MEDICAL EVIDENCE IN PERSONAL INJURY LITIGATION: DAUBERT'S GHOST©

with commentary on scientific evidence in medical negligence litigation

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Medical Presentation at Trial: Scientific Evidence in the 21st Century[1]

By Elliott B. Oppenheim, MD/JD/LLM HEALTH LAW[2]

§ 1 Preparation of Medical Proof for Trial- Introduction

As a case approaches trial, consistent with the Federal Rules of Civil Procedure and of Evidence, parties attempt to narrow issues which the trier of fact must then decide. This process winnows scientific wheat from chaff.[3] In some ways a pre-trial cottage industry has arisen in excluding expert witness testimony and of the scientific evidence through pre-trial motions *in limine*. This monograph concerns this winnowing process and describes in what ways courts make decisions in this winnowing process.

Fed.R.Evid. 702 provides:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

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[1] See, *generally*, ASHLEY S. LIPSON, IS IT ADMISSIBLE? (James 2000). This is an handy short and direct handbook which is helpful to trial lawyers who seek to object, grasp for the language, but want a bit of help. This book is clear, an easy to read, and functional courtroom tool. Contact: James Publishing: 800-440-4780; fax 714-751-2709; website: http://www.jamespublishing.com.

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[3] *See*, Weisgram v. Marley Company, 528 U.S. 440, 120 S.Ct. 1011 (2000) (holding that non-scientific evidence may support case dismissal).

This monograph examines the *substance* of testimony these expert witnesses would offer.[4] Will testimony assist the trier of fact? And what about the quality of an opinion … "or otherwise." How does a judge know what is scientific or technical or other specialized knowledge which requires expert testimony? What is the meaning of this substantive aspect of Rule 702?

Medical, scientific, and "other specialized" evidence dominate automobile litigation and this monograph will present important issues in the context of automobile litigation. This area of law can be enormously complicated or, if one can see the forest for the trees, as this monograph endeavors to point out, in many ways, this area of law is not unlike reading a road map. Frankly, much of what constitutes scientific evidence is "common sense," intuitive to most people. But, as simple as that observation appears, how to define science in the court room is elusive. There is no "perfect" test to separate science from non-science.

This monograph will explain to the lawyer how to "get there" from "here." "There" is a successful jury verdict; "here," the monograph's starting point, is with a professional, an expert witness, who sits in the jury box waiting to testify.

In some ways, since scientific engineering evidence does not present *as* subjective a component for the court's discretionary analysis as does medical interpretations; because engineering evidence is more concrete, engineering evidence is actually easier to analyze from the point of view of an evidentiary analysis. This monograph will thoroughly discuss both engineering and medical evidence.

[4] "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified … may testify thereto in the form of an opinion or otherwise." *Id.*

Going to the heart of science, medicine, and law, the analysis and discussion will grapple with what exactly is meant by the term "scientific evidence" when a party wishes to introduce scientific testimony or scientific proof. What is the legal definition of "science" in the court room? How does one know when information or data qualifies as "science?"

Obviously any rule must be so broadly crafted that it would work for nearly all situations. A rule would not be successful, in a constitutional or evidentiary sense, if one rule covered only medical evidence, another rule covered only mathematical evidence, another rule were required for vocational rehabilitation, and another rule for animal testing evidence and for life expectancy analyses. The construction of such a successful rule has spanned eighty years and what is now the "rule" in the American judicial system is an easy one to articulate but with endless qualifications and paradiddles which still leave the courts in some disarray as we enter the next century. The Rule is a tribute to the legal minds whose cumulative litigation experience and analysis have contributed to creation of "The Rule."

This monograph will present the landmark decisions and attempt to sculpt from these trees a unity which is relatively straightforward to understand even for the trial lawyer for whom this monograph represents an initial foray into these dark forests of scientific evidence.

In medical negligence litigation this author has advised orally and in writings that unless one can look to a recovery of at least $150,000, then "don't do the case." This is not true in motor vehicular negligence litigation where many lawyers obtain recoveries which compensate the client for small injuries; cervical spine strain; lumbosacral strain;

contusions and abrasions. One of the reasons that this is possible is that the cost of automobile related litigation is much less than that of medical negligence litigation. The duty in driving an automobile or motor vehicle is well understood; liability is much easier to establish and juries are easily able to see causation; damages are "common sense." Folks don't view automobile litigation as "personally" as do medical professionals view medical negligence actions; there generally is no reptutational "fall out" from a rear-end collision. Automobile accidents are common-place in everyday life.

In many cases, where insurance coverage is in effect, usually it is not even necessary to file suit. The dollar for dollar profitability for a lawyer is much greater in automobile negligence cases than in medical negligence litigation although the upside potential in medical negligence litigation is perhaps substantially higher than in automobile litigation.

Automobile negligence cases are "economically efficient" for the client and for the lawyer. A lawyer who recovers $1,000,000 for clients involved in motor vehicle litigations receives fees between 33.3% and 40% in most jurisdictions. In many cases, injured parties may settle with the insurance company without retaining counsel.[5] The cases, individually, might recover $50, 000, on the average; twenty cases. Most cases, with good liability and significant injuries, will settle with few costs. Insurance

[5] *See*, Annette Wencl & David Strickland, *Allstate's "Customer Service" Charade*, TRIAL, September 1999 at p. 42. "The insurance company's pledge to help auto collision victims who don't use attorneys is misleading," argue the authors. "In several states, the pledge is considered the unlicensed practice of law, and in others class action lawsuits are pending." *See also*, David C. Cassidy, *et al.* , *Effect of Eliminating Compensation for Pain and Suffering on the Outcome of Insurance Claims for Whiplash Injury*, 342 N.ENG.J.MED 1179 (2000). This study concluded that the elimination of compensation for pain and suffering was associated with a decreased incidence and improved prognosis of whiplash injury. The study was funded by the Saskatchewan Government Insurance company, the only automobile insurer in that Canadian province. *But see*, *No-Fault Study Doesn't Prove its Claims*, 26(5) ADVOCATE 1 (2000) (analyzing the N.Eng.J.Med article and the flaws ATLA detected).

companies avoid economic inefficiency. Why take a treating doctor's deposition which may cost $3,000-$10,000[6] in a case worth $50,000 when the police report supports liability and where the medical records document the injuries? What is left to fight about?

The low injury, low damage cases are vastly more common than the high injury automobile cases, too. The "low impact cases," as they are called, rely, in some instances, upon some novel scientific theory, which, when this topic is discussed, will serve as background to the evidentiary problems raised by three famous landmark cases: *Frye*, *Daubert*, and now, most recently *Kumho Tire*.

> **Practice Tip:** To research the law of evidence and this scientific interface consult the WestLaw databases: FPP, FEDEVID, RMSCIEVID. Also, the following texts are superb: BERT BLACK & PATRICK W. LEE, EXPERT EVIDENCE: A PRACTITIONER'S GUIDE TO LAW, SCIENCE, AND THE FJC[7] MANUAL (West Group 1997);[8] DAVID L. FAIGMAN, DAVID H. KAYE, MICHAEL J. SAKS & JOSEPH SAUNDERS, MODERN SCIENTIFIC EVIDENCE (West Group 1997).[9] The guidebook which the federal judiciary uses may be found at http://www.fjc.gov/EVIDENCE/science/sc_ev_sec.html.

§ 2 From Newton to *Daubert*: Basic Physics

It is important at this time to present some basic review information about the physics of automobile collisions. Automobile or motor vehicle collisions are "inelastic collisions." Automobile - pedestrian collisions are inelastic. What is meant by this term "inelastic" is that the energy from one mass is not fully transmitted to the mass of the second object; some energy is absorbed by the colliding bodies. Unless we speak in

[6] Lawyer fees + expert witness fees + court reporter fees + lost opportunity costs for the company' attorney + adjuster fees.
[7] FJC = Federal Judicial Center's REFERENCE MANUAL ON SCIENTIFIC EVIDENCE.
[8] [hereinafter EEPG].
[9] This is a three volume set with the most recent supplemental volume three released in 1999. [Hereinafter MSE].

nuclear or even at sub-atomic levels, there are probably no truly elastic collisions[10] on earth since there are always the forces of gravity and friction present which "absorb" energy and make it physically impossible for one body to transmit all of its energy to another.

An example, however, of a collision which is nearly elastic occurs on the pool or billiard table where one ball transmits most of its energy to the target balls. The physics equation, $m_1v_1=m_2v_2$, expresses the physical concept that the mass and velocity of one object are completely transferred to another object when the two objects collide head on in a perfect, frictionless, system. "Air hockey"[11] is another example of these systems which approach such a fully elastic situation.

The equation stands for the premise that the mass and velocity of incoming object is transferred to the mass and resultant velocity of the target object: fully, completely, 100%. The opposite is true as well. The target object will move according to the mass and velocity of the incoming object. In the system, the energy is said to be conserved. Energy always goes somewhere — often to the car frame, surrounding structures, and to the passengers...but somewhere.

An example illustrates these principles: There are two balls: an incoming ball; a target ball. If an incoming billiard ball moves at 10 mph and strikes another target billiard ball[12] which is stationary, the exit speed of the target ball will equal[13] the entry speed of the incoming ball: 10 mph.

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[10] An elastic collision is one in which all of the energy from the colliding mass is transferred to the target mass without energy loss.
[11] Pucks are supported by an air cushion on a playing table as players strike the puck with a cue … similar to billiards or to pool.
[12] Of equal weight.

Suppose, now, that the target ball, instead of being made from plastic, is composed of soft clay. The measurements of the balls are otherwise equal and the weights remain the same. The incoming ball strikes the target ball at 10 mph. What happens to the target ball. Since the target ball is soft, it will absorb the impact and does not move. What happened to the energy in the system?[14] If one inspects the target ball, one will find that the target ball has deformed. The energy from the incoming ball transferred to the target ball and caused the ball's deformation.

Imagine applying these principles to an automobile accident. Life on earth is physically imperfect due to losses through friction and gravity and when an automobile collides with another automobile, the lion's share of the impact is absorbed by the automobile frame, the roadway, by the target automobile … and by the passengers.[15] The forces are tremendous, even in a small collision.

Consider a 2,000 pound automobile traveling at 20 miles per hour. If the above formula is applied, the automobile mass is 2,000 pounds, the incoming velocity is 20 miles per hour:

$m_1v_1 = m_2v_2$ (2,000 pounds) X (20 miles / hour) = 40,000 pound /miles per hour

The force in this system, the inertia, is expressed by the value 40,000 pound /miles / hour.[16] At 60 miles per hour, then, the incoming forces would equal (2,000 pounds) X (60 miles per hour) = 120,000 pounds/ mph. If the car strikes an immovable object, a

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[13] As above noted, these are approximations. Actually some energy is lost in the system but, for the illustrative purposes, it is possible to ignore these imperceptible losses.
[14] The incoming ball traveling at 10 mph.
[15] To attempt to create a vehicle which would be less absorbing would create disasters rather than decrease them. In terms of automobile safety, it is safer to permit energy absorption into the vehicle rather than to deflect it away. This is the reason automobiles have "crumple zones," areas which absorb energy … rather than transmit the energy to … the passengers.
[16] It is not important here to get into the physics, but one can easily see that 40,000 is a big number.

concrete retaining wall, at that speed where do the forces go? To the frame of the car, to the retaining wall … to the passengers.

A vehicle traveling at 60 miles per hour moves 88 feet in one second.[17] Assuming one jumps out of a car at 60 mph, it is easy to see why the injuries are so severe when one considers that a 200 pound man traveling at 60 miles per hour, by the time he decelerates to 0 mph on the roadway … would have traveled a considerable distance and all of the force involved would have to be dissipated somewhere … typically to the body of the person skidding along the road. Ouch!

On earth, as mentioned above, there are no collisions which are either perfectly elastic or perfectly inelastic. In a smaller example, consider two loosely compacted balls of tin foil. If these balls collide into one another, notice how each deforms as it absorbs the energy from the collision. To illustrate further, here, consider an egg, dropped from six inches. The shell absorbs some impact, the contents absorb some … but the floor absorbs some impact, but very little. Notice the effect the egg shell's inelasticity has on its contents, the yolk.

In the analysis of any automobile collision, always consider these physics concepts and it will make it easier to conceptualize the accident and the effects of the accident upon the vehicle occupants and the injured parties. Remember, too, that a small amount of force applied in the right anatomic place for a passenger can produce a fatal injury even at low speed. Never forget what David did to Goliath with a stone sent hurtling with a slingshot. The human body has anatomic vulnerabilities — Achilles Heels, so to speak.

Precisely how and why is this information useful to the practitioner? To understand the scientific principles, the physics, is as important in automobile litigation as it is to understand the medicine in medical negligence litigation. Whether an attorney represents the plaintiff or the defendant, the attorney must understand the mechanism of a motor vehicle accident. Automobile accidents are lessons in Newtonian physics, in the simplest form.[18] Unless the attorney is able to visualize the dynamic physics of the crash in action, it would be confusing to plan discovery, to understand accident reconstructions, or to understand the nature of the medical injuries.

For instance, at one time seatbelts only covered the lap. It was not until engineers understood that at the moment of impact the whole torso moved forward and severed the spinal cord against the lap belt, that safety engineers added the chest harness. This small addition to the seatbelt dramatically reduced spinal cord injuries.[19] The same is true for the airbag.[20]

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[17] 60 mph = (60mph)(5,280 failure to / mile) ÷(60 minutes / hr)(60 seconds / minute) = 88 feet / second.

[18] Newton's laws of motion are the three laws that form the basis of Newtonian mechanics. (1) Unless acted upon by an external resultant, or unbalanced, force, an object at rest stays at rest, and a moving object continues moving at the same speed in the same straight line. Put more simply, the law says that, if left alone, stationary objects will not move and moving objects will keep on moving at a constant speed in a straight line. (2) A resultant or unbalanced force applied to an object produces a rate of change of momentum that is directly proportional to the force and is in the direction of the force. For an object of constant mass m , this law may be rephrased as: a resultant or unbalanced force F applied to an object gives it an acceleration a that is directly proportional to, and in the direction of, the force applied and inversely proportional to the mass. This relationship is represented by the equation: a = F/m . This equation is usually rearranged in the form: F = ma; (3) When an object A applies a force to an object B, B applies an equal and opposite force to A; that is, to every action there is an equal and opposite reaction. *Hutchinson Dictionary of Science*, MULTIPEDIA, SOFTKEY CD-ROM (1995). To order: 800-845-8692.

[19] *See*, Mark P. Robinson, Jr. & Kevin F. Calcagnie, *Rear-Impact Collisions Expose Seat Defects*, TRIAL, March 1999 at p. 50. Seat backs are equal to seat-belts in providing passenger safety. In relatively slow rear-impact collisions, seat backs may collapse and cause substantial injury.

[20] *See*, Lawrence Baron & Matthew Whitman, *The Hard Truth about Airbags*, TRIAL, January 2000 at p. 53. Air bags can, themselves, kill. "Despite knowing about the hazards, automakers have been slow to adopt safer designs," the authors criticize.

If the attorney understands the physics of the collision, the attorney will then understand how the accident occurred and how the injuries occurred. This may lead to other causes of action including a products liability action included in the physical tort action.

Defending a motor vehicle lawsuit also requires a detailed understanding of the accident mechanism. Suppose the plaintiff's case theory does not hold "scientific water?" The defense might revolve around a scientifically invalid case theory which may lead the jury to find for the defense. If successful for the defense, the case may founder through a *Daubert* motion.

§ 2 Proof and the Expert Witness

Medical matters must be introduced as scientific evidence. Courts will require medical expert witnesses to testify according to a reasonable degree of medical certainty based upon medical facts[21] and to meet all the *Daubert* rules on admissibility.[22]

§ 2.1 To Convince the Trier of Fact:

To prove many aspects of an automobile accident case will require the attorney to introduce evidence which will convince the jury that (a) an accident happened in which the defendant was involved; (b) the accident occurred in a certain way for which the jury should hold the defendant liable; (c) that the plaintiff was injured; (d) that the plaintiff was injured by the accident; (e) that the injuries require compensation.

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[21] MSE v.1 §1-3.3.2[2] (discussing error rates attributable to research methods used). *See*, also, Singer, Co. v. E.I. duPont de Nemours & Co., 579 F.2d 433 (8th Cir. 1978). An opinion not based upon some medical facts is incompetent and should be stricken as conjecture or as speculative. *See*, also, McCormick 64

[22] Robert M. Palmer, *Opening the Gates*, TRIAL June 2000 at 86. This article discusses the federal judiciary's gatekeeper function where the judges enforce strict admissibility standards for expert witnesses. Trial lawyers must prepare experts in depth for jury testimony.

Typically one expert or another[23] will need to explain the arcane nuances at each step of this situation to the jury since most of this material falls outside of what an ordinary person knows and is able to understand without assistance from an expert witness.

§ 2.3 Subject Matter Proper for Expert Testimony:

To warrant the use of an expert witness, the proponent must establish two general requirements under Fed.R.Evid. 702: the matter must be distinctively related to science, medicine, some business or profession, or occupation so that it is "beyond the ken" of lay persons.[24]

The second requirement is that the witness' qualifications are sufficient to admit the witness as an expert witness. The witness must possess sufficient skill or knowledge related to the particular field or calling so that this witness' conclusion will aid the trier of fact in the search for truth.[25]

§ 2.4 How Expert Witness Testimony Fits into the Trial:

In a simple scenario, expert witnesses might include, for either side, an accident reconstructionist, a treating physician, and an economist. In every case involving a contested personal injury case there will arise a number of medical issues. Generally these issues fall into three categories:

1. A description of the injury;

2. The cause of the injury;

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[23] McCormick §13 (discussing the problem of "trial by experts" where opposing experts testify in a blithering array of testimony so that the trial becomes incomprehensible to the jurors).
[24] MCCORMICK 58. *See*, Hagler v. Gilliland, 292 So.2d 647 (Ala. 1974).
[25] MCCORMICK 59. *See*, Farner v. Paccar, Inc., 562 F.2d 518 (8th Cir. 1977). Whether the opinion is scientifically valid will be discussed at length below.

3. The consequences of the injury.

In the simple case where a client's leg is broken in an automobile accident, for instance, he experiences immediate pain in his lower leg and observes the bone sticking through his skin. The leg is casted and knits, but at trial time there is tenderness at the site of the fracture and pain upon prolonged use or a change in the weather. How will the three elements be established? Must a medical witness be called? Can lay testimony suffice?

The injury can be easily described and just as easily understood by any juror; "a broken leg". The cause of the injury is apparent: leg broke in accident. Where expert testimony will be required is to describe the nature of the break and the subsequent disability which resulted from that injury. The defense may contest the extent of(the injury and the permanency of injury. Not all injuries are so easily described, so apparently traumatic, with such obvious results.

Where the injury is not easy to establish, if the injury, its cause and its consequences are beyond an average juror's understanding, then a medical expert will have to testify in order to fill the void and establish the quantum of proof necessary to establish a jury issue.

