, who have developed high-precision systems to output products which are nearly error free, and adopt their methodology. We have to look at human factors engineers, to design products and systems that fit the user, and not the other way around. We have to design systems that are elegant and simple, and function to inherently reduce human error. We have to look at the service industry and see how they make changes in the services that they deliver when their consumers are unhappy.

There is a science to quality improvement. Checklists, Six Sigma methodology, Lean principles, Kaizen, and human factors all can be used to our advantage in revolutionizing the quality of the care that we render. Every single one of these techniques has been used within health care already, but rarely are they used in trauma. They are almost never studied, and they are rarely presented at national meetings.

I am sure that everybody here has used a checklist in their hospital at some point, particularly in the intensive care unit. Unfortunately, there is only limited evidence to support their use in health care, and even less in trauma.[8,9]

Six Sigma is a system that was developed by Motorola in the 1980s and ultimately championed by General Electric. It is a conceptual framework: the goal is to reduce your error rate to 3.4 defects per million, or six sigma from the desired measure. How does it work? You define the problem, you establish a metric which defines the problem, and you measure it for a period so that you have some baseline data, and you implement an improvement. You then look at a control process, which ultimately shows that you have improved the quality of the measured "problem."

What is Lean? Lean is based upon a Toyota manufacturing paradigm that focuses on eliminating waste. Leaders and workers continually analyze the steps that are used to perform a process, for example a trauma resuscitation, and you try to eliminate of all the steps that don't add value to the process. Lean can be a difficult strategy to employ initially, as it requires a cultural shift in organizational behavior, and requires support from all tiers of hospital management. Its benefits, however, have been shown in ICUs, and it is recommended by the Institute for Healthcare Improvement.[10]

The last methodology to discuss is Kaizen, which, quite frankly, is my favorite. "Kaizen" is Japanese for improvement, or "change for the best." In manufacturing and engineering, Kaizen is a process through which you instill a dedication to continuous quality improvement throughout a system. What is unique about Kaizen is that the philosophy applies to every person within an institution, from the CEO to the factory workers. Kaizen is now a recognized quality paradigm worldwide, and is an important pillar of any high-functioning, highly competitive manufacturer.

Kaizen works when it sets new standards of quality every single day. Typically in a system, there is a period of innovation, followed by a period of continuous improvement. The end result is that the process generates a continuous rise in the quality of the product that you are producing. For leaders, Kaizen methodology means that you constantly have to upgrade your standard, and Kaizen strategists say that standards are, by nature, tentative. Each standard should be viewed as a stepping stone, with one standard leading to another as continuing improvements are made.[5]

How about human factors engineering? Human factors engineers actually look at processes in unique ways, looking for deviations in a process called "flow disruptions." A flow disruption is defined as "a deviation from the natural progression of a task that potentially compromises or reduces the safety and efficiency of a process."[11] Ken Catchpole, who is a human factors engineer in my own institution, actually studied flow disruptions in trauma bays, and he identified that coordination and communication issues make up approximately half of all flow disruptions in Level I centers.[12] The accumulation of flow disruptions ultimately leads to preventable errors.

Let's return to my four "unfortunate events." My argument with my CQO regarding our PE rate was centered around our aggressive screening for PEs. In this circumstance, the objective data, in my opinion, was not matching the subjective data. I felt very strongly that we were actually rendering high-quality care.

Fortunately, there is data to help support my bias. Bilimoria et al. wrote a paper, entitled "Evaluation of Surveillance Bias and Validity of the Venous Thromboembolism Quality Measure,"[13] which looked at the factor of surveillance bias on the validity of the VTE quality measure. Essentially, what this group found was that the higher-quality institution you were, the more PEs you identified and the higher your VTE rate was.

This article, and my experience, calls into question the merit of the PSI-12 VTE outcome measure, which I fight every day as a quality officer. It calls into question this metric's use as a publicly-reportable, performance-based metric for which we are being reimbursed. In sum, the system is penalizing us for the wrong thing!

How about my staffing issue? In this circumstance, we have to rely upon the subjective aspect of quality, as my literature review did not identify any objective quality data to aid in my staffing models. I was forced to look at what some other industries do.