While the victim may be able to tell the jury about how the leg broke in the accident, it will take an expert witness, qualified in a particular area of expertise, testifying to things outside the realm of common knowledge and, consequently, permitted to give opinions which will form the basis of medical legal proof so that the jury may reach a conclusion on whether to compensate the victim, and how much to compensate the victim.

Medical testimony serves a function beyond merely "getting the case to the jury." A lawyer rarely thinks in terms of presenting the barest amount of testimony necessary for his case. Getting beyond a motion to dismiss is hardly to be considered a victory. Success in summary disposition establishes only eligibility to compete for the real prize—a jury verdict. To achieve a favorable jury verdict the lawyer must present clear, convincing, moving testimony. He must think in terms of maximums—not minimums. He will not be content with the injury being described as a "broken leg".

Through the lawyer's professional skills the jury must be acquainted with those elements of the injury which are beyond their normal ken—the attendant splitting of the periosteum, the ruptured vessels, the torn ligaments, the damaged nerves. An in court demonstration is often helpful to educate the jury. Breaking a turkey leg, for instance, might illustrate what happens when a leg breaks but is the turkey leg example admissible to "prove" the force necessary to break a human leg? Is such a test admissible evidence for any purpose? Is the "test" a valid scientific reconstruction of the leg break; it the test "substantially similar"[26] to the accident breaking the leg?

Favorable jury verdicts, for either side, come only after the jury is provided facts. Without facts to make the argument, Clarence Darrow would have made little impression. Disability will not be compensated with testimony that, "It hurts when I walk". There must be proof of the loss of motion in the joint, the area of hypesthesia, the extent of disuse atrophy. Nor will the extent of harm be confined to the site of the injury. The swelling in the foot will be associated with the impaired circulation, the pain in the low

[26] This is the legal standard for a reconstruction and this will be discussed in depth below.

back will be related to the unnatural posture necessitated by a favoring of the injured limb. Expert testimony is required to give the trier of fact … facts.

§ 2.5 Function of the Plaintiff's Medical Witness:

This, then, is the function of the plaintiff's medical witness—

1. To establish sufficient proof to create jury questions on the legal issues of proximate cause and extent of the consequences; and

2. To convince the jury of the extent of the injuries and that these consequences were the result of the accident.

In serving these two functions, the expert witness serves two roles. The witness will describe the medical injuries and then the witness will educate the jury about the injury and what it means to the patient's function. If the witness is the treating physician, the witness has pertinent information regarding the injury, the treatment and the result. In this respect the doctor is no different than any other witness. Any layman could testify to the appearance of a plaintiff after an accident and this testimony is competent and very meaningful. The competency of this evidence is no way affected by the medical education or lack of it by the testifier.

The doctor who views the plaintiff in the emergency room may be more technical and perhaps more accurate ("The victim was suffering from a large, flap type laceration extending from the right temporal region through the outer borders of the right brow, across the eyelid to the glabellar region. Another laceration extended from the outer canthal region of the left eye inferiorly and medially to within 2 centimeters of the left nostril, etc."). But the ambulance driver's testimony might be more vivid ("Her face was cut to ribbons"). Indeed, the value of this type of testimony is frequently in inverse proportion to the medical knowledge of the witness since these events are so shocking to

lay witnesses that they often give vivid descriptions which medical professionals, since this is their "hum-drum day in the clinic," typically never articulate.

In addition, the description of what was done by way of treatment could be competently recited by a lay witness as well as by a doctor. "He set my leg. I was given a series of shots. I had to take whirlpool baths and other kinds of physiotherapy. They operated on my leg and put in a pin". This is typical testimony from an injured plaintiff. In so testifying he is not usurping the function of the doctor nor is he assuming the role of an expert. The plaintiff relates what he saw or experienced. When the doctor testifies, he too is fulfilling this role as a witness.

The result of the injury might also fall within the same category of testimony. The doctor is merely a witness testifying to whatever any layman could recite when he states, "The plaintiff now has a one inch shortening in his leg.—He walks with a decided limp—The leg swells with prolonged use."

Of what significance is it that the medical practitioner is serving the role of a typical lay witness in many aspects of his testimony? First, the lawyer might have a medical witness who does not qualify as a medical expert. What of the homeopath, the masseuse who treated the aching back, or the correspondence-course chiropractor? Even though such witnesses may not qualify as experts their testimony will be received if it stays within the bounds of presenting facts.

Second, sometimes the lawyer encounters a qualified medical expert who is extremely uncooperative or perhaps even hostile to his cause. When contacted about the possibility of testifying he flatly says he won't come to court warning "if you subpoena

me I'll charge you $1,000 an hour as an expert witness". Under those circumstances, introduce the medical records and let the doctor stay in his office![27]

§ 2.6 Function of the Defendant's Medical Witness:

In an equal and opposite fashion, the defendant's medical witness comes to trial for two purposes:

> 1. To create jury questions on the legal issues of proximate cause and extent of the consequences; and
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> 2. To convince the jury that the extent of the injuries and that these consequences either were not the result of the accident or whatever injuries did occur do not rise to the level to justify the compensation the plaintiff seeks.

The defense attorney is tested here because nearly everyone is sympathetic to the injured person. It is a difficult task for the defense lawyer, through his medical witnesses to argue that the pain and suffering is not genuine, that the disfigurement does not impact the person to the degree she professes, that the disability is not as disabling as the plaintiff says it is. This is one reason cases settle. How can anyone argue that second and third degree burns do not impact a person's well-being? It is here that defense attorneys "earn their salary."

§ 3 Scientific Evidence- General Discussion[28]

Fed.R.Evid. 702 empowers the court to admit into evidence an expert witness' opinions. The Rule's organic language includes four important prongs: (1) that there must

[27] If the lawyer acquiesces and calls such a witness, the potential for disaster is terrific. Once the doctor is on the stand there is no way to "turn off" hostile or unfavorable testimony. Professional witnesses, unlike lay witnesses, can be nearly impossible to control and when the opposing counsel senses this unpleasantry, there is a good likelihood that the opposing lawyer will insist that the "doctor is allowed to express his full opinion!"

[28] *See,* generally, JOHN. W. STRONG, ED., MCCORMICK ON EVIDENCE ch. 20 (West Group 1999); DAVID L. FAIGMAN, *ET AL.* , MODERN SCIENTIFIC EVIDENCE (West 1997); BERT BLACK & PATRICK W. LEE, EXPERT EVIDENCE: A PRACTITIONER'S GUIDE TO LAW, SCIENCE, AND THE FJC MANUAL (West 1997).

exist some scientific, technical, or other specialized knowledge;[29] (2) the knowledge must assist the trier of fact to understand the evidence so that the trier of fact may be able to determine a fact in issue;[30] (3) the evidence to assist the trier of fact is introduced by a witness who must qualify as an expert witness by knowledge, skill, experience, training, or education; (4) the expert witness may testify by giving an opinion.

In general, any licensed health care practitioner will qualify as an expert witness in medical matters by way of background, skills, knowledge and expertise but the court may limit the scope of the opinion which it will permit the expert to offer.[31] Doctors must be confined to medical opinions within their respective fields and engineers must be restrained to offer opinions within engineering.[32] "[E]xpert testimony always should reflect knowledge from the field of expertise at issue, be it medicine,[33] … psychology,[34] … or any other kind of specialized knowledge."[35]

This monograph is concerned with the *quality* aspect of the testimony; the basis and scope of the opinion the expert witness will provide the court. That being said, it is important to understand fully the mechanics of the admission of the expert witness.

At this stage at trial the more significant role of the medical witness will be to establish the causal relationship between accident and injury and to provide a prognosis of the short and long term effects of the injury.[36] Both necessitate opinion evidence and in order to express such opinions the medical witness must satisfy the court that he

[29] Medical knowledge may be viewed as any of these categories, depending upon the information.
[30] The relevancy prong.
[31] Edward J. Imwinkelried, *The Next Step after Daubert: Developing a Similarly Epistemological Approach to Ensuring the Reliability of Nonscientific Expert Testimony*, 15 CARDOZO L. REV. 2271, 2281 (1994).
[32] EEPG 47.
[33] Wheat v. Pfizer, 31 F.3d 340 (5th Cir. 1994).
[34] Cirilo v. Garcia, 908 F.Supp. 85 (D.P.R. 1995).
[35] Cook v. American, S.S. Co., 53 F.3d 733 (6th Cir. 1995).

possesses knowledge beyond that of the average person in an area of knowledge beyond that normally to be expected of an average person.

For opinion evidence to be admitted, the court itself must consider both the subject matter of the testimony and the person's qualification who provides the testimony. Although the jury will hear the testimony, it is the judge who makes the determination, pursuant to Fed.R.Evid. 104(a), whether this person is qualified to act as an expert witness. Remember, unless the court makes this preliminary determination, none of the Article VII rules can apply.

Finally, here, and perhaps of greatest litigation significance, discretion in the admission of the person as an expert and the quality of the testimony is broad … so broad, that unless the judge makes a great mistake and that mistake greatly affects the outcome of the trial, in the opinion of the appellate court, these discretionary decisions are nearly impossible to over turn on appeal. At this point, one is playing, so to speak, "for the whole enchilada."[37] To fail to qualify an expert witness at trial creates a serious disaster, depending upon one's vantage point. For the defense, this may result in the best result … dismissal of the plaintiff's case.[38]

§ 4 Fed.R.Evid. 702: The Two Part Test:

Before examining the *Frye*, *Daubert*, and *Kumho Tire* cases in greater depth, it is import to point out that Fed.R.Evid. 702 contains a two part test: (1) the subject matter of testimony must be distinctively related to a science, business, profession, or occupation

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[36] Permanent or partial disability.

[37] Recently the Virginia Supreme Court issued a public reprimand against attorney William Gething Dade, Virginia State Bar No. 97-060-2390, (October 27, 1999) where this attorney was not able to qualify his own expert in a medical negligence case. The Bar viewed this as a violation of DR 6-101 which requires the attorney to undertake matters where he is competent.

that, in general, lay persons would not understand the testimony without expert witness testimony;[39] and (2) the witness must qualify as an expert witness such that calling upon the witness' specialized knowledge will assist the trier of fact.[40]

§ 4.1 Identification of the Subject Matter:

The key to understanding Fed.R.Evid. 702 lies in the court's search for facts which, without expert assistance, lie outside of the jury's ability to understand.[41] Science defies easy definition[42] but there is extensive literature on how to evaluate expert testimony.[43]

> **Practice Tip:** An expert witness is necessary when fact determinations would exceed the ordinary juror's understanding. Apply the rule of "common sense."

Engineering is an example of an area of technical expertise where the court will require expert witness testimony to educate the jury since scientific methodology is central to the jurors' collective understanding of these concepts.[44] Engineering predated modern science and has always relied upon experimentation and inventiveness along with practical knowledge and common sense.[45] While scientists concentrate more on making

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[38] Ample illustrations follow at the end of this work.
[39] MCCORMICK 58.
[40] Miller v. Pillsbury Co., 211 N.E.2d 733 (Ill. 1965) (holding that the trend is to permit expert testimony in areas which are complicated and outside the knowledge of the average person).
[41] *See,* John W. String, *Language and Logic in Expert testimony: Limiting expert Testimony by Restrictions of Function, Reliability and Form*, 71 OR. L. REV. 349, 355-56 (1992).
[42] EEPG 50.
[43] *Id.* n. 172. (providing numerous cases which describe these analyses).
[44] EEPG 51.
[45] E.V. KRICK, AN INTRODUCTION TO ENGINEERING AND ENGINEERING DESIGN 33 (2nd ed. 1969). Ancient man built an home, for instance, by cutting up a log. Empirically, he discovered that some logs were of the correct thickness to support a roof, to withstand storms, and remain in place over a period of time. Pre-historic man did not engage in "scientific" materials testing to make these decisions. After a while, through trial and error, some roofs "worked" while others did not. Although one may view this home- building as an "experiment," it is the product of trial and error, not one of contemplative scientific methodology.

discoveries and engineers work more on solving practical problems, in applying basic scientific principles to a real-world problem, the fields overlap.[46]

§ 5 The Admission of Scientific Testimony at Trial: *Frye, Daubert, Kumho Tire*[47] and Beyond[48]

Fed.R.Evid. 702 permits the trier of fact to admit into evidence information which is "scientific, technical, or other specialized knowledge" though the testimony of an expert witness. The trial court judge decides who will testify as an expert witness under Fed.R.Evid. 104(a) and decides precisely what information the jury may consider. In automobile litigation, often the parties debate both accident and medical cause and effect. The way in which this is done is that one expert finds accident or medical causation then the other expert witness disputes this expert's findings. In terms of products liability cases, there is considerable engineering evidence which the attorneys introduce and ask the jury to consider. The same may be true when the parties dispute medical injuries.

Scientific evidence overflows modern automobile litigation. In what ways must a court respond to scientific or even non-scientific expert testimony? This section considers this important question. Three cases dominate the legal evidentiary analysis of all scientific evidence: *Frye v. United States*;[49] *Daubert v. Merrell Dow Pharmaceuticals, Inc.*;[50] and *Kumho Tire Co. v. Carmichael*.[51]

§ 5.1 A Concise Overview:

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[46] EEPG 51. Berry v. City of Detroit, 25 F.3d 1342 (6th Cir. 1994) contains a superb legal discussion explaining how science relates to other kinds of knowledge. Consider the field of handwriting analysis in the court's denial of scientific status to the handwriting expert in United States v. Starzecpyzel, 880 F.Supp. 1027 (S.D.N.Y. 1995).

[47] These cases must be read in their entirety. Fortunately the cases are not long!

[48] *See,* generally, JOHN W. STRONG, ED., *Experimental and Scientific Evidence*, ch. 20, MCCORMICK ON EVIDENCE (5th ed. 1999). [Hereinafter, MCCORMICK].

[49] 293 F. 1013 (D.C. Cir. 1923).

[50] 509 U.S. 579 (1993).

Here is a concise overview of this vast body of law. *Frye* established the "general acceptance test."[52] If a test were acceptable in the scientific community, then it passed evidentiary muster and the test was admissible. In most federal and state jurisdiction, the *Frye* test was the sole test to determine the admissibility of novel scientific or pseudoscientific evidence.

Daubert then advanced the admission of scientific evidence in that it established a two prong test: (1) is the reasoning and methodology underlying the theory or technique reliable? and (2) Is the proposed evidence relevant to the case facts in which it is offered?[53]

§ 5.2 What is a Matter of Scientific Inquiry?:

The problem courts faced with *Frye*, then confronted in both *Daubert* and *Kumho Tire*, was that courts lacked an analytical grid through which they could judge that which was legitimate science and that which was "junk science"[54] … an attempt, frankly, to hoodwink the court into believing that the evidence was 'scientific" and therefore credible.[55] "Junk scientists" could say anything without this analytical framework and there would be no way to test whether their theories held scientific water.

That is not to say that the court may not admit testimony which conforms to established orthodoxy, but the trier of fact would not and could not attach the same weight and credibility to a "junk" scientist's testimony as to a legitimate scientist. So

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[51] 119 S.Ct. 1167 (1999).
[52] 293 F.3d 1013, 1014.
[53] 509 U.S. 579.
[54] *See,* David M. Adkisson, *Attacking the Defense Biomechanical Engineer*, TRIAL June 2000 at 83. (advancing the position that "true" junk science emanates from defense expert witness who claim that low speed collisions don't cause injuries).
[55] *See,* Imwinkelried, *The Next Step after Daubert: Developing a Similarly Epistemological Approach to Ensuring the Reliability of Nonscientific Expert Testimony*, 15 CARDOZO L. REV. 2271, 2289-94.

called, hired guns' testimony would be excludable if their testimony did not meet the scientific criteria. Without *Daubert*, junk scientists would merely become junk technicians and junk specialists.[56]

§ 5.3 *Daubert*'s Non-Exclusive Standard for Determining Scientific Validity:[57]

With respect to the reliability inquiry, the *Daubert* Court made several "general observations," known as the *Daubert* criteria, about what factors the trial court *may* consider when making this determination. (1) Is the theory *subject to testing* and has the theory been *subjected* to testing. This testing standard is a "key question."[58] (2) Has the theory been subjected to peer review and has it been published in peer reviewed journals?[59] (3) What is the technique's known rate of error?[60] (4) What are the existence and maintenance of standards which control the technique's operation?[61]

> **Practice Tip:** The *Daubert* criteria are (1) testability (or falsifiability); (2) error rate; (3) peer review and publication and; (4) general acceptance.[62]

§ 5.4 Testability:[63]

How does a trial court identify an opinion which contains uniquely scientific knowledge? One way is to determine whether the assertion may be tested. If the assertion is not subject to testing, then it can not be a scientific statement.[64] The concept of

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[56] MSE v.1. 31. *See*, generally, Clifton T. Hutchinson & Danny S. Ashby, *Daubert v. Merrell Dow Pharmaceuticals, Inc.: Redefining the Bases for the Admissibility of Scientific Expert Testimony*, 15 CARDOZO L. REV. 1875, 1879-81 (1994).
[57] See MSE §1-3.3.
[58] 509 U.S. 579, 593.
[59] *Id.*
[60] *Id.*
[61] *Id.*
[62] MSE v.1 18. Other courts and commentators include additional factors for the court to consider.
[63] *See*, generally, EEPG 429-45; MSE ch. 1.
[64] MSE v.1 19.

testability or falsifiability is most closely associated with the English scientist and philosopher, sir Karl Popper.[65] The *Daubert* court relied upon Popper's writings in its formulations of the non-exclusive criteria.[66]

The concept of falsifiability remains separate from the question of when a scientific theory has been corroborated of falsified by observations. The *status* of a scientific statement relies upon whether it is amenable to testing.[67] The *merit* of a scientific argument is dependent upon the degree to which the argument or hypothesis survives attempts at falsification. Under *Daubert*, both status and merit of a scientific statement are subjects by which a judge must assess the statements.[68]

Under *Daubert*, then, an expert's testimony must be both testable and have been tested … but the opinion did not state the manner in which this should be done.[69]

§ 5.5 Error Rate:[70]

Error rate refers to the number of mistakes a particular technique will make in some specific number of trials.[71]

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[65] K. Popper, REALISM AND THE AIM OF SCIENCE [W. Bartley, III ed. 1983).

[66] 113 S.Ct. at 2796-97. (citing and quoting Popper at length from K. POPPER, CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE 37 (5th ed. 1989)).

[67] This is a theoretical discussion. Consider this, however: Suppose a witness testified that the weight of the human soul was equal to the weight of the number of angels which could fit on the head of a pin. This was a "test" used in the Dark Ages. In a more modern analysis, is this theory, taking it as it is, subject to testing? How would one obtain the angels? Another example: television advertises "certified psychics" who, for a price, will reveal a person's past and future. How would one "test" whether the psychic's powers were legitimate? By testimonials?

[68] 113 S.Ct. at 2796.

[69] See Schmaltz v. Norfolk & Western Railway Co, 878 F.Supp. 1119, 1122 (N.D.Ill. 1995); Williamson v. General Motors Corp., 1994 WL 660649 *5-*6 (N.D.Ga. 1994).

[70] *See,* MSE §1-3.3.2.

[71] To illustrate: Suppose a person is asked to count ten blocks. Most people would be able to do that ten times without error — or maybe miss one. This would be an error rate of 1% or <1%. Suppose the machine counts cells and there are billions of them. If the same sample were presented for testing on five different occasions, the machine would offer numbers which differ by an error rate. Suppose that the exact number is 3 billion, exactly. On some occasions, the machine would measure 2.99×10^9 . On other occasions, the machine would measure 3.01×10^9. In five measurements, however the number would come out to be 3.00

§ 5.6 Sensitivity and Specificity:[72]

There are two important concepts here with respect to scientific measuring: (1) specificity; (2) sensitivity. All scientific testing contains errors in both specificity and in sensitivity. "Specificity" is a scientific term of art which refers to what level of mathematical variability the technique measures *only* that which is sought. "Sensitivity," another term of art, refers to whether the technique measure the proper *amount* of that which is sought.

Both specificity and sensitivity are expressed as a scientific mathematical variable: a value with confidence values: "±" a number.

To illustrate: A meat scale is calibrated to detect differences of 1/10 of an ounce. Meat which "weighs" 6 ounces could actually weigh, using a this balance could weigh between 5.9 and 6.1 ounces. The "scientific weight" of this meat is expressed as 6 ounces ± 0.1 ounce. For most commercial purposes this is just fine since 0.1 ounce is not a significant commercial difference. In society, these variables do not matter in commercial transactions since prices include the variable. It is not important to the butcher or to the purchaser, for instance, if he sells some customers 6.1 ounces and some others 5.9 ounces, so long as both agree that the meat is sufficiently close to 6 ounces for commercial purposes that neither party's interests are prejudiced.

This "ballpark" measurement is insufficient for scientific concerns since a millimeter can represent the difference between life and death … literally.[73] Engineering and medicine measurements require, generally, great specificity and great sensitivity.[74]

X 10^9 but the observed error rate might be ±.1%, the error fluctuation which is dependent upon the machine's rate of error.

[72] *See*, generally, MSE v.1 ch. 3 (statistical proof).

Suppose it is important to know the serum potassium of a patient. The test may show that the potassium level is 3.5 mmol/l and the test would show that the normal range is 3.5-6.3 mmol/l as the reference range. Every laboratory generates its own statistical variability. For instance, this serum postassium may be 3.5 mmol/l ± 0.01 mmol/l. Therefore, a serum postassium which approaches either end of the normal range could actually be dangerous. For instance, a serum postassium of 6.3± 0.01 mmol/l might lies in a range between 6.29-6.31, for instance. This variability in a reference laboratory is determined every day and in some laboratories several times a day whenever the machines are calibrated.

A variability of ± 0.01 mmol/l may be safe for serum potassiums, a determined through clinical studies but suppose one needed to detect a toxic substance which were lethal in parts per trillion, 10^{-10} , to test at that level and to have the test be meaningful might require an experimental variability range at 10^{-12} . Experimental variabilities in both sensitivity and specificity become extremely important in scientific studies.

Here is another example of large variability in specificity and in sensitivity: the polygraph.[75] If a polygraph has an error rate of 35%, the test is wrong 65% of the time! In scientific measurements, two types of error rates occur: false positives; false negatives. A false positive occurs when the test detects something in an amount which is incorrect; a false negative says that the amount is not present but, in reality, it is: truth. The problem

[73] My father told me a story which illustrates some of these principles. During WW II, according to my dad, the Swiss argued with the Germans over whose techniques were better. The tale was this. The German craftsmen-engineers sent to the Swiss counterparts a wire so fine that it could not be seen with the naked eye. The Swiss returned the wire and the Germans accepted this as a triumph … until a German analyst examined the wire and noted that the Swiss drilled an hole through the wire's center! Another variation on that story was that the Swiss sent back the wire with the stamping "Made in Switzerland."
[74] MSE v.1 25.

with the polygraph in terms of its scientific admissibility is that the technique itself is scientifically flawed in that it is neither scientifically specific nor sensitive. In contrast, courts do admit DNA evidence since this evidence has been shown to be both sensitive and specific.[76]

> **Practice Tip:** Suppose, a machine detects a controlled substance X. A false positive would detect the drug … but in reality it is not present. A false negative would not detect the drug; but in reality it is present. Every scientific test has levels of specificity and sensitivity and all scientific tests have false positive and false negative rates. When the levels of specificity and sensitivity become large, the test itself becomes less "scientific." A test which has large rates of false positive or false negatives, is not specific, is not sensitive, and is not "scientific." These error rates are the reason why polygraphs are not scientific and their results are inadmissible. A person could easily tell the truth but the interpretation is subject to wide interpretative variations. EKG, on the other hand, while there are certainly reader variations, are more uniformly interpreted and are a scientific test whose results are admissible as scientific evidence.

In general, scientific investigation is subject to many limitations in *methodology*.[77] These include the three general levels of science: (1) general theory, (2) general application and (3) general technology. Sometimes it is not possible to quantify a source of error. Rate of error corresponds to the general technology limitation level in science.

The *Daubert* court did not specify what error rate should be generally expected but the error rate, in order to assure scientific integrity must not approach the rate produced by chance.[78] In a practical sense, then, it is impossible to dissect free the Rule 702 probative value component with respect to error rate from the Rule 403 analysis. Scientific knowledge is never known with 100% certainty therefore its value to the trier

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[75] *See*, generally, MSE v.1 ch. 14 (polygraph tests).
[76] *See*, generally, MSE v.1 ch. 18 (DNA profiling).
[77] MSE v.1 26.
[78] *Daubert*, 113 S.Ct. at 2796.

of fact, its relevance, depends upon the costs associated with being wrong. The costs of making a mistake should guide a court's evaluation of the proffered evidence.[79]

§ 5.7 Peer Review and Publication:[80]

Falsifiability and error rate examine the actual scientific opinion. "Publication" does not. Under the *Daubert* non-exclusive criteria, when a scientist publishes a body of work in a peer reviewed journal, courts recognize this criteria as *one* of the important signs of scientific legitimacy.[81] Publication in the relevant field, however, operates as a professional endorsement, an indicia, of the expert witness' stature as an expert witness, but says nothing about the *validity* of the precise opinion offered in testimony.

Practice Tip: Publication of the opinion does not make the opinion valid.

Publication in peer reviewed journals is an objective standard since it is simple to access MEDLINE and to read the bibliography or to read the expert witness' CV, but notice that this criterion does not comment upon the actual *validity* of the precise opinion. Further, there are various tiers of peer-reviewed journals, some being more "prestigious" than others. For instance, JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, LANCET,[82] and NEW ENGLAND JOURNAL OF MEDICINE are the most well regarded journals in the English speaking world. It is "most prestigious" for an author to publish in those journals. Judges, too, as well as fellow scientists, judge the quality of scientific scholarship by the journals in which the author has published. That being said, even the "best" journals repudiate studies and have published studies which were later found to have been tainted

[79] MSE v.1 26.
[80] MSE §1-3.3.3.
[81] 113 S.Ct. 2798.
[82] Published in England and Great Britain's counterpart to J.A.M.A.

and wrong. Nevertheless, the *Daubert* court included this criterion in assessing admissibility but, as with the other criteria, it is not a necessary prerequisite.[83]

Suppose an expert witness never published anything on the topic at hand and that no-one else has published in the area? There are esoteric areas about which nothing has been written. A court would examine this and consider that the *Daubert* factors are non-exclusive. The court might then rely on what the court knows about the relationship between science and other kinds of knowledge.[84]

§ 5.8 General Acceptance:

General acceptance really is a proxy for scientific validity and, as with publication, is only as good as the field in which the survey is done.[85] In *Frye*, general acceptance was the standard under which the expert testimony was judged. Rule 104(a) mandates that a judge determines whether the science is valid: it is not a jury question.[86] "In general, trial courts may be expected to admit expert opinion in fields in which rigorous testing is part of the culture. In those fields, substantial testing of hypotheses that have not achieved general acceptance will likely be permitted as support for an expert's opinion."[87]

[83] 113 S.Ct. 2797.
[84] *See, e.g.*, Iacobelli Constr., Inc. v. County of Monroe, 32 F.3d 19 (2nd Cir. 1994) (holding that foundation engineering is not with *Daubert*'s scope); but *see*, FDIC v. Suna Assoc., Inc. 80 F.3d 681 (2nd Cir. 1996) (finding that methodology used by an appraiser satisfied *Daubert*). EEPG 50.
[85] MSE v.1 28. Like peer review, though, general acceptance does not test the actual scientific merit. The criteria of peer review and general acceptance in effect illustrate adage, "birds of a feather, flock together." The meaning in this context is that if testimony is scientific, then it will appear in the company with the scientific "birds" of peer review, publication, and general acceptance.
[86] MSE v.1 28. *See*, Huddleston v. United States, 485 U.S. 681 (1988).
[87] MSE v.1 29.

The *Daubert* court noted that the "general acceptance standard" of *Frye* remained relevant, although it no longer remains a conclusive inquiry.[88] The court's inquiry at the trial level should be "flexible" and trial courts are free to consider other appropriate factors. The Court concluded, however, that "[t]he focus … must be solely on principles and methodology, not on the conclusions that they generate."[89]

§ 5.9 Gatekeeping Functions:[90] ***Kumho Tire Co., Ltd. v. Carmichael***:

Kumho Tire is the next step in the progression where the Supreme Court applied the *Daubert* factors to non-scientific expert witness testimony; to *all* expert testimony.[91] Trial judges are the "gatekeepers" of scientific evidence … for all scientific testimony.[92] In the *Kumho Tire* opinion, the judges made it amply clear that trial judges reserve "considerable leeway" in determining whether a particular expert's testimony is reliable.[93]

The general rule which has evolved from this analytical trellis is that the trial court should admit testimony which contain the indicia of reliability and allows the trier of fact, whether the bench or the jury, to then consider the weight and credibility of the witness' testimony.

§ 6 Who Can Qualify as an Expert Witness:

Should *Daubert* and *Kumho Tire* lead to more or less expert testimony? What will be the winnowing effect from these cases? The reality probably will lies in the middle. In a scientific area with a tradition of vigorous research, *Daubert* will be more liberal.

[88] 509 U.S. 579, 594.
[89] *Id.* at 595.
[90] *See,* generally, EEPG ch. 2 §.
[91] 526 U.S. 137.
[92] Daubert, 509 U.S. 579, 589; Kumho Tire, 119 S. Ct. 1167, 1172.

However, where there is no cohesive tradition, then the consequences of *Daubert* will be to exclude evidence. The judge's task, under *Daubert* and its progeny, will require, "Show me the data!" Where no data is forthcoming, then the judge will exclude the testimony. This may be limited, however, where data is subject to testability but to where is has not yet been tested.

Judges, most judges, do not have much, if any scientific training and there will be a judicial learning curve. Judges will become somewhat skeptical of fields that do not engage in a rigorous scientific analysis.[94]

> **Practice Tip:** Fed.R.Evid. 403 is a tool through which the court can exercise its gatekeeping authority where it weighs the danger of unfair prejudice through the admission of the testimony against the probative value of the proffered evidence. Evidence which does not meet the scientific standards would be considered unduly prejudicial.

§ 7 Expert Witness Qualifications:

These cases do not provide the basis for wholesale exclusion of expert witness testimony.[95] Courts have always required an expert witness to be "qualified" in order to offer expert testimony[96] but qualifications alone do not make an expert witness qualified to offer testimony even in a area in which the witness may have considerable

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[93] Kumho Tire Co., Ltd., 119 S. Ct. 1167, 1176.

[94] Chiropracty, naturopathy, various para-psychologic fields, acupuncture, and other forms of alternative medicine, for instance. But, *see,* Sidney Stevens, *Has Alternative Medicine Gone Mainstream?*, PHYSICIAN'S FINANCIAL NEWS June 30, 2000 at 1. Economic pressure on traditional medicine has forced allopaths to embrace alternative medicine. Further, in order to intellectually accommodate these disciplines, traditional medicine has begun to "generally accept" some of the theories. What effect this will have in litigation is speculative, of course, but this blending of disciplines will add another layer of complexity to medical expert witness analyses. If scientific rigor admits non-traditional therapy, one wonders about the effect upon those traditionalists and their ability to withstand cross-examination.

[95] *See,* Black & Lee, Expert Evidence ch. 2, § IV, Gatekeeping after *Kumho Tire*: *Some Guideposts for the Future* (Supp. 1999-2000).

[96] MSE v.1 15.

knowledge.[97] What are the analysis points a court will apply in a motion to exclude an expert witness?

An expert witness need not have an advanced degree to testify as an expert witness.[98] The Rule's organic language is so broad that any person whose "knowledge, skill, experience, training or education" fit the facts in question may offer an expert opinion. Here, medical testimony does require threshold educational credentials.[99] Further, experts in medical matters are expected to have medical degrees, appropriate certifications and clinical experience.[100] Lack of experience in the precise area of testimony may disqualify an expert witness.[101] Some courts require demonstrated expertise in a specific areas and upon a specific topic of testimony.[102]

In general, courts interpret the main qualifications requirements in relation to the expert witness' claimed expertise and the proffered testimony.[103] Courts consult the expert witness' respective field for guidance regarding what qualifies a witness to be a "qualified" expert witness.

> **Practice Tip:** Beware, here, because not all medical fields contain well-articulated standards and there may be wide intersection between legitimate medical fields. The state analysis will be state specific, depending upon state

[97] Broders v. Heise, 924 S.W.2d 148 (Tex. 1996). The Texas Supreme Court excluded an emergency doctor's testimony opposed to that of a neurosurgeon on the issue whether brain injury was operable. The emergency doctor only vaguely knew about operability whereas these decisions were the neurosurgeons' "bread and butter." The fact that the emergency room doctor knew about these injuries was insufficient to permit him to offer testimony on a topic upon which his knowledge was "second hand."
[98] MSE v.1 15-16.
[99] If that weren't the case, then lay witnesses could offer expert witness testimony. A lay witness would be unable to assist the trier of fact.
[100] Edmonds v. Illinois Central Gulf Railroad, 910 F.2d 1284, 1287 (5th Cir. 1990).
[101] O'Conner v. Commonwealth Edison Co., 13 F.2d 1090, 1107 n. 19 (7th Cir. 1994) (excluding a clinical psychologist's testimony with respect to claimant's heart condition).
[102] Watkins v. Schriver, 52 F.3d 769, 771 (8th Cir. 1995) (excluding a neurologist's testimony regarding the cause of injury since the neurologist was not "an expert in either accident reconstruction or forensic medicine").
[103] Edmonds v. Illinois Central Gulf Railroad, 910, F.2d 1284, 1287 (5th Cir. 1990).

statutes and case law. Never assume that the analysis in one state will be adopted or accepted by another jurisdiction.

§ 7.1 Generalist Opinion Versus the Specialist:

In modern times, the hallmark of all expertise has become specialization.[104] This trend has caused court confusions where generalists have been used to advance theories which may be highly specialized.[105] Some courts have required experts to have demonstrated expertise in specific areas and for specific topics upon which they anticipate testimony.[106] In general, the guideline to courts is one of flexibility, where the expert witness is able to "assist the trier of fact" then the inertia is to admit the expert. Other courts have held, on this issue of specialization, that where a generalist may offer testimony in an area of specialization, this perceived deficit between the specialist's view and the generalist's, becomes a matter of weight of the testimony for the trier of fact.[107] In some instances, however, this judicial inertia has permitted expert witnesses to wander into areas outside of their true expertise.[108]

There is no "best" expert witness rule. Fed.R.Evid. 702's requirement states that an expert witness is one who qualifies "as an expert by knowledge, skill, experience, training, or education." What could be more clear? Notice that the Rule does not provide *who* may qualify as an expert witness, only that "a witness qualified as an expert by

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[104] MSE v.1 17.
[105] United States v. Roldan-Zapata, 916 F.2d 795, 805 (2nd Cir. 1990); see also, Broders v. Heise, 924 S.W.2d 148 (Tex. 1996) (excluding a well-qualified physician in emergency medicine from offering testimony wholly within the area of neurosurgical analysis and decision-making).
[106] Watkins v. Shriver, 52 F.3d 769, 771 (8th Cir. 1995); Chikovsky v. Ortho Pharmaceutical Corp., 832 F.Supp. 341, 344-46 (S.D.Fla. 1993).
[107] Carroll v. Morgan, 17 F.3d 787, 790 (5th Cir. 1994) (holding that *Daubert* does not require a pathologist to testify about the cause of death. The fact that three testifying cardiologists disagreed with a cardiologist's conclusion becomes "grist for the jury." Each witness, however, was qualified to express an opinion).
[108] MSE v.1 17 n. 36. *See*, also, ANDRÉ A. MOENSSENS, FRED E. INBAU & JAMES E. STARRS, SCIENTIFIC EVIDENCE IN CRIMINAL CASES (3rd ed. 1986).

knowledge, skill, experience, training, or education, may testify."[109] This leaves the decision as to who may qualify in the hands of the trial court and, absent abuse of discretion, this decision will not be disturbed on appeal.[110] The trial court's decision to admit an expert witness is a big one. Let's examine what contributes to the decision.

§ 7.2 To Admit or Not to Admit; That is the Question:

Two cases illustrate some of the important points here. In *Ceaser v. Stiner,*[111] following a rear-end collision and after a bench trial, the trial court made an award and the defendant appealed on several points. The trial court excluded psychiatric testimony on the "effects of stress on the heart."[112] The appellate court concluded that the trial court should have admitted this testimony and the objections should go to the "weight of the evidence rather than to its admissibility."[113]

Further, the trial court did not permit a specialist in physical medicine and rehabilitation to testify on whether the patient would need surgery in the future.[114] Physicians in physical medicine and rehabilitation are known as rehabilitation specialists and they do not perform surgery; to exclude this testimony was erroneous. Here, the court concluded that the testimony of the PM&R physician also went to the effect or weight and not to the admissibility.

Huntoon v. TCI Cablevision of Colorado, Inc.,[115] illustrates the problem which arises when non-MD testimony is sought in a physical specialty. After a rear-end

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[109] *See,* Dolen v. St. Mary's Hospital of Huntington, Inc., 506 S.E.2d 624 (W.Va. 1998).
[110] General Electric Company v. Joiner, 522 U.S. 136, 139 (1997) (holding that the abuse of discretion standard applies to trial court's decision to exclude scientific evidence).
[111] 1998 WL 857921 (La.App. 1998) (opinion not released).
[112] *Id.* at *3.
[113] *Id.*.
[114] *Id.*
[115] 969 P.2d 681 (Colo. 1998) (*en banc*).

collision, the plaintiff received a directed verdict on liability. The trial court then entered judgment on a jury verdict. The Supreme Court of Colorado held that a neuropsychologist is not *per se* unqualified to testify as expert on causation of organic brain injury and the trial court did not abuse its discretion in admitting causation testimony of the neuropsychologist proffered as expert by plaintiff.