I have a family friend, who is a professional pilot. He asked my son, "What does your dad do when he's really tired at work?" My son replied, "He just works through it." Our friend was aghast. "In my industry, we call that fatiguing. I am actually limited in the number of consecutive hours that I can fly prior to having mandatory downtime. If I land someplace and I say that I'm tired, I just raise my hand, and my company automatically gives me a twelve-hour rest period, without repercussions." Subsequently, the pilot and I have discussed this paradigm in detail, and the culture of safety within the airline industry: "If I say that it is unsafe, it's done. There are no questions asked." His seat time hours are tracked by the FAA and the pilots' union, because fatiguing is felt to be an immense safety issue within the industry. Curious, I asked him why no one ever pushes these boundaries: "because the owners pay you to be the best that you can be." In fact, pilots are incredibly sensitive to these issues, because mistakes also cost you your own life.

Let's look back at our own profession. What if you were the patient that was asleep on the table and your surgeon was tired? What if it was your life on the line, much like that of the airline pilot? Remember Dr. Shackford's dictum regarding the sacred pact between the surgeon and the defenseless patient? We have no work hour regulations, and we have no recommendations for safe staffing ratios. How many times have you been asked if you're "well rested" in the holding area of your operating room by a patient? How many times have you been honest, and answered "no? " How many times have you known that you were lying when you said "yes, I am well rested?"

There is no trauma organization in this country that has taken charge of establishing even minimum safety standards for attending surgeons. Is that how we honor the sacred pact with our patients?

Is this how we want to care for our patients? Is this optimal care? Recall that we have "30,000 preventable deaths per year'" and trauma "creates an ideal breeding ground for medical errors." Is this optimal for our profession?

How about the COT verification visit and the metrics that we are required to track? Do we al agree on the taxonomy of "quality?" Does "Optimal Care of the Injured Patient" really ring true to you? Are trauma medical directors being adequately trained in quality improvement methodology, or do we just say "go for it?" Is anyone teaching Kaizen or Lean to our Trauma Medical Directors or to our Trauma fellows? How can we critically evaluate the metrics that the COT is mandating us to track, if we are not taught the fundamental tools to understand quality and quality systems?

How about the NASEM report? "Achieving zero preventable deaths is an achievable goal when leadership takes ownership," but whom is going to provide that leadership? Who is going to take ownership? Who is not afraid to fail? Who has the drive, the knowledge, the passion, and the manpower to take on that challenge on behalf of our patients?

My challenge to my colleagues is this: How are we going to live? Are we going to honor that sacred pact that we have

with our patients? How can we just be good when we were sent to be great?

My charge to the trauma organizations of this country is to create quality committees, and race into the quality leadership vacuum. Our mission should be to champion strategies of care for trauma patients that adhere to Corrigan's "Six Aims" and to design systems that are high-quality care and eliminate preventable deaths. I would like our profession to try to combine Pirsig's subjective and objective aspects of quality to use data, but also to use experience. We must look critically at the standard quality metrics, and challenge their utility. We are obligated to lobby CMS for change where the "quality metrics" are nonsensical. We need to advocate for, and adopt, standards of care where others have failed to tread: staffing ratios and mandatory rest periods. We must look at the care that we are providing, analyze it, and develop white papers on the issues surrounding quality when there is a lack of data. We need to develop consensus statements as to the taxonomy of "quality:" what is a "preventable death?. We should teach young trauma surgeons the new techniques in quality improvement, such as Just Culture, Lean, human factors engineering, and Kaizen. We must identify and set priorities for future research and quality improvement.

My beliefs on the future of quality in trauma care are summarized well by Pirsig, in Zen and the Art of Motorcycle Maintenance: "If a revolution destroys a systematic government, but the systematic patterns of thought that produced the government are left intact, then those patterns will repeat themselves in the succeeding government. We need to change the way that we think to optimize care. We are not doing it the way that we should."[4]

My challenge to the trauma community is to lead this charge and implement change in our specialty. I know that we all can see pieces of ourselves in this quote by Avedis Donabedian, a University of Michigan professor who is considered to be the "Father of Quality:" "Systems awareness and system design are important for health professionals, but they are not enough. They are enabling mechanisms only. It is the ethical dimensions of individuals which are essential to a system's success. Ultimately, the secret quality is love."[14]

"It's a sin to be good when you were sent to be great." That quote comes from a University of Michigan running back, Chris Evans, who was eighteen years old at the time he made that statement. I found it incredible that a young man could be so poignant in describing his quest to be better. We must take his words, and use them as our mantra for quality in trauma care.

DISCLOSURE

The author declares no conflict of interest.

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