Under Fed.R.Evid. 702 there is no requirement that a proffered expert witness hold a specific degree, training certificate, accreditation, or membership in professional organization in order to testify on a particular issue. The neuropsychologist testified about the methodology employed by neuropsychologists[116] then gave his opinion on causation.

Here, the defendants objected since he was not a "medical doctor" and the opinion was one about "brain injury," an area which defendant argued was a "physical manifestation." The trial court sustained the objection on the basis of insufficient foundation. Plaintiff's counsel then asked various questions which satisfied this defect and the doctor was allowed to give his opinion.[117]

This was a significant issue for all personal injury litigation in Colorado. The Colorado Supreme Court was concerned that the appellate court created a categorical exclusion of an entire profession, that neuropsychologists could not, as a matter of law, express an opinion on organic brain dysfunction as opposed to cognitive defects.[118] To resolve this, the high court concluded that a categorical exclusion was not proper and that

[116] *Id.*.
[117] *Id.*.
[118] *Id.* at 688.

"the propriety of such testimony is determined by using the same CRE 702 analysis applicable to all other experts."[119]

The Colorado Court examined the two part test under Rule 702:

> [A] court must first determine whether the proffered expert testimony will be helpful to a trier of fact in the understanding of evidence or resolution of a fact at issue in the case. [citation omitted] A court must next review the qualifications of the witness, and determine whether a showing of "knowledge, skill, experience, training, or education" has been made sufficient to support testimony in the form of an expert opinion. … An expert opinion is helpful to the trier of fact if it embraces a relevant matter outside the understanding of the typical juror. To a large extent, this aspect of CRE 702 involves an inquiry as to "whether the untrained [layperson] would be qualified to determine intelligently and to the best possible degree the particular issue without enlightenment from those having a specialized understanding of the subject involved." [citation omitted] A witness may be qualified by virtue of any one of the five factors specified in the rule.[120]

The court summed the credential issue this way: "There is no requirement that a witness hold a specific degree, training certificate, accreditation, or membership in a professional organization, in order to testify on a particular issue."[121]

Other courts have considered this important issue whether one discipline may testify in related fields. A case which represents the mirror image of the non-MD testifying on MD turf is the South Carolina case of *Bellamy v. Payne*.[122] The South Carolina appellate court held that an orthopedic surgeon does not have the necessary background to serve as an expert witness with respect to podiatric standards of care.

In this case, the patient sued two podiatrists and then used an orthopedic surgeon to testify on the crucial standard of care issues. While the qualification of an expert

[119] *Id.* 689.
[120] *Id.* at 689-90.
[121] *Id.* at 690.
[122] 403 S.E.2d 326 (S.C. Ct. App. 1991)

witness is within the sound discretion of the court[123] the appellate court would not upset the trial court's discretion in the exclusion of this testimony.

The court reasoned this way:

> [The orthopedist] … only kept up with podiatric literature on an annual basis, he had only seen twelve to fifteen patients treated by podiatrists in the last ten years, he had never attended a course given by podiatrists, he was not familiar with the standards of the American Academy of Ambulatory Foot Surgery or the American College of Podiatric Foot Surgeons, and he had never seen a podiatrist actually perform any foot surgery. In brief, [the orthopedic surgeon] … failed to demonstrate to the satisfaction of the trial court his familiarity with the diagnostic, surgical, and treatment procedures employed by podiatrists.[124]

Presumably, had the orthopedist been more familiar with podiatry, with the standards of care, he would then have been admitted to testify. For instance, suppose the orthopedist would have taught podiatrists, given continuing medical education courses, or taught in a podiatric clinic or school, he would then know the standard of care and would have then been admitted as an expert witness to testify on the podiatric standards of care.

> **Practice Tip:** The bottom-line is that this cross-profession testimony remains a close call for the court but what is vital is that there is sufficient foundation to lay the testimony. Where similarly credentialled expert witnesses "do" the same form of care, then courts will permit the cross-discipline testimony.

In *Scales v. Swill*,[125] a personal injury suit, the trial court ordered the plaintiff to submit to an independent medical examination and denied plaintiff's motion to strike the examiner as a witness. The plaintiff objected to this IME since he had already been examined by a chiropractor and to submit to this examination required him to travel to an adjacent county for the examination. The appellate court would not disturb this decision since "[i]n light of the fact that orthopedic doctors and chiropractors are not synonymous

[123] *Id.* at 327.
[124] *Id.*.
[125] 715 So.2d 1059 (Fla. Dist. Ct. App. 1998).

in training or expertise."[126] In this case the court readily distinguished the "pecking order" between orthopedic surgery and chiropractic.

In a medical malpractice case concerning the death of a child due to substandard emergency transportation, the plaintiff failed to find an expert witness who would support their case.[127] The plaintiff wanted to use non-physicians, a neonatal intensive care nurse and two witnesses knowledgeable about emergency medical services, to raise a jury question in response to a summary judgment. The trial court, in granting the defendant's motion, would not permit the lay witnesses to testify on causation since that testimony would exceed their expertise. West Virginia code requires, in a medical negligence action, testimony "of one or more knowledgeable, competent expert witnesses …."[128]

The Rule 702 interpretation stated that the non-MD witnesses could testify about emergency transport but NOT on the issue of causation. While it is within the discretion of the court to admit expert witnesses, nurses are not qualified to give opinions on medical matters. Citing another case, the West Virginia Supreme Court of Appeals stated: "Although a nurse may well be trained in the proper location to administer injections, we are not persuaded that a nurse is qualified to opine as to nerve damage caused by an allegedly improper injection."[129] The trial court "acted within its discretion in determining that the nurse and the two other witnesses disclosed by the appellants were not qualified upon those matters."[130]

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[126] *Id.* at 1060.
[127] Short v. Appalachian OH-9, Inc., 507 S.E.2d 124 (W.Va. 1998).
[128] *Id.* at 130.
[129] *Id.* at 131.
[130] *Id.*

The court granted the plaintiff additional time to obtain a physician to testify and even upon entry of the summary judgment concluding that the plaintiff could file a motion to reconsider if they found an expert witness who would qualify — but they never found an expert witness to support the case. Presumably, following this analysis, a chiropractor would not be permitted to testify in areas which are wholly medical; causation, for instance.

Dolen v. St. Mary's Hospital of Huntington, Inc.,[131] arose as a medical negligence case where the defendants obtained a summary judgment. The plaintiff alleged that an emergency room doctor and a radiologist negligently treated a patient who sustained a jaw fracture. The trial court ruled that an oral surgeon, not an MD,[132] was not qualified to offer such an opinion. However, the West Virginia Supreme Court of Appeals reversed the trial court.

Here, the expert witness was a dentist and an oral surgeon: a DMD, DDS. The Court ruled that the oral surgeon was qualified by knowledge, skill, experience, training, or education; the elements of Rule 702. Remember that there is no "best expert rule?"[133] In concluding that the trial court abused its discretion the Court reasoned this way:

> [The oral surgeon] received a degree in dental surgery, a master's degree in biological science with a concentration in oral surgery from the Mayo Graduate School of Medicine, and had practiced since at least 1984 in the fields of oral and maxillofacial surgery. [He] … had been granted privileges to perform oral surgery at defendant … Hospital. [The oral surgeon] … testified in his deposition that he held himself out as an expert in the management of trauma to the jaw, that he had diagnosed over 600 broken jaws by panorex radiograph, and that the management of fractures in the jaw region were within the scope of his practice at [this] … hospital. Furthermore, [the witness] … testified that he had reviewed more than 30,000 panorex radiographs since leaving the Mayo Clinic. … [I]t is

[131] 506 S.E.2d 624 (W.Va. 1998).
[132] The defendant E.R. doc was an osteopathic physician.
[133] *Id.* at 629.

> apparent that [the oral surgeon] … (a) had substantial educational and experiential qualifications relating to jaw fractures; (b) that his field of expertise is relevant to the diagnosis by panorex radiograph and the treatment of fractures to the jaw; and (c) this expertise will assist the trier of fact. Second, this expertise relates to the expected testimony by [the expert witness] … that the defendants were negligent in their diagnosis and treatment of the plaintiff's broken jaw.[134]

> In a dissent opinion, Justice Maynard raised the slippery-slope concern:

> Will we allow registered nurses to give expert testimony against physicians? Because they have more knowledge than the general public about medical matters, they qualify as an expert witness under the majority opinion. Can a chiropractor now testify against an orthopedic surgeon? Chiropractors have greater knowledge and would apparently qualify as expert witnesses. What about podiatrists? What about emergency medical technicians? What about allowing midwives, who are licensed in West Virginia, to testify against obstetricians?[135]

Although there is no "best expert witness" rule, no expert witness testimony is worse than a cross-profession witness since with no witness support, the case will falter at this level and may be dismissed if proponent expert witness was intended to offer crucial testimony.

> **Practice Tip:** How close to the expert witness testimony line may a lawyer tread, so to speak? This becomes a question of experience and confidence with the principles involved. As a purely practical matter, a party will move forward until the witness is excluded. If the trial court judge excludes a witness at trial, the blow may be fatal. Most courts do not permit "backup" witnesses since listing a long line-up of expert witnesses, each of whom would testify to the *same* aspect of the case would be viewed as cumulative. In an expert witness designation, to guard against this calamity, a party may designate similarly trained witnesses who *would* testify on various *different* aspects of the case. Then, if one witness were not to attend trial, in one way or another,[136] there is already a designated "back-up" hitter who, by way of similar background, training, and skills, the witness could testify. In a witness designation be sure to list *all* of the areas upon which a witness may testify since the opposing party is entitled to engage in discovery upon all of these issues. Where a party has not designated a witness to testify in a particular area and where the opposing party had no notice about the issue upon which testimony

[134] *Id.* at 629-30.
[135] *Id.* at 631-32.
[136] For example: (1) witness death or personal illness or some other personal event; (2) witness "cold feet;" (3) court exclusion through the court's discretionary powers.

> is subsequently sought, because of prejudice to the non-designating party, the court will have no other option but to exclude the witness on that "new" issue.

§ 8 *Frye*: The General Acceptance Theory:

The historical development of this body of the law of evidence is important for the trial lawyer to understand since this will enable the lawyer to think creatively when standing before a judge in the middle of arguing a motion. To know the history enhances the analysis.

In 1920, Frye appealed his murder conviction in the Supreme Court of the District of Columbia and the appellate court affirmed the conviction. Frye wanted to use a novel scientific theory to prove that he was innocent: the systolic blood pressure deception test. If he were lying, this test would show his fabrication.

During the trial, defense counsel offered an expert witness to testify about the results of a "deception test" which the defense lawyer administered to his client. The test was called the "systolic blood pressure deception test" and the basis of the test was that, if a person were lying, then the blood pressure would fluctuate.[137] The so called scientific theory here was that blood pressure is influenced by emotional changes and systolic blood pressure changes are affected by "nervous impulses sent to the sympathetic branch of the autonomic nervous system."[138] The test proponents, the defense, claimed that

> … scientific experiments … demonstrated that fear, rage, and pain always produce a rise of systolic blood pressure, and that conscious deception or falsehood, concealment of facts, or guilt of crime, accompanied by fear of detection when the person is under examination, raises the systolic blood pressure in a curve, which corresponds exactly to the struggle going on in the subject's mind, between fear and attempted control of that fear, as the examination touches the vital points in respect of which he is attempting to deceive the examiner.[139]

[137] Everyone should recognize this as the basis for the "lie detector test," — the polygraph.
[138] *Id.* at 1013.
[139] *Id.* at 1013-14.

The benefit of this "science" was that "truth is spontaneous." Truth is the product of calm, unconscious effort, whereas the "utterance of a falsehood requires a conscious effort"[140] which the examiner could quickly and accurately detect by measuring the blood pressure. How would one detect the rise in blood pressure, though, over the anxiety from merely taking the test? The answer to this was straightforward.

> In the former instance, the pressure rises higher than in the latter, and is more pronounced as the examination proceeds, while in the latter case, if the subject is telling the truth, the pressure registers highest at the beginning of the examination, and gradually diminishes as the examination proceeds.[141]

Prior to trial the defendant was subjected to this "test" and counsel produced the scientist who conducted the test as an expert witness to testify about the results.[142] Opposing counsel, for the government, objected, the trial court sustained, and then the defense lawyer offered to have the witness take the test before the jury. This opportunity, the court also declined.

In 1923 there was no body of case law on this sort of a questions: the presentation of novel scientific theories as evidence. The court analyzed:

> The rule is that the opinions of experts or skilled witnesses are admissible in evidence in those cases in which the matter of inquiry is such that inexperienced persons are unlikely to prove capable of forming a correct judgment upon it, for the reason that the subject-matter so far partakes of a science, art, or trade as to require a previous habit or experience or study in it, in order to acquire a knowledge of it. When the question involved does not lie within the range of common experience or common knowledge, but requires special experience or special knowledge, then the opinions of witnesses skilled in that particular science, art, or trade to which the question relates are admissible in evidence.[143]

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[140] *Id.* at 1014.
[141] *Id.* at 1014.
[142] *Id.*
[143] *Id.*

Where is the line between scientific principle or discovery between experimental and demonstrable? The court struggled. The appellate court found the line here, literally, in "the twilight zone."[144]

> Somewhere in this twilight zone[145] the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.[146]

In affirming the conviction, the appellate court refused to admit this "systolic blood pressure test" since it had not yet gained such "standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made."[147]

Thus, was born what came to be known as the Frye Test. For "scientific evidence" to be admissible the evidence must have gained sufficient popularity by way of standing and recognition in the "scientific community" so that the court would admit the testimony as reliable. *Frye* assured trial judges that whatever proponent of scientific evidence had the had the loudest cheering section, whoever won the scientific popularity contest, that proponent would be the "most" admissible.[148]

§ 9 *Daubert*: "Scientific Reliability" after the Implementation of the Federal Rules of Evidence in 1975

[144] *Id.*
[145] Parenthetically, one wonders if Rod Serling knew about this case when he chose the title for the much celebrated and pioneering science fiction 1950's television show: THE TWILIGHT ZONE.
[146] *Id.*
[147] *Id.*
[148] In essence, in1923 the unpopular Darwin was dead and the popular creationists won!

Frye was the controlling standard in 45 states[149] until seventy years later when the *Daubert* decision finally woke the sleeping scientific giant.[150] The United States Supreme Court approved the final draft of the Federal Rules of Evidence in 1972 and virtually all states adopted some form of the Rules within a short time. Congress adopted the Federal Rules of Evidence in 1975.[151]

Although essentially all states follow the Federal Rules of Evidence[152] states divide into six categories with respect to *Daubert*.[153] Nineteen states have accepted *Daubert* since the state was persuaded by the Supreme Court's reasoning or they already adhered to a test which was substantially similar.[154] Eight states have indicated a willingness to consider revising the rule as applied to the admission of scientific evidence.[155] for the time being, eleven states have rejected *Daubert* and have preferred to remain *Frye* jurisdictions or with an alternative state formulation of the test of general

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[149] Note, Betty R Steingass, *Changing the Standard or the Admissibility of Non-Scientific Evidence*, 40 OHIO ST. L.J. 757, 769 (1979).
[150] Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579 (1993).
[151] Pub. L. No. 93-595; 88 Stat. 1926, H.R. 5463 (Jan.2 1975).
[152] ELLIOTT B. OPPENHEIM, THE MEDICAL RECORD AS EVIDENCE 3 (Lexis 1998); McCormick
[153] MSE v.1 11 n.7.
[154] *See,* Nelson v. State, 628 A.2d 69 (Del 1993); Jordan v. Georgia Power Company, , 466 S.E.2d 601 (Ga. App. 1995); State v. Parkinson, 909 P.2d 647 (Idaho 1996); Steward v. State, 652 N.E.2d 490 (Ind. 1995); Hutchinson v. American Family Mutual Insurance Co., 514 N.W.2d 882 (Iowa 1994); Mitchell v. Commonwealth, 908 S.W.2d 100 (Ky. 1995); State v. Foret, 628 So.2d 1116 (La. 1993); Green v. Cessna Aircraft Co., 673 A.2d 216 (me. 1996); Commonwealth v. Lanigan, 641 N.E.2d 1342 (Mass. 1994); State v. weeks, 891 P.2d 477 (Mont. 1995); State v. Cavliere, 663 A.2d 96 (N.H. 1995); State v. Goode, 461 S.E.2d 631 (N.C. 1995); Taylor v. State, 889 P.2d 319 (Okla.Crim.App. 1995); State v. O'Key, 899 P.2d 663 (Or. 1995); State v. Schweitzer, 533 N.W.2d 156 (S.D. 1995); E.I. du Pont de Nemours & Co. v Robinson, 923 S.W.2d 549 (Tex. 1995); State v. Streich, 658 A.2d 38 (Vt. 1995); Wilt v. Bulracker, 443 S.E.2d 196 (W.Va. 1993), *cert. denied*, 511 U.S. 1129 (1994); Springfield v. State, 860 P.2d 435 (Wyo. 1993).
[155] Mattox v. State Dept. of Revenue, Child Support Enforcement Div., 875 P.2d 763 (Alaska 1994); Jones v. State, 86 S.W.2d (Ark. 1993); Lindsey v. People, 892 P.2d 281 (Colo. 1995); Dotto v. Okan, 646 N.E.2d 1277 (Ill. 1995); Fairview Hospital and Health Care Services v. St. Paul Fire & Marine Insurance Co., 535 N.W.2d 337 (Minn. 1995); Ripa v. Owens Corning Fiberglass Corp., 660 A.2d 521 (N.J. 1995); Commonwealth v. Crews, 640 A.2d 395 (Pa. 1994); State v. Russell, 882 P.2d 747 (Wash. 1994), *cert. denied*, — U.S. — , 115 S.Ct. 2004 (1995).

acceptance and relevancy.[156] Six states follow their own state version of a relevance / reliability determination, based, usually, on the legislatively adopted state evidence code.[157] Four states remain undecided, fence-sitting for the time being,[158] and three states have yet to cite *Daubert* or to discuss its applicability to scientific evidence within the state. These jurisdictions include Alabama, Mississippi, and Nevada.[159]

As mentioned above, the "*Daubert* motion" typically is brought under Fed.R.Evid. 104(a) or the state equivalent and these are initiated by whichever party wishes to challenge the validity of the scientific evidence. *Daubert* permits judges to exclude evidence, however, as invalid even in the absence of objection by the opponent of the evidence.[160] Judges, of course, must, themselves, have a sufficient appreciation for the scientific method to spot unscientific evidence in the preliminary assessment, during their gatekeeping functions.[161]

After *Frye* but before *Daubert*, the admission of scientific evidence remained a popularity contest since either side could put on its own "dog and pony show" to support general acceptance in the scientific community.

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[156] State v. Bible, 858 P.2d 1152 (Ariz. 1993), *cert. denied*, 511 U.S. 1046 (1994); People v. Leahy, 882 P.2d 321 (Cal. 1994); State v. Ali, 660 A.2d 337 (Conn. 1995); Flanagan v. State, 625 So.2d 827 (Fla. 1993); State v. Haddock, 897 P.2d 152 Kan. 1995); Schultz v. State, 664 A.2d 60 (Md. 1995); People v. Peterson, 537 N.W.2d 857 (Mich. 1995) amended 548 N.W.2d 625 (Mich. 1995); Callahan v. Cardinal Glennon Hospital, 863 S.W.2d 852 (Mo. 1993); State v. Carter, 524 N.W.2d 763 (Neb. 1994); People v. Wesley, 633 N.E.2d 451 (N.Y. 1994); City of Fargo v. McLaughlin, 512 N.W.2d 700 (N.D. 1994).

[157] Taylor v. United States, 661 A.2d 636 (D.C. 1995); State v. Maelega, 907 P.2d 758 (Haw. 1995); State v. Anderson, 881 P.2d 29 (N.M. 1994); State v. Clark, 655 N.E.2d 795 (Ohio 1995); State v. Dinkins, 462 S.E.2d 59 (S.C. 1995); State v. Peters, 534 N.W.2d 867 (Wis.App. 1995).

[158] Soares v. Vestal 632 A.2d 647 (R.I. 1993); State v. Smith, 1994 WL 361851 (Tenn.Crim.App. 1994); Dikeou v. Osborn, 881 P.2d 943 (Utah Ct.App. 1994); Cotton v. Commonwealth, 451 S.E.2d 673 (Va.App. 1994) withdrawn and vac'd on hearing, 459 S.E.2d 527 (Va.App. 1995).

[159] MSE v.1 12 n. 7.

[160] Hoult v. Hoult, 57 F.3d 1, 4 (1st Cir. 1995).

[161] Daubert, 113 Supreme Court at 2796;

The *Daubert* decision in 1993 changed this vulnerability. Judges, in most cases, are not and have not been scientists.[162] Most judges are as incapable as most jurors to make a decision whether a scientific theory is or is not valid. And besides, that, what does the phrase "generally accepted in the scientific community" really mean?

Bendectin was a medicine produced by Merrell Dow Pharmaceuticals to reduce the nausea and vomiting which occurred in the first trimester of pregnancy. Unfortunately, some infants developed limb defects and it appeared that the unifying "cause" was Bendectin. Plaintiffs sued and the pharmaceutical company moved for summary judgment. The United States District Court for the Southern District of California granted the motion for summary judgment, the plaintiff's appealed, the appellate court affirmed, and the case rose to the United States Supreme Court.

Justice Blackmun, who vacated the lower courts' decisions and remanded, wrote the opinion where the Court held: "(1) "general acceptance" is not [a] necessary precondition to the admissibility of scientific evidence under Federal Rules of Evidence,

[162] See Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 Yale L.J. 1535 (1998). This profound article considers an even deeper and perhaps more disturbing question about the admissibility of scientific evidence. What credentials and insight do judges and juries bring to this analysis where, in general, these triers of the case are not themselves scientifically qualified? Isn't it a farce to permit unqualified judges to determine what scientific evidence will be heard when the judges have none to little professional ability to understand the science upon which they rule? "Moreover, almost inevitably in litigated cases in which expert scientific evidence is offered, nonexpert judges and juries are presented, not with one authoritative "voice" of scientific truth, but instead with competing scientific expert witnesses who testify to contrary or even contradictory scientific propositions. Lacking the information necessary to make cogent independent judgments about which of the competing scientific experts to believe, nonexpert legal decisionmakers choose among the experts by relying on such indicia of expertise as credentials, reputation, and demeanor. Thus, even the act of soliciting and deferring to expert scientific judgment requires nonexperts to use a reasoning process--the process of selecting the experts, deciding which expert to believe when the experts compete, and, finally, deciding how to use the believed expert's information in resolving the central dispute being litigated." *Id.* at 1538-39.

and (2) the Rules require that the trial court judge make a determination that the expert's testimony rests on 'reliable foundation and is relevant to task at hand.'"[163]

The Federal Rules of Evidence superseded the *Frye* "general acceptance" popularity contest for the admissibility of scientific evidence and an era admitting the unscientific, unpopular analysis of science, after seventy years, was over.

The District Court granted summary judgment "based on a well-credentialed expert's affidavit concluding, upon reviewing the extensive published scientific literature on the subject, that maternal use of Bendectin has not been shown to be a risk factor for human birth defects."[164] The plaintiffs responded with testimony "of eight other well-credentialed experts, who based their conclusion that Bendectin can cause birth defects on animal studies, chemical structure analyses, and the unpublished 'reanalysis' of previously published human statistical studies."[165]

Doesn't this confrontation superbly illustrate the battle of the "experts equal!" How may a court resolve this collision? If the court were to use the *Frye* general acceptance test, aren't both theories about equal? The trial court concluded that this evidence did not meet the "general acceptance" *Frye* standard for the admission of expert testimony,[166] replacing this theory with the "reliability theory," a rule consistent with the Fed.R.Evid. 702's more *liberal* theory of admissibility of scientific evidence.

Here, the Court wrote:

> The Rules occupy the field,[167] and, although the common law of evidence may serve as an aid to their application, … the respondent's assertion that they

[163] *Id.* at 579
[164] *Id.*.
[165] *Id.*
[166] *Id.* at 579.
[167] *Id.* (citing United States v. Abel, 469 U.S. 45, 49 (19XX).

> somehow assimilated Frye is unconvincing. Nothing in the Rules as a whole or in the text and drafting history of Rule 702, which specifically governs expert testimony, gives any indication that "general acceptance" is a necessary precondition to the admissibility of scientific evidence. Moreover, such a rigid standard would be at odds with the Rules' liberal thrust and their general approach of relaxing the traditional barriers to "opinion" testimony. … The Rules--especially Rule 702--place appropriate limits on the admissibility of purportedly scientific evidence by assigning to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand. The reliability standard is established by Rule 702's requirement that an expert's testimony pertain to "scientific ... knowledge," since the adjective "scientific" implies a grounding in science's methods and procedures, while the word "knowledge" connotes a body of known facts or of ideas inferred from such facts or accepted as true on good grounds. The Rule's requirement that the testimony "assist the trier of fact to understand the evidence or to determine a fact in issue" goes primarily to relevance by demanding a valid scientific connection to the pertinent inquiry as a precondition to admissibility.[168]

§ 9.1 The Preliminary Assessment Requirement:

Daubert required that the trial judge, when faced with a proffer of expert scientific testimony under Fed.R.Evid. 702,[169] engage in a (1) preliminary assessment of whether the testimony's underlying reasoning or methodology is scientifically valid and (2) whether that scientific evidence may be properly applied to the facts at issue in the case at bar. The *Daubert* court noted the criteria to make the determination whether the theory is itself valid:

> … whether the theory or technique in question can be (and has been) tested, whether it has been subjected to peer review and publication, its known or potential error rate and the existence and maintenance of standards controlling its operation, and whether it has attracted widespread acceptance within a relevant scientific community. The inquiry is a flexible one, and its focus must be solely on principles and methodology, not on the conclusions that they generate.[170]

[168] *Id.* at 579-80.
[169] Pursuant to Fed.R.Evid. 104(a).
[170] *Id.* at 580. These are the four Daubert standards which will appear in many cases.

Further, and this is very important, the judge must hear the cross-examination, weigh the presentation of the contrary evidence, and consider the burden of proof.[171] This method replaced the "uncompromising" general acceptance standard of *Frye*.[172] In *Daubert* the "pivotal question is whether the witness has empirically validated the hypothesis by appropriate scientific methodology."[173]

The Federal Rules of Evidence are not perfect, this Court readily acknowledged in dictum:

> That even limited screening by the trial judge, on occasion, will prevent the jury from hearing of authentic scientific breakthroughs is simply a consequence of the fact that the Rules are not designed to seek cosmic understanding but, rather, to resolve legal disputes.[174]

Is any theory admissible as scientific evidence, then? The trial court must "ensure that any and all scientific testimony or evidence … is relevant [and] reliable,"[175] the court concluded and Justice Blackmun wrote:

> The subject of an expert's testimony must be "scientific ... knowledge." The adjective "scientific" implies a grounding in the methods and procedures of science. Similarly, the word "knowledge" connotes more than subjective belief or unsupported speculation. The term "applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds.[176]

In addition, "[i]n a case involving scientific evidence, evidentiary reliability will be based upon scientific validity."[177] Expert witnesses have great responsibility and

> [u]nlike an ordinary witness … an expert is permitted wide latitude to offer opinions, including those that are not based on firsthand knowledge or observation. … Presumably, this relaxation of the usual requirement of firsthand

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[171] *Id.*
[172] *Id.*
[173] Edward J. Imwinkelried, *Admissibility of Nonscientific Expert Testimony: Should Courts Import the Near Miss Doctrine?*, 10/1/96 TRIAL-MAG, 1996 WL 13323184 (1996).
[174] 509 U.S. 579, 580.
[175] *Id.* at 589.
[176] *Id.* at 589-90.
[177] *Id.* at 590.

> knowledge--a rule which represents "a 'most pervasive manifestation' of the common law insistence upon 'the most reliable sources of information …[178]

§ 9.2 Assist the Trier of Fact: Is it Science?

One of the key questions for a trial court to address is whether the theory or technique is "scientific" knowledge which will assist the trier of fact. The inquiry begins at this point. "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry. … [T]he criterion of the scientific status of a theory is its falsifiability, or refutability, or testability."[179]

Has the theory been subjected to peer review and publication in scientific journals? Publication, though, is not the "*sine qua non* of admissibility; it does not necessarily correlate with reliability"[180] nevertheless, when a proponent is willing to submit a theory to the scrutiny of the scientific community, this increases "the likelihood that substantive flaws in methodology will be detected."[181] But publication in a peer-reviewed scientific journal is viewed only as "relevant, though not dispositive" of the scientific validity of a particular technique or methodology upon which an expert witness premises an opinion,[182] and the court should also look to the rate of error, the existence and maintenance of standards which control the techniques operation.[183]

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[178] *Id.*
[179] *Id.*
[180] *Id.*
[181] *Id.* at 593.
[182] *Id.*
[183] *Id.*

Finally, "general acceptance" may still bear upon the inquiry.[184] "Widespread acceptance can be an important factor in ruling particular evidence admissible, and 'a known technique which has been able to attract only minimal support within the community,' [citation omitted] … may properly be viewed with skepticism."[185] The analysis does not end at this point since the trial court must examine whether the facts or data are "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject."[186]

The Court addressed the fear that federal court judges and juries would engage in a "free-for-all"

> … in which befuddled juries are confounded by absurd and irrational pseudoscientific assertions. In this regard respondent seems to us to be overly pessimistic about the capabilities of the jury and of the adversary system generally. Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.[187]

The court remains free to direct a judgment when it concludes that the "scintilla of evidence" which supports a theory is insufficient to allow a "reasonable juror" to conclude that the scientific position is more likely true than not, is true.[188]

The *Daubert* court summarized:

> "General acceptance" is not a necessary precondition to the admissibility of scientific evidence under the Federal Rules of Evidence, but the Rules of Evidence--especially Rule 702--do assign to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand. Pertinent evidence based on scientifically valid principles will satisfy those demands. The inquiries of the District Court and the Court of

[184] *Id.*
[185] *Id.* at 594.
[186] *Id.* at 595.
[187] *Id.* at 595-96.
[188] *Id.* at 596.

> Appeals focused almost exclusively on "general acceptance," as gauged by publication and the decisions of other courts.[189]
>
> Be careful! Publication, even in prestigious journals, does not assure admissibility.

§ 10 *Kumho Tire*: *Daubert* Applies to All Expert Witness Testimony

In *Kumho Tire Company, Ltd. v. Carmichael*[190] the plaintiffs brought a products liability action against Kumho Tire for injuries after a tire failed. The United States District Court for the Southern District of Alabama granted summary judgment for the defendants and the plaintiff appealed to the Eleventh Circuit which reversed and remanded. The defendants filed a writ of certiorari and the United States Supreme Court, in its reversal, visited again the admission of scientific testimony again. Justice Bryer wrote the opinion for the Court and it held:

> (1) *Daubert's* "gatekeeping" obligation, requiring an inquiry into both relevance and reliability, applies not only to "scientific" testimony, but to all expert testimony; (2) when assessing reliability of engineering expert's testimony, trial court may consider the *Daubert* factors to the extent relevant; and (3) trial court did not abuse its discretion in its application of *Daubert* to exclude tire failure analyst's expert testimony that particular tire failed due to manufacturing or design defect.[191]

Justice Breyer began his analysis with the *Daubert* holding[192] where the Court focused upon the rule that scientific testimony is admissible when it "both relevant and reliable."[193] Further, the Court held that the Federal Rules of Evidence "assign to the trial

[189] *Id.* at 597.
[190] 119 S.Ct. 1167 (1999).
[191] *Id.* at 1167.
[192] *Id.* at 1171.
[193] *Id.*

judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand."[194]

§ 11 Non-Scientist Expert Witness Testimony and *Daubert*:

The enumerated indicia of scientific reliability under *Daubert* are "testing, peer review, error rates, and acceptability in the relevant scientific community, some or all of which might prove helpful in determining the reliability of a particular scientific theory or technique."[195] How does *Daubert* apply to engineering testimony and to other experts who are not scientists?

This was the problem in *Kumho Tire* where the court concluded that "*Daubert's* general holding--setting forth the trial judge's general "gatekeeping" obligation--applies not only to testimony based on "scientific" knowledge, but also to testimony based on "technical" and "other specialized" knowledge."[196]

The lawyer who wishes to introduce complex technical, engineering, or medical evidence through an expert witness must meet the scientific criteria. *Kumho Tire* is a crucial case for any attorney who introduces engineering evidence or other non-medical evidence, or non-scientific evidence through expert witnesses in litigation.

Daubert left unresolved the standard the court must apply to expert testimony which is not, or not quite, scientific.[197] Rule 702 applies to scientific knowledge and to "technical, or other specialized knowledge." Numerous non-scientific fields would be interesting to lawyers who undertake automobile litigation but where the fields make no pretense about being "scientific." Some fields contain an aspect of art or even of

[194] Id. (citing Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 597 (1993)).
[195] Id. (citing Daubert, 509 U.S. 579, 593-594)).
[196] *Id.* at 1171.

artifice.[198] Under *Daubert*, the opinion did not give guidance as to whether this conceptual framework applied to the entire span of Fed.R.Evid. 702.[199]

The *Daubert* court limited its analysis to "scientific knowledge" and did not comment on whether the(validity standards extends to technical or other specialized knowledge.[200] Court have disagreed since the *Daubert* decision on whether the holding applied to technical or other specialized knowledge but the majority of courts have favored extending the gatekeeping function to all expert witness testimony.[201] The *Kumho Tire* decision cleared up this ambiguity, though, where the *Kumho Tire* opinion applied *Daubert* to all testimony by expert witnesses.[202]

Most federal courts apply *Daubert* to Rule 702's entirety while recognizing that it may not be possible to apply *Daubert*'s four criteria in the same way to non-scientific data through expert testimony.

The *Joiner* court excluded epidemiological studies in which infant mice received "massive doses" of PCB's injected directly into their peritoneums or stomachs. The plaintiff was an adult human, however, and, in contrast to the infant mice whose experimental exposure was enormous, his exposure was substantially less than that to which the mice were exposed.[203] It was not reasonable to compare the experimental situation to the case in the litigation.

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[197] Campbell v. People, 814 P.2d 1, 8 (Colo. 1991); Fishback v. People, 851 P.2d 884, 889 (Colo. 1993).
[198] i.e.- accident reconstructionsts, economic analysts, tire failure analysts.
[199] AMERICAN COLLEGE OF TRIAL LAWYERS, STANDARDS AND PROCEDURES FOR DETERMINING ADMISSIBILITY OF EXPERT EVIDENCE AFTER *DAUBERT* 7 (1994) (advocating the position that "a single conceptual framework for evaluating the admissibility of all types of expert evidence" should be adopted).
[200] MSE v.1 29.
[201] Berry v. City of Detroit, 25 F.3d 1342, 1350 (6th Cir. 1994), *cert. denied*, — U.S. — , 115 S.Ct. 902 (1995).
[202] Kumho Tire, 119 S.Ct. 1167, 1171.
[203] Joiner, 522 U.S. 136, 144.

The *Joiner* court found the studies so dissimilar that it concluded that it was not possible to extrapolate between the infant mice studies to the plaintiff.[204] "A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered,"[205] the court reasoned.

In *Logerquist v. McVey,*[206] the Arizona Supreme Court examined the status of scientific evidence analysis under Fed.R.Evid. 702 in the context of repressed memory. Here Court did not apply the *Frye* rule in a medical negligence case where the trial court excluded expert testimony about alleged repressed memory. Arizona rejected *Daubert* and expressly found *Frye* to be inapplicable.[207] Further, the court vacated the trial court's expert witness exclusion preferring to permit the defense to cross-examine the witness and to permit the jury to decide the issue. The plaintiff argued that repressed memory is not a scientific principle so that neither *Daubert* nor *Frye* applied.[208] "Determination of these issues does not depend on science; it is the exclusive province of the jury," said the court.[209]

> *Frye* is applicable when an expert witness reaches a conclusion by deduction from the application of novel scientific principles, formulae, or procedures developed by others. It is inapplicable when a witness reaches a conclusion by inductive reasoning based on his or her own experience, observation, or research. In the latter case, the validity of the premise is tested by interrogation of the witness; in the former case, it is tested by inquiring into general acceptance. This case turns on a non-scientific issue.[210]

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[204] *Id.* at 144-45.
[205] *Id.* at 146.
[206] 2000 WL 419980 (Ariz. 2000).
[207] *Id.* at *2.
[208] *Id.* at *6.
[209] *Id.* at *7.
[210] *Id.* at *24.

Daubert's reliability criteria are "flexible" but the *Daubert* list of factors "neither necessarily nor exclusively applies to all experts or in every case. Rather, the law grants a district court the same broad latitude when it decides how to determine reliability as it enjoys in respect to its ultimate reliability determination."[211] In the case at bar, then, where the trial court excluded certain expert testimony, the trial court did not err and was within the trial court's discretion — within its gatekeeping function.[212]

The plaintiff's well-credentialled tire wear expert analyzed the tire and concluded that it malfunctioned. The *Kumho* court examined this expert's "methodology in light of the reliability-related factors … such as a theory's testability, whether it "has been a subject of peer review or publication," the "known or potential rate of error," and the "degree of acceptance ... within the relevant scientific community."[213] Here, the court concluded that the expert's testimony argued against it being reliable and the court excluded the testimony and granted the defense the summary judgment. Even upon reconsideration where the court revisited the issue in view of the flexibility for which *Daubert* stood, the court excluded the testimony.[214] The expert witness was reliable; the methodology was not.

The Eleventh Circuit reversed the trial court in *Carmichael v. Samyang Tire, Inc.*,[215] and it noted that "the Supreme Court in *Daubert* explicitly limited its holding to cover only the 'scientific context,' " adding that "a *Daubert* analysis" applies only where

[211] *Id.*
[212] *Id.*
[213] *Id.* at 1173.
[214] *Id.*
[215] 131 F.3d 1433 (1997).

an expert relies "on the application of scientific principles," rather than "on skill- or experience-based observation."[216]

Seeing this uncertainty in whether the *Daubert* decision applied to expert testimony which is not based upon scientific knowledge, but technical or other specialized knowledge, the United States Supreme Court accepted this case.[217]

> **Practice Tip:** In short, **following the *Kumho* decision, *Daubert* applies to *all* expert witness testimony.**

Fed.R.Evid. 702 clearly applies to "scientific, technical, or other specialized knowledge" and these words include the testimony of *all* expert witnesses. The *Kumho Tire* court observed that the rule makes "no relevant distinction between "scientific" knowledge and "technical" or "other specialized" knowledge. It makes clear that any such knowledge might become the subject of expert testimony."[218]

Here is an important distinction which the Court clarified:

> Finally, it would prove difficult, if not impossible, for judges to administer evidentiary rules under which a gatekeeping obligation depended upon a distinction between "scientific" knowledge and "technical" or "other specialized" knowledge. There is no clear line that divides the one from the others. Disciplines such as engineering rest upon scientific knowledge. Pure scientific theory itself may depend for its development upon observation and properly engineered machinery. And conceptual efforts to distinguish the two are unlikely to produce clear legal lines capable of application in particular cases.[219]

[216] 119 S.Ct. 1167, 1173. (citing Carmichael, 131 F.3d 1433, 1435-1436)).
[217] *Id.*
[218] *Id.* at 1174.
[219] *Id.*

In interpreting *Daubert* in *Kumho Tire*, the Court said "that *Daubert's* general principles apply to the expert matters described in Rule 702. The Rule, in respect to all such matters, "establishes a standard of evidentiary reliability."[220]

The court reasoned further, "[a]nd where such testimony's factual basis, data, principles, methods, or their application are called sufficiently into question … the trial judge must determine whether the testimony has "a reliable basis in the knowledge and experience of [the relevant] discipline."[221]

The petitioners, in this case, *Kumho Tire*, asked whether the trial judge may consider additional factors to those which appeared in *Daubert*. The reason was that *Kumho* concerned engineering data on a failed tire and this is not scientific experimentation or a study. These additional criteria "bear on" the judge's gatekeeping determination.[222]

Here, the court cited the four *Daubert* factors,[223] the *Kumho* court answered the "may" question with a "yes."[224] "Engineering testimony rests upon scientific foundations, the reliability of which will be at issue in some cases,"[225] the court analyzed. The *Daubert* criteria are flexible but there are "many different kinds of expertise," which might include, for instance, "experts in drug terms, handwriting analysis, criminal modus operandi, land valuation, agricultural practices, railroad procedures, attorney's fee

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[220] *Id.* at 1175. (citing Daubert, 509 U.S. at 590). … It "requires a valid ... connection to the pertinent inquiry as a precondition to admissibility." *Id.*).
[221] *Id.* (citing Daubert, 509 U.S., at 592).
[222] *Id.* at 1175.
[223] *Id.*. (citing 509 U.S., at 592-594. ("Whether a "theory or technique ... can be (and has been) tested; Whether it "has been subjected to peer review and publication"; Whether, in respect to a particular technique, there is a high "known or potential rate of error" and whether there are "standards controlling the technique's operation"; and Whether the theory or technique enjoys "general acceptance" within a "relevant scientific community").
[224] *Id.*

valuation, and others."[226] The *Daubert* criteria do not represent a "definitive checklist or test" and the holding in *Daubert* "adds that the gatekeeping inquiry must be "'tied to the facts"' of a particular "case."[227]

The criteria a judge will use is case-specific and "*Daubert* is not to the contrary."[228] Further, some of the *Daubert* questions could be used to

> … evaluate the reliability even of experience-based testimony. In certain cases, it will be appropriate for the trial judge to ask, for example, how often an engineering expert's experience- based methodology has produced erroneous results, or whether such a method is generally accepted in the relevant engineering community. Likewise, it will at times be useful to ask even of a witness whose expertise is based purely on experience, say, a perfume tester able to distinguish among 140 odors at a sniff, whether his preparation is of a kind that others in the field would recognize as acceptable.[229]

The United States Supreme Court views the trial court's role as this:

> We do not believe that Rule 702 creates a schematism that segregates expertise by type while mapping certain kinds of questions to certain kinds of experts. Life and the legal cases that it generates are too complex to warrant so definitive a match. To say this is not to deny the importance of *Daubert's* gatekeeping requirement. The objective of that requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field. Nor do we deny that, as stated in *Daubert*, the particular questions that it mentioned will often be appropriate for use in determining the reliability of challenged expert testimony. Rather, we conclude that the trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable. That is to say, a trial court should consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of expert testimony.[230]

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[225] *Id.*
[226] *Id.*
[227] *Id.* (quoting United States v. Downing, 753 F.2d 1224, 1242 (C.A.3 1985).
[228] *Id.*
[229] *Id.* at 1176.
[230] *Id.*

Since the *Kumho Tire* decision appeared at the end of March 1999, it is too early for courts for court decisions to fully reflect its effects in automobile litigation but the *Daubert* flexibility and the "case specific" expansive analysis required by *Kumho* undoubtedly will have profound effects on all expert witness testimony in all fields.

Numerous court have now applied *Kumho Tire* to scientific evidence analysis.[231]

§ 13 Advisory Committee Notes: 1 December 2000:

[231] The following post-Kumho Tire cases have applied the Daubert standard to determine the admissibility of nonscientific expert testimony: Bryant v. City of Chicago, 2000 US App Lexis 528 (7th Cir. January 14, 2000) (testimony of psychologist regarding police employee selection and promotion testing); U.S. v. Tocco, 2000 WL 3849 (6th Cir.) (FBI agent's testimony on organized crime); U.S. v. Hernandez-Corona, 1999 WL 1269319 (9th Cir.) (expert testimony of INS official regarding defendant's eligibility to return to United States); Humphries v. Mack Trucks, Inc., 198 F 3d 236 (4th Cir. 1999) (testimony of human factors expert and cognitive psychologist in products liability case); French v. Wal-Mart Stores, 188 F 3d 501 (4th Cir. 1999) (rehabilitation counselor's testimony on loss of earning capacity); Young v. Reliable Ins., 1999 WL 731752 (E.D. La.) (expert testimony on motor carrier safety and automobile operator techniques); Ballance v. Wal-Mart Stores, 178 F 3d 1282 (4th Cir. 1999) (medical expert testimony regarding future medical costs); U.S. v Battle, 188 F 3d 519 (10th Cir. 1999) (document examiner and handwriting expert); U.S. v Majors, 196 F3d 1206 (11th Cir. 1999) (testimony of financial expert); U.S. v Romero, 189 F3d 576 (7th Cir. 1999) (FBI expert's testimony on modus operandi of modern child molesters); Skidmore v. Precision Printing and Packaging, Inc., 188 F3d 606 (5th Cir. 1999) (testimony of psychiatrist regarding diagnosis of post-traumatic stress disorder and depression); Rushing v. Kansas City Southern Ry. Co., 185 F3d 496 (5th Cir. 1999) (audiology expert's testimony regarding audiology test results); U.S. v. Paul, 175 F3d 906 (11th Cir. 1999)(handwriting expert in criminal case); U.S. v Molina, 172 F3d 1048 (8th Cir. 1999) and U.S. v Harris, 192 F3d 580 (6th Cir. 1999) (police officer's testimony regarding indicia of drug trafficking trade); Kershenstinev. Martin, 1999 WL 1201932 (ED La) (expert testimony on design and processing of plastics and plastic components); American Computer Innovators, Inc. v.. Electronic Data Systems Corp., 1999 WL 1021049 (D Mass) (investment consultant's testimony regarding lost profits); Gonzalez. Conoco, Inc., 1999 US Dist LEXIS 19936 (SD Tex Oct 15, 1999) (testimony of industrial psychologist and expert on human resources and employment practices in an employment discrimination case); In re Cudd Pressure Control, Inc., 1999 WL 756439 (ED La) (marine safety expert, marine surveyor, psychiatrist, drowning expert, and economist); Bultema v. Caterpillar, Inc., 1999 WL 258440 (ND Ill) (material handling expert, life care planning expert, vocational expert, and economist); U.S. v. Hines, 55 F. Supp. 2d 62 (D. Mass. 1999) (psychology expert's testimony based on experimental psychological studies on memory retention and retrieval); J.B. Hunt Transport, Inc. v.. GMC, 52 F Supp 2d 1084 (E.D. Mo. 1999) (accident reconstructionist's testimony regarding vehicle speed and location); Wheat v. Sofamor, 46 F Supp 2d 1351 (N.D. Ga. App. 28, 1999) (medical expert's testimony regarding cause of plaintiff's pain); Regalado v. City of Chicago, 40 F Supp 2d 1009 (ND Ill 1999) (neurologist's testimony regarding cause of head trauma); Wahl v. American Honda Motor Co., 181 Misc. 2d 396, 693 NYS 2d 875 (NYS Ct 1999) (expert testimony regarding mathematic and engineering principles and potential effect on steering and tipping of vehicle); James v. Beauregard Elec. Coop., 736 So 2d 353 (3d Cir. 1999) (agricultural engineer's opinions on stray voltage); Gross v. IRS, 78 TCM (CCH) 201, TCM (RIA) 99254 (US Tax Ct 1999) and In re Zenith Electronics Corp., 241 BR 92 (Bankr. D. Del. 1999) (expert testimony regarding stock valuation). Kumho Tire Co., 119 S Ct at 1176.

Absent Congressional action, the Advisory Committee amended several Federal Rules of Evidence, including Rules 103, 404, 701, 702, 703, 803, and 902. These amendments will take effect 1 December 2000 and it is unlikely that Congress will intervene. The most germane revisions essentially codify the Supreme Court's opinion in *Daubert* and in *Kumho Tire*.[232] What follows here, and most relevant to this discussion, is a distillation from the Advisory Committee's Notes with respect to the important Rules 701, 702, and 703.

§ 12.1 Amended Fed.R.Evid. 701:

Fed.R.Evid. 701 concerns lay testimony and the amendment proposes adding "(c) not based on scientific, technical, or other specialized knowledge within the scope of Rule 702." The amendment eliminates the risk that the reliability requirements found in Rule 702 will be evaded through the clever substitution of "an expert in lay witness clothing."[233]

The Advisory Notes observed that Primary purpose of this rule is to allow nonexpert witnesses to give opinion testimony when, as a matter of practical necessity, events which they have personally observed cannot otherwise be fully presented to the court or the jury, but generally this rule does not permit a lay witness to express an opinion as to matters which are beyond the realm of common experience and which require the special skill and knowledge of an expert witness.[234]

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[232] To research these changes in WestLaw, use the US-Rules database and the search query: CI (FRE +3 103 404 701 702 703 803 902). *See*, WESTLAW DATABASE DIRECTORY 5, 369, 401 (1998).
[233] Advisory Notes to Rule 701. *See, generally* Asplundh Mfg. Div. v. Benton Harbor Eng'g, 57 F.3d 1190 (3d Cir. 1995).
[234] Randolph v. Collectramatic, Inc., 590 F.2d 844 (C.A. 10 Okla. 1979).

The amendment ensures that a party will not evade the expert witness disclosure requirements set forth in Fed.R.Civ.P. 26 by simply calling a true expert witness as a layperson.[235] Finally, with respect to lay witnesses, the Committee added the limitation "within the scope of Rule 702" to emphasize that a lay witness does not need to qualify as an expert witness.

§ 12.2 Amended Fed.R.Evid. 702:

As discussed above in the main section concerning under Fed.R.Evid. 702, this section controls the testimony by experts. Here, the advisory committee added language which makes this rule of evidence consistent with *Daubert* and *Kumho Tire* but it does not "codify" this body of law.

This is the proposed new text:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Rule 702 has been amended in response to *Daubert v. Merrell Dow Pharmaceuticals, Inc.* and to the many cases applying *Daubert*, including *Kumho Tire*

[235] *See*, Joseph, Emerging Expert Issues Under the 1993 Disclosure Amendments to the Federal Rules of Civil Procedure, 164 F.R.D. 97, 108 (1996) (noting that "there is no good reason to allow what is essentially surprise expert testimony." and that "the Court should be vigilant to preclude manipulative conduct designed to thwart the expert disclosure and discovery process"). *See*, also, United States v. Figueroa-Lopez, 125 F.3d 1241, 1246 (9th Cir. 1997), in which law enforcement agents testified that the defendant's conduct was "consistent with that of a drug trafficker." The court limited this witness since he was really an expert witness. Further, this amendment distinguishes between expert and lay testimony rather than between expert and lay witnesses. However, the same witness may offer both lay and expert testimony in a single case. United States v. Figueroa-Lopez, 125 F.3d 1241, 1246 (9th Cir. 1997) (holding that law enforcement agents could testify that the defendant was acting suspiciously, without being qualified as experts. However, the rules on experts were applicable where the agents testified on the basis of extensive experience that the defendant was using code words to refer to drug quantities and prices).

Co. v. Carmichael. In *Daubert* the Court charged trial judges with the responsibility of acting as gatekeepers to exclude unreliable expert testimony, and the Court in *Kumho* clarified that this gatekeeper function applies to all expert testimony, not just testimony based in science.[236]

This amendment affirms the trial court's role as gatekeeper and provides some general standards that the trial court must use to assess the reliability and helpfulness of proffered expert testimony. The Rule as amended is consistent with *Kumho Tire* and provides that *all* types of expert testimony presents questions of admissibility for the trial court in deciding whether the evidence is *both* reliable and helpful. Consequently, Rule 104(a) governs the admissibility of *all* expert testimony.

Under Fed.R.Evid. 104(a) the proponent has the burden to establish that he meets the pertinent admissibility requirements by a preponderance of the evidence.[237] *Daubert* set forth a non-exclusive checklist for trial courts to use in assessing the reliability of scientific expert testimony: (1) whether the expert's technique or theory can be or has been

tested; i.e. whether the expert's theory can be challenged in some objective sense, or whether it is instead simply a subjective, conclusory approach that cannot reasonably be assessed for reliability; (2) whether the technique or theory has been subjected to peer review and publication; (3) the known or potential rate of error of the technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) whether the technique or theory has been generally accepted in the scientific community.

[236] See also Kumho, 119 S.Ct. at 1178.
[237] The Notes cite Bourjaily v. United States, 483 U.S. 171 (1987).

In *Kumho Tire* the Court concluded that these factors might also be applicable in assessing the reliability of non-scientific expert testimony, depending upon "the particular circumstances of the particular case at issue."[238] Note, here, however, that the amendment is not an attempt to "codify" these specific factors. *Daubert* itself emphasized that the factors were neither exclusive nor dispositive. Other cases have recognized that not all of the specific Daubert factors can apply to every type of expert testimony.[239]

In addition to the *Daubert* factors, courts both before and after *Daubert* have found other factors relevant in determining whether expert testimony is sufficiently reliable to be considered by the trier of fact. The Committee noted five additional factors:

> (1) Whether experts are "proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying."[240]
> (2) Whether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion.[241]
> (3) Whether the expert has adequately accounted for obvious alternative explanations.[242]
> (4) Whether the expert "is being as careful as he would be in his regular professional work outside his paid litigation consulting."[243]

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[238] Kumho Tire, 119 S.Ct. at 1175.

[239] In addition to Kumho, 119 S.Ct. at 1175, *see,* Tyus v. Urban Search Management, 102 F.3d 256 (7th Cir. 1996) (noting that the factors mentioned by the Court in Daubert do not neatly apply to expert testimony from a sociologist). *See, also*, Kannankeril v. Terminix Int'l, Inc., 128 F.3d 802, 809 (3d Cir. 1997) (holding that lack of peer review or publication was not dispositive where the expert's opinion was supported by "widely accepted scientific knowledge"). The standards set forth in the amendment are broad enough to require consideration of any or all of the specific Daubert factors where appropriate.

[240] Daubert, 43 F.3d 1311, 1317.

[241] *See,* General Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997) (noting that in some cases a trial court "may conclude that there is simply too great an analytical gap between the data and the opinion proffered").

[242] *See,* Claar v. Burlington N.R.R., 29 F.3d 499 (9th Cir. 1994) (testimony excluded where the expert failed to consider other obvious causes for the plaintiff's condition). *Compare,* Ambrosini v. Labarraque, 101 F.3d 129 (D.C. Cir. 1996) (the possibility of some uneliminated causes presents a question of weight, so long as the most obvious causes have been considered and reasonably ruled out by the expert).

[243] Sheehan v. Daily Racing Form, Inc., 104 F.3d 940, 942 (7th Cir. 1997). See Kumho Tire Co. v. Carmichael, 119 S.Ct. 1167, 1176 (1999) (Daubert requires the trial court to assure itself that the expert "employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field").

(5) Whether the field of expertise claimed by the expert is known to reach reliable results for the type of opinion the expert would give.[244]

All of these factors remain relevant to the determination of the reliability of expert testimony under the Rule as amended but other factors may be relevant.[245] Whether supporting or opposing a motion to exclude, note that the committee's opinion is that no single factor is necessarily dispositive of the reliability of a particular expert's testimony.[246]

As above emphasized, a review of the caselaw after Daubert shows that the rejection of expert testimony is the exception rather than the rule. *Daubert* did not work a "change over federal evidence law," and "the trial court's role as gatekeeper is not intended to serve as a replacement for the adversary system."[247]

The *Daubert* Court stated: "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."[248] Similarly, this

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[244] See Kumho Tire Co. v. Carmichael, 119 S.Ct.1167, 1175 (1999) (Daubert's general acceptance factor does not "help show that an expert's testimony is reliable where the discipline itself lacks reliability, as for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy."), Moore v. Ashland Chemical, Inc., 151 F.3d 269 (5th Cir. 1998) (en banc) (clinical doctor was properly precluded from testifying to the toxicological cause of the plaintiff's respiratory problem, where the opinion was not sufficiently grounded in scientific methodology); Sterling v. Velsicol Chem. Corp., 855 F.2d 1188 (6th Cir. 1988) (rejecting testimony based on "clinical ecology" as unfounded and unreliable).

[245] See Kumho, 119 S.Ct. 1167, 1176 ("[W]e conclude that the trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable.").

[246] See, e.g., Heller v. Shaw Industries, Inc., 167 F.3d 146, 155 (3d Cir. 1999) ("not only must each stage of the expert's testimony be reliable, but each stage must be evaluated
practically and flexibly without bright-line exclusionary (or inclusionary) rules."); Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F.3d 1311, 1317, n.5 (9th Cir. 1995) (noting that some expert disciplines "have the courtroom as a principal theat[er] of operations" and as to these disciplines "the fact that the expert has developed an expertise principally for purposes of litigation will obviously not be a substantial consideration.").

[247] United States v. 14.38 Acres of Land Situated in Leflore County, Mississippi, 80 F.3d 1074, 1078 (5th Cir. 1996).

[248] 509 U.S. at 595.

amendment is not intended to provide an excuse for an automatic challenge to the testimony of every expert.[249]

When a trial court applies this amendment and rules that an expert's testimony is reliable, this does not necessarily mean that contradictory expert testimony is unreliable. The amendment is broad enough to permit testimony that is the product of competing scientific principles or scientific methods in the same field of expertise.[250]

The *Daubert* Court declared that the "focus, of course, must be solely on principles and methodology, not on the conclusions they generate,"[251] yet the Court later recognized that "conclusions and methodology are not entirely distinct from one another."[252]

Where an expert purports to apply principles and methods to the facts of the case, it is important that the witness apply this in a reliable way. At the same time, it might also

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[249] See Kumho Tire, 119 S.Ct.1167, 1176 (1999) (noting that the trial judge has the discretion "both to avoid unnecessary 'reliability' proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted, and to require appropriate proceedings in the less usual or more complex cases where cause for questioning the expert's reliability arises.").

[250] See, e.g., Heller v. Shaw Industries, Inc., 167 F.3d 146, 160 (3d Cir. 1999) (expert testimony cannot be excluded simply because the expert uses one test rather than another, when both tests are accepted in the field and both reach reliable results). As the court stated in In re Paoli R.R. Yard PCB Litigation, 35 F.3d 717, 744 (3d Cir. 1994), proponents "do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable.... The evidentiary requirement of reliability is lower than the merits standard of correctness." See also Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F.3d 1311, 1318 (9th Cir. 1995) (scientific experts might be permitted to testify if they could show that the methods they used were also employed by "a recognized minority of scientists in their field."); Ruiz-Troche v. Pepsi Cola, 161 F.3d 77, 85 (1st Cir. 1998) ("Daubert neither requires nor empowers trial courts to determine which of several competing scientific theories has the best provenance.").

[251] 509 U.S. at 595.

[252] General Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997). Under the amendment, as under Daubert, when an expert purports to apply principles and methods in accordance with professional standards, and yet reaches a conclusion that other experts in the field would not reach, the trial court may fairly suspect that the principles and methods have not been faithfully applied. *See*, Lust v. Merrell Dow Pharmaceuticals, Inc., 89 F.3d 594, 598 (9th Cir. 1996). The amendment specifically provides that the trial court must scrutinize not only the principles and methods used by the expert, but also whether those principles and methods have been properly applied to the facts of the case. As the court noted in In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 745 (3d Cir. 1994), "any step that renders the analysis unreliable ... renders the expert's testimony inadmissible. This is true whether the

be important in some cases for an expert to educate the factfinder about general principles,

without ever attempting to apply these principles to the specific facts of the case. For example, experts might instruct the factfinder on the principles of thermodynamics, or bloodclotting, or on how financial markets respond to corporate reports, without

ever knowing about or trying to tie their testimony into the facts of the case. The amendment does not alter the venerable practice of using expert testimony to educate the factfinder on general principles.

In this instance, where the expert witness educates the court, Rule 702 simply requires that: (1) the expert be qualified; (2) the testimony address a subject matter on which the factfinder can be assisted by an expert; (3) the testimony be reliable; and (4) the testimony "fit" the facts of the case.[253]

The 2000 amendment to Fed.R.Evid. 702 does not distinguish between scientific and other forms of expert testimony but the trial court's gatekeeping function applies to testimony by *any* expert.[254] The amendment creates an evidentiary requirement which

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step completely changes a reliable methodology or merely misapplies that methodology."

[253] Advisory Notes.

[254] See Kumho Tire Co. v. Carmichael, 119 S.Ct. 1167, 1171 (1999) ("We conclude that Daubert's general holding--setting forth the trial judge's general 'gatekeeping' obligation--applies not only to testimony based on 'scientific' knowledge, but also to testimony based on 'technical' and 'other specialized' knowledge."). While the relevant factors for determining reliability will vary from expertise to expertise, the amendment rejects the premise that an expert's testimony should be treated more permissively simply because it is outside the realm of science. An opinion from an expert who is not a scientist should receive the same degree of scrutiny for reliability as an opinion from an expert who purports to be a scientist. See Watkins v. Telsmith, Inc., 121 F.3d 984, 991 (5th Cir. 1997) ("[I]t seems exactly backwards that experts who purport to rely on general engineering principles and practical experience might escape screening by the district court simply by stating that their conclusions were not reached by any particular method or technique."). Some types of expert testimony will be more objectively verifiable, and subject to the expectations of falsifiability, peer review, and publication, than others. Some types of expert testimony will not rely on anything like a scientific method, and so will have to be evaluated by reference to other standard principles attendant to the particular area of expertise. The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well-reasoned, and not speculative before it can be admitted. The expert's

requires that the testimony must be the product of reliable principles and methods which are then reliably applied to the facts of the case. While the terms "principles" and "methods" may convey a certain impression when applied to scientific knowledge, they remain relevant when applied to testimony based on technical or other specialized knowledge.[255]

If the witness relies solely or primarily upon experience, then the witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts. The trial court's gatekeeping function requires more than simply "taking the expert's word for it."[256]

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testimony must be grounded in an accepted body of learning or experience in the expert's field, and the expert must explain how the conclusion is so grounded. See, e.g., American College of Trial Lawyers, Standards and Procedures for Determining the Admissibility of Expert Testimony after Daubert, 157 F.R.D. 571, 579 (1994) ("[W]hether the testimony concerns economic principles, accounting standards, property valuation or other non-scientific subjects, it should be evaluated by reference to the 'knowledge and experience' of that particular field.").

[255] For example, when a law enforcement agent testifies regarding the use of code words in a drug transaction, the principle used by the agent is that participants in such transactions regularly use code words to conceal the nature of their activities. The method used by the agent is the application of extensive experience to analyze the meaning of the conversations. So long as the principles and methods are reliable and applied reliably to the facts of the case, this type of testimony should be admitted. Nothing in this amendment is intended to suggest that experience alone--or experience in conjunction with other knowledge, skill, training or education-- may not provide a sufficient foundation for expert testimony. To the contrary, the text of Rule 702 expressly contemplates that an expert may be qualified on the basis of experience. In certain fields, experience is the predominant, if not sole, basis for a great deal of reliable expert testimony. See, e.g., United States v. Jones, 107 F.3d 1147 (6th Cir. 1997) (no abuse of discretion in admitting the testimony of a handwriting examiner who had years of practical experience and extensive training, and who explained his methodology in detail); Tassin v. Sears Roebuck, 946 F.Supp. 1241, 1248 (M.D.La. 1996) (design engineer's testimony can be admissible when the expert's opinions "are based on facts, a reasonable investigation,
and traditional technical/mechanical expertise, and he provides a reasonable link between the information and procedures he uses and the conclusions he reaches"). See also Kumho Tire Co. v. Carmichael, 119 S.Ct. 1167, 1178 (1999) (stating that "no one denies
that an expert might draw a conclusion from a set of observations based on extensive and specialized experience.").

[256] See *Daubert*, 43 F.3d 1311, 1319 (9th Cir. 1995) ("We've been presented with only the experts' qualifications, their conclusions and their assurances of reliability. Under Daubert, that's not enough."). The more subjective and controversial the expert's inquiry, the more likely the testimony should be excluded as

Subpart (1) of Rule 702 calls for a quantitative rather than qualitative analysis. The amendment requires as a foundational element basing expert testimony on sufficient underlying "facts or data." The term "data" is intended to encompass the reliable opinions of other experts.[257] The language "facts or data" is broad enough to allow an expert to rely on hypothetical facts that are supported by the evidence.[258]

When facts are in dispute, experts sometimes reach different conclusions based on competing versions of the facts. The emphasis in the amendment on " sufficient facts or data" is not intended to authorize a trial court to exclude an expert's testimony on the ground that the court merely *believes* one version of the facts and not the other.[259]

What is the relationship between Rules 702 and 703? The 2000 clarifies this distinction by requiring that the sufficiency of the basis of an expert' s testimony is to be decided under Rule 702. Rule 702 sets forth the overarching requirement of reliability, and an analysis of the sufficiency of the expert's basis cannot be divorced from the ultimate reliability of the expert's opinion. In contrast, the "reasonable reliance" requirement of Rule 703 is a relatively narrow inquiry. When an expert relies on inadmissible information, Rule 703 requires the trial court to determine whether that information is of a type reasonably relied on by other experts in the field. If so, the expert can rely on the information in reaching an opinion. However, the question whether the

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unreliable. See O'Conner v. Commonwealth Edison Co., 13 F.3d 1090 (7th Cir. 1994) (expert testimony based on a completely subjective methodology held properly excluded). See also Kumho Tire
Co. v. Carmichael, 119 S.Ct . 1167, 1176 (1999) ("[I]t will at times be useful to ask even of a witness whose expertise is based
purely on experience, say, a perfume tester able to distinguish among 140 odors at a sniff, whether his preparation is of a kind
that others in the field would recognize as acceptable.").

[257] See the original Advisory Committee Note to Rule 703.

[258] Id.

[259] Advisory Committee Notes (2000).

expert is relying on a sufficient basis of information[260] is governed by the requirements of Rule 702.

The amendment makes no attempt to set forth procedural requirements for exercising the trial court's gatekeeping function over expert testimony.[261] Courts have shown considerable ingenuity and flexibility in considering challenges to expert testimony under *Daubert*, and the Committee contemplated that this will continue under the amended Rule.[262]

The amendment continues the practice of the original Rule terming a qualified witness as an "expert." This was done to provide continuity and to minimize change. The use of the term "expert" in the Rule does not, however, mean that a jury should actually be informed that a qualified witness is testifying as an "expert." Indeed, there is much to be said for a practice that prohibits the use of the term "expert" by both the parties and the court at trial. Such a practice "ensures that trial courts do not inadvertently put their stamp of authority" on a witness's opinion, and protects against the jury's being "overwhelmed by the so-called 'experts'."[263]

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[260] Whether admissible information or not.

[261] See Daniel J. Capra, The Daubert Puzzle, 38 Ga.L.Rev. 699, 766 (1998) ("Trial courts should be allowed substantial discretion in dealing with Daubert questions; any attempt to codify procedures will likely give rise to unnecessary changes in practice and create difficult questions for appellate review.").

[262] See, e.g., Cortes-Irizarry v. Corporación Insular, 111 F.3d 184 (1st Cir. 1997) (discussing the application of Daubert in ruling on a motion for summary judgment); In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 736, 739 (3d Cir. 1994) (discussing the use of in limine hearings); Claar v. Burlington N.R.R., 29 F.3d 499, 502-05 (9th Cir. 1994) (discussing the trial court's technique of ordering experts to submit serial affidavits explaining the reasoning and methods underlying their conclusions).

[263] Hon. Charles Richey, Proposals to Eliminate the Prejudicial Effect of the Use of the Word "Expert" Under the Federal Rules of Evidence in Criminal and Civil Jury Trials, 154 F.R.D. 537, 559 (1994) (setting forth limiting instructions and a standing order employed to prohibit the use of the term " expert" injury trials).

May an expert witness in one discipline offer testimony in another field of expertise? For instance, may an E.R. physician be used in an automobile negligence case to discuss the injury a patient sustained to his wrist?

In most states, the answer is found in statutes whereas in other states the answer comes from an analysis of the evidence code. Who may qualify as an expert? What is the permitted scope of the testimony? Finally, how may a trial lawyer utilize cross-discipline testimony?

There are at least four reasons that this material is so important. An attorney may have (1) access to expert testimony from one discipline but not in another. (2) Experts are hard to find. The other reason is that the testimony which is sought may (3) not be forthcoming from an anticipated expert but another expert may "see the light." Finally, medical negligence litigation is one area in law where disaster predictably strikes. An (4) expert becomes unavailable at the last minute and the trial lawyer needs a replacement. The attorney who is blind-sided by these evidentiary issues may find his case completely dismissed without an available remedy or, second worst, with a lengthy appeal.

First, let us turn our attention to Fed.R.Evid. 702. For trial lawyers everywhere, the main opposition to most expert witness testimony is the lack of qualification, that the proponent's expert witness is not sufficiently similar to the defendant. In some cases the defense will wait until the moment of trial, hoping to strain the plaintiff's nerves and resources. In other cases, the defense will file a motion to exclude the testimony. If inexperienced in medical negligence litigation the wily and nimble trial lawyer may not "see it coming" but, if he knows the principles he may artfully and vigorously respond to the challenges.

§ 14 Overview, Generalizations, and Principles from Fed.R.Evid. 702, *Frye, Daubert,* and *Kumho Tire*:[264]

Before moving on to individual other federal and states cases it is wise to spend a moment to summarize, by paraphrase, the marrow found in *Frye*, *Daubert*, and *Kumho Tire* and the all important Federal Rule of Evidence 702 which permits the trier of fact to admit into evidence information which is scientific, technical, or other specialized knowledge though the testimony of an expert witness.

(1) The proponent offers the witness. (2) The trial court judge decides who will testify as an expert witness under Fed.R.Evid. 104(a) and decides precisely what information the jury may consider. In automobile litigation, often the parties debate how the accident occurred, what precisely caused the accident, and then the parties dual out medical cause and effect.

The way in which this is done is that one expert finds causation and the other expert witness disputes this expert's findings. The *Daubert* decision states that the *Frye* "general acceptance" is not a necessary precondition to the admissibility of scientific evidence under Federal Rules of Evidence, and that (3) the Rules require that the trial court judge make a determination that the expert's testimony rests on 'reliable foundation and is relevant to task at hand. *Daubert* standards include (a) whether the theory or technique in question can be (and has been) tested, (b) whether it has been subjected to peer review and publication, (c) its known or potential error rate and the existence and maintenance of standards controlling its operation, and (d) whether it has attracted widespread acceptance within a relevant scientific community. The inquiry is a flexible

one, and its focus must be solely on principles and methodology, not on the conclusions that they generate.[265]

In *Daubert* the pivotal question is whether the witness has empirically validated the hypothesis by appropriate scientific methodology. The subject of an expert's testimony must be "scientific ... knowledge." The adjective "scientific" implies a grounding in the methods and procedures of science. Similarly, the word "knowledge" connotes more than a subjective belief or unsupported speculation. The term applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds. Scientific methodology today is based on generating hypotheses and testing them to see if they can be *falsified*.[266]

> **Practice Tip:** It is this methodology which distinguishes science from other fields. Scientific status is conferred upon data which may be analyzed by its falsifiability, refutability, or testability.

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[264] *See, Scouting the Frontiers of the Law*, TRIAL September 1999 at p. 20. This is an interview with Arthur Caplan, the director of the Philadelphia-based Center for Bioethics, a branch of the University of Pennsylvania Health System. Professor Caplan discusses the cutting-edge challenges the courts face.

[265] Cross-examination permits this battle about conclusions to unfold.

[266] For those unfamiliar with this approach to "the scientific method," a rule which is scientific remains true under the same circumstances. To illustrate, an earth-year, measured by the earth's revolution around the sun, is 365 ¼ days ...no matter who does the measurement. The atomic weight of gold is 196.967; the specific gravity of gold is 19.32. A liter of water always weighs one kilogram or approximately 2.2 pounds. A mile is always 5,280 feet, 1,728 yards, 1.609 km; a meter is always 1,000 cm, or approximately 3.3 feet, etc. Light travels at approximately 3 X 10^8 meters per second. One may do whatever one wants to do, but these numbers will remain constant for all observers, whether or not the day is cloudy or sunny … Mitochondria are membrane-enclosed organelles within eukaryotic cells, containing enzymes responsible for energy production during aerobic respiration. These rodlike or spherical bodies are thought to be derived from free-living bacteria that, at a very early stage in the history of life, invaded larger cells and took up a symbaotic way of life inside. Each still contains its own small loop of DNA called mitochondrial DNA, and new mitochondria arise by division of existing ones. Contrast the previous data to the body of "knowledge" know as "astrology." If one asks a "certified astrologer" about one's future, one gets a different answer depending upon what information one gives to the astrologer and the astrologer's identity. Astrology is not scientific; astronomy is scientific; chemistry and physics are scientific. The difference is that scientific principles are impossible to falsify … non-scientific "principles" are observer or user dependent. In medicine, while there may be debate over permanent disabilities, upon reading an x-ray, there is no legitimate debate in the interpretation of a femur fracture where the femur bone completely separated in mid-shaft. One the other hand, where one attempts to "measure" or identify a patient's "aura," the magnetic field surrounding a patient said to be "felt" by practitioners of this "art," the results are practitioner specific and unscientific.

While (4) publication in peer reviewed journals is not the "*sine qua non* of admissibility" it does not necessarily correlate with reliability. Nevertheless, when a proponent is willing to submit a theory to the scrutiny of the scientific community, this increases the likelihood that substantive flaws in methodology will be detected. But publication in a peer-reviewed scientific journal is viewed only as relevant, not a dispositive indicator of the scientific validity of a particular technique or methodology upon which an expert witness premises an opinion. Here, the (5) court should also look to the rate of error, the existence and maintenance of standards which control the techniques operation.

Finally, (6) "general acceptance" may still bear upon the inquiry. Widespread acceptance can be an important factor in ruling particular evidence admissible, and a known technique which has been able to attract only minimal support within the community may properly be viewed with skepticism. The analysis does not end at this point since the (7) trial court must examine whether the facts or data are of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.

(8) Under *Kumho Tire*, scientific and technical knowledge and specialized knowledge follow the same rules for admissibility such that there is a unified standard of evidentiary reliability. However, the *Daubert* criteria do not represent a "definitive checklist or test"[267] and the holding in the gatekeeping inquiry must be '"tied to the facts"' of a particular "case.

[267] MSE v.1 17; *Daubert*, 113 S.Ct. at 2796. Although the *Daubert* holding stated that these criteria were non-exclusive, not "a definitive checklist or test," courts have applied them in this manner. *See*, *e.g.*,

§ 15 Selected Points on Admissibility of Scientific Evidence:

§ 15.1 Expert Witness Degrees:

An expert's degrees, in and of themselves, do not make his testimony useful to the court, admissible, or reliable. The courts look for precise methodology, strict relevance to the case at bar, and a narrow interpretation of whether the trial court needs the to decide the matter in a meaningful way. When an expert engages in "unabashed speculation" a court will exclude the testimony under Fed.R.Evid. 702 and the holdings of *Frye*, *Daubert*, and *Kumho Tire*.

In *Clark v. Takata Corporation*[268] the Seventh Circuit Court of Appeals affirmed the trial court's striking of the plaintiff's emergency medical technician expert's (EMT) testimony and affidavit in an automobile roll-over, seat-belt failure case. The plaintiff filed suit under the Kentucky Products Liability Act,[269] where he asserted claims of negligence and strict liability. The plaintiff contended that the "seat belt latching mechanism [on his lap belt] ... failed and such failure caused [him] to become unrestrained and strike his head on the interior of the automobile' thereby causing him to suffer permanent and serious injury."[270]

At trial the plaintiff introduced testimony by an expert witness, Dr. James Lafferty, P.E., Ph.D., who submitted an expert report which concluded that had the seat belt functioned then the plaintiff would not have struck his head on the roof of the car and

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Roback v. V.I.P. Transport, Inc., No. 91-C-5902, 1994 WL 548197, at *4-*5 (N.D.Ill. 1994); Stanczyk v. Balck & Decker, Inc., 836 F.Supp. 565, 565-68 (N.D.Ill. 1993).

[268] --- F.3d ----, 1999 WL 756521 (7th Cir. 1999).

[269] KY. REV. STAT. §§411.300, 411.182.
RS sec. 411.300, et seq. and KRS sec. 411.182

[270] *Id.* at *2.

that he would not have sustained "serious injury in this accident."[271] In deposition the expert witness "again stated that Clark's head struck the roof of the car because the lap belt had become unlatched as the car was rolling down the embankment, though he gave no indication how he had arrived at this conclusion."[272]

Here, the defendants filed a motion for summary judgment arguing that the plaintiff had "failed to present admissible evidence to establish that the lap belt did not restrain him during the accident."[273] In response, the plaintiff filed the expert witness' affidavit which clarified the engineer's opinion and which restated "his conclusion that the lap belt had malfunctioned by unfastening during the rollover … [and] added the additional contention that the lack of blood on the lap belt, in comparison to the large amount of blood found on the shoulder harness and the driver's seat, "is inconsistent with the lap belt being buckled during and after the accident."[274]

The plaintiff also buttressed this engineer's affidavit with the testimony from the EMT "which stated that "[i]t is [her] belief ... that [the plaintiff's] … lap belt was not attached around his waist at any time from when [she] first arrived on the scene to and including his extraction from the automobile."[275]

Under Fed.R.Evid. 702 the defendant moved to strike the engineer's testimony since he failed to perform "the necessary research and testing to submit legitimate expert opinions"[276] which the rule requires as well as failing to meet the *Daubert* requirements. Simultaneously, the defendant moved to strike the affidavit of the EMT since the new

[271] *Id.* at *2.
[272] *Id.*
[273] *Id.* at *3
[274] *Id.*
[275] *Id.*

allegations contained in that affidavit were inconsistent with prior testimony and were unreliable.[277]

The district court granted this motion to strike the engineer's opinions since they failed to meet the *Daubert* standards — the requisite level of reliability — which mandates that scientific testimony is both relevant and reliable.[278] Also the court struck the EMT's testimony since it was inconsistent with prior testimony where the EMT denied "recalling anything" about the seat belt.[279]

The defect here was that the plaintiff failed to "come forward" with any evidence which would establish that the "lap belt came undone before or during the accident."[280] This allegation was an essential element of the tort claim and absent this element, the trial court granted the motion for summary judgment.[281]

In its review the appellate court reviewed the engineer's one and one half page report, where he had reviewed medical records, where he "estimated" that it would require 10,000 pounds to cause the fracture dislocation at C_6 and C_7 . The report further concluded that

> … the injury occurred when [the plaintiff's] … head impacted the roof of the Honda during the rollover sequence … If Mr. Clark's lap belt had functioned properly, he would have been restrained from impacting the roof of the Honda and he would have had no serious injury in this accident. From measurements made of Mr. Clark, I understand that his seated height is approximatelq 32 inches. The distance from the bottom of the seat cushion of the driver's seat of the Honda to the top of the head rest (restraint) is 32 inches. Thus, he had about four inches of

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[276] *Id.*
[277] *Id.*
[278] *Id.*
[279] *Id.*
[280] *Id.*
[281] *Id.*

> clearance between the top of his head and the crushed roof of the car. A lap belt, therefore, would have prevented his neck injury.[282]

The engineer did not review the plaintiff's testimony, witness testimony from the accident scene, or from the passengers from the vehicle. Further, in the engineer's report, he failed to consider the plaintiff's height or weight in drawing his conclusions. The engineer did perform a "visual inspection" of the vehicle and the driver's lap belt prior to writing his report, the appellate court criticized the engineer's work further in noting that he made "no other measurements, such as how far the front seat was reclined at the time of the accident or the extent to which the roof was crushed in the rollover."[283]

After the defendants filed their motion for summary judgment, the engineer then filed his affidavit in response to their arguments:

> … so that there can be no doubt about my opinion, I would like to re-state my professional opinion.... Based on my education, research, and experience in the fields of Biomechanics and Mechanical Engineering it is my professional opinion that had [the plaintiff's] … lap belt remained fastened, Clayton Clark would not have suffered serious injury."[284]

Now, to support his contention that the lap belt became disengaged during the course of the rollover, the engineer provided a reason not mentioned in his previously submitted expert report. This was "the relative lack of blood on the lap belt in comparison to the blood on the shoulder harness and the seat is inconsistent with the lap belt being buckled during and after the accident."[285]

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[282] *Id.* at *4
[283] *Id.* at *4.
[284] *Id.*
[285] *Id.*

The appellate court reviews matters of admissibility of scientific evidence under the abuse of discretion standard[286] The appellate court accords deference to the trial court's decision, the "hallmark" of the abuse of discretion standard.[287] In this instance, the appellate court analyzed that Fed.R.Evid. 702 which require the trial court to function as gatekeeper "to the screening of expert testimony."[288] The rule "imposes "a special obligation upon a trial judge to 'ensure that any and all scientific testimony ... is not only relevant, but reliable.'"[289]

> The objective of [*Daubert's* gatekeeping] requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.[290]

Further, the court analyzed that "[i]t is axiomatic that proffered expert testimony must be " 'derived by the scientific method[.]'"[291] In this case, the engineer's testimony is inadmissible since his opinions are unsupported by scientific evidence and are not reliable. The opinions were that "(1) the lap belt unbuckled during the rollover sequence; and (2) a properly functioning lap belt would have prevented Clark from moving upward four inches and striking the roof."[292]

To admit this testimony requires the court to engage in a two-step analysis:

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[286] *Id.* (citing Kumho Tire Co. v. Carmichael, --- U.S. at ----, ----, 119 S.Ct. at 1167, 1176 (1999); see also General Electric Co. v. Joiner, 522 U.S. 136, 118 S.Ct. 512, 515 (1997).
[287] *Id.*
[288] *Id.* at *5 (citing Kumho, --- U.S. at ----, 119 S.Ct. at 1174; Daubert, 509 U.S. at 589).
[289] *Id.*
[290] *Id.* (citing Kumho, --- U.S. at ----, 119 S.Ct. at 1176.)
[291] *Id.* (citing Wintz v. Northrop Corp., 110 F.3d 508, 512 (7th Cir.1997) (quoting Daubert, 509 U.S. at 590-91).
[292] *Id.*

(1) determine whether the expert's testimony is reliable; determine whether the testimony "is based on a reliable methodology."[293] (2) Then the court must decide whether "evidence or testimony assists the trier of fact in understanding the evidence or in determining a fact in issue."[294] One problem the appellate court found with this expert's testimony and opinion was that he assumed as true the fact which the plaintiff needed to prove at trial: "that the lap belt, though previously secure, became unlatched during the accident."[295]

In his deposition the engineer admitted that he never addressed this question and that he had formulated "no independent opinion as to whether the lap belt became unlatched during the accident sequence."[296] In beginning his analysis, the expert witness assumed as fact the very fact he had been hired to prove! Therefore his testimony "is not helpful to the trier of fact" in making the determination of that ultimate issue of fact.[297] The expert witness hadn't proven this allegation; he assumed it to be true.

Trial court judges are required to exclude opinion testimony which represents "a subjective belief or unsupported speculation" by considering whether the testimony has been subjected to the scientific method."[298] The standard for an expert is to substantiate his opinion by scientific evidence and to provide an ultimate conclusion without analysis is "meaningless."[299] An expert witness does not assist the trier of fact to determine

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[293] *Id.* (citing Cummins v. Lyle Indus., 93 F.3d 362, 368 (7th Cir.1996); see also Daubert, 509 U.S. at 590).
[294] *Id.* (citing Cummins, 93 F.3d at 368 (internal citations and quotations omitted); see also Daubert, 509 U.S. at 591.)
[295] *Id.*
[296] *Id.*
[297] *Id.* at *6.
[298] *Id.*
[299] *Id.* (citing Huey v. United Parcel Serv., Inc., 165 F.3d 1084, 1087 (7th Cir.1999) (citing Minasian v. Standard Chartered Bank, PLC, 109 F.3d 1212, 1216 (7th Cir.1997)).

whether a product failed when he initiates his analysis with the assumption that the product failed.[300]

The engineer then stated that it was his opinion that a properly functioning lap belt would have prevented the injury. His methodology to reach such a conclusion was "unclear at best."[301] He did no testing, created no models, engaged in no re-enactments — in short, he had done nothing except to express the opinion.[302]

Under *Daubert*, an expert witness must position his opinion upon "any rigorous methodology" other than merely experience and training.[303] "Either "hands-on testing" or "review of experimental, statistical, or other scientific data generated by others in the field" may suffice as a reasonable methodology upon which to base an opinion."[304] The trial court rejected the "four inches" testimony because the opinion had no substantiation in fact or in science. He had done no scientific tests to determine whether "forces acting on the lap belt at the time immediately before and during the impact and rollover, including Clark's height, weight, and the force of the impact as related to the speed of the striking vehicle."[305] Additionally, "he failed to identify, much less offer, any evidence to support his conclusion that a lap belt, if properly fastened, could have stopped Clark from hitting the roof."[306]

In striking the EMT's testimony, the court referred to her former testimony where she testified that she remembered nothing about the lap belt and relied upon the court's

[300] *Id.*
[301] *Id.*
[302] *Id.* *7.
[303] *Id.*
[304] *Id.*
[305] *Id.*
[306] *Id.* at *7.

analysis[307] in *Unterreiner v. Volkswagen of America, Inc.*,[308] where that court ruled that "'"[a] party cannot claim a lack of general knowledge about a subject and later make a statement which requires detailed knowledge about the same subject."'[309]

Further, "an affidavit cannot be used to create a genuine issue of material fact where the affidavit differs from prior deposition testimony to the point that it is unreliable."[310] *Daubert* set forth the familiar nonexhaustive list of four factors that are helpful in gauging the reliability of expert testimony,[311] but the bottom-line is that an expert's credentials are but one minor step along the way to admissibility of scientific testimony.

§ 15.2 The Effect of No Evidentiary Hearing:

In *Padillas v. Stork-Gamco, Inc.*,[312] a worker in a poultry plant brought a products liability action and the trial court excluded an expert report under the *Daubert* standard. In its reversal, the appellate court held that the trial court erred since a fact issue whether a product was defective precluded summary judgment and it abused its discretion where the court failed to hold an *in limine* hearing on factual issues consistent with the *Daubert* ruling.

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[307] *Id.* at *8.
[308] *Id.* (citing 8 F.3d 1206, 1210 (7th Cir.1993)).
[309] *Id.* (citing Unterreiner, 8 F.3d at 1211).
[310] *Id.* (citing Patterson v. Chicago Ass'n for Retarded Citizens, 150 F.3d 719, 720 (7th Cir.1998)).
[311] *Id.* ((1) whether the theory is scientific knowledge that will assist the trier of fact and can be tested; (2) whether the theory has been subjected to peer review or publication; (3) the known or potential rate of error and the existence of standards controlling the technique's operation; and (4) the extent to which the methodology or technique employed by the expert is generally accepted in the scientific community. See Daubert, 509 U.S. at 593-94. *Id.* at *9 n.3.
[312] 186 F.3d 412 (3rd Cir. 1999)

In its reversal, the court noted that its review on this subject is plenary.[313] The defense moved for summary judgment on the ground that the plaintiff did not satisfy the *Azzarello* standard,[314] the only evidence the plaintiff had which evidenced the product defect was an expert report. When the trial court concluded that this report was inadmissible under Fed.R.Evid. 702, they had no support for their case and summary judgment would have been proper.

This matter represented a diversity jurisdiction case and Pennsylvania products liability law controlled. The *Azzarello* standard was elaborated in *Azzarello v. Black Brothers Co.*,[315] which states that in a product liability case, "the jury may find a defect where the product left the supplier's control lacking any element necessary to make it safe for its intended use or possessing any feature that renders it unsafe for the intended use."[316]

In addition to its own expert's report, the plaintiff offered a report which predated the incident from the manufacturer's own engineering manager which addressed the problem in the machine; a memorandum also predating the incident from the employer's employee directed to the machine manufacturer, evidence of a design defect from a sister company, and evidence of post-accident remedial measures.[317] The appellate court concluded that this evidence was probative of a condition where a reasonable jury could

[313] *Id.* at 414.
[314] *Id.*
[315] 480 Pa. 547, 391 A.2d 1020 (Pa.1978).
[316] 186 F.3d 412, 414 (citing Azzarello, 391 A.2d 1020, 1027).
[317] *Id.*

find that the machine was unsafe for its intended use but, would a jury return a verdict on this evidence standing alone apart from the plaintiff's offered expert's report?[318]

This particular court had never addressed this specific issue of when expert witness evidence was required in a products liability dispute but, in dictum, the court had said, "'"[i]n addition to expert testimony on design defect, a defective condition in a product can be established by the presentation of other types of circumstantial evidence."'[319]

Expert evidence is not necessary where

> … all the primary facts can be accurately and intelligibly described to the jury … as men of common understanding, are as capable of comprehending the primary facts and of drawing correct conclusions from them as are witnesses possessed of special or peculiar training, experience, or observation in respect of the subject under investigation.[320]

Further, this court reasoned:

Since the case at bar was at the summary judgment stage, it was "premature to rule out that testimony and pictures may enable the jury to clearly see the construction of the machine and the manner of its use, rendering expert evidence unnecessary."[321] For that reason, the court held that it could not "exclude the possibility that plaintiff's non-expert evidence will be sufficient to submit his claim of defect to the jury."[322]

It is important to zero in on precisely what the plaintiff offered as evidence. It offered a mechanical engineer's report in which he detailed his findings about the

[318] *Id.*
[319] *Id.* at 415. (citing Barris v. Bob's Drag Chutes & Safety Equip., Inc., 685 F.2d 94, 101 (3d Cir.1982).
[320] *Id.* at 415-16
[321] *Id.* at 416.
[322] *Id.*

machine and he analyzed the machine's operation.[323] The lower court concluded that *Daubert* applied to this "technical expert evidence"[324] but the report did not "pass muster," however, under Fed.R.Evid. 702 and *Daubert* since the mechanical engineer provided *no basis* for his conclusions and observations.

> He does not indicate his research or experience in this area. His curriculum vitae indicates he has had experience with cutting machines, but it does not indicate whether he has experience in the design of these machines from which some methodology or design efficacy might emerge. He does not set forth in his report the methodology by which he made his determinations in this case. He does not indicate that he conducted any tests or what the testing techniques were.... [H]e mentions the four "recognized" levels of analysis of a hazardous work zone on a machine, but he does not provide citations as to where these levels of analysis are derived or by whom they are recognized.[325]

The expert witness did not explain how a design modification which he proposed would have prevented the injuries and, equally fatal here, the report was conclusory in nature.[326]

Prior to a *Daubert* analysis, "the trial judge must determine at the outset, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue."[327] In this case where the judge did not provide adequate process to the parties at the evidentiary stage, particularly on an outcome determinative step such as summary judgment, the plaintiff is entitled to an hearing.[328] The court ruled against the plaintiff and that concluded the case.

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[323] *Id.*
[324] *Id.* (citing Kumho Tire Co. v. Carmichael, --- U.S. ----, ----, 119 S.Ct. 1167, 1175, 143 L.Ed.2d 238 (1999).
[325] *Id.*
[326] *Id.* at 416-17.
[327] Daubert, 509 U.S. at 592, 113 S.Ct. 2786. The court must preliminarily decide whether the expert himself is qualified under Fed.R.Evid. 104(a). *Id.* at 417.
[328] *Id.*

"The need for this opportunity is compelling because the burden of establishing admissibility by a preponderance of the evidence … is on the proponent."[329]

Daubert should not be used as an evidentiary guillotine and parties must be provided an opportunity to be heard.

> The fact that *Daubert* can be used in connection with summary judgment motions does not mean that it should be used profligately. A trial setting normally will provide the best operating environment for the triage which *Daubert* demands.... [G]iven the complex factual inquiry required by *Daubert*, courts will be hard-pressed in all but the most clearcut cases to gauge the reliability of expert proof on a truncated record.[330]

When the ruling on admissibility turns on a factual issue, the failure to hold any hearing in general, will constitute an abuse of discretion.[331]

§ 15.3 Unreliable Methodology:

In *Blue Dane Simmental Corporation v. American Simmental Association*,[332] the court examined the registration of Simmental cattle. To catalogue this livestock the American Simmental Association maintains a herdbook where breeders may register the cattle. The dispute here centered upon the percentage of a bloodline in order to qualify as "purebred." This registration ability and percentage of the bloodline translates to significant financial rewards. The trial court excluded the testimony of an agricultural economist under *Daubert* and *Kumho Tire* analyses and this court reviewed that exclusion.[333]

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[329] *Id.* at 417-18 (See Daubert, 509 U.S. at 592 n. 10, citing Bourjaily v. United States, 483 U.S. 171, 175-76 (1987)).
[330] (*Id.* at 418. (citing Cortes-Irizarry v. Corporación Insular De Seguros, 111 F.3d 184, 188 (1st Cir.1997).
[331] *Id.* at 418.
[332] 178 F.3d 1035 (8th Cir. 1999).
[333] *Id.* at 1039.

This expert provided essentially a "testimonial" about the influence of the dilution of the herds upon the prices of cattle.[334] In determining that the testimony was not reliable, the district court did not dispute that Dr. Baquet was an adequately qualified expert witness. Instead, it found that the methodology he employed was unreliable, stating that the analysis was "simplistic." The court noted that Dr. Baquet attributed the entire difference in market price within the United States and Canada to the Risinger fullbloods, despite the fact that these animals made up a tiny fraction of the market, nineteen out of 138,169 total head. The district court also noted that at least one other independent variable contributed to the falling cattle markets, as it was undisputed that both the Canadian and American markets were falling prior to the introduction of the Risinger animals.

Furthermore, during his deposition Dr. Baquet admitted that various factors contribute to particular cattle breeds losing market value. He stated that generally an economist would attempt to identify and evaluate all of the independent variables significantly affecting changes in the value of a breed. Dr. Baquet acknowledged that he had neglected to consider *any* variables other than the introduction of the Risinger fullbloods.[335]

In finding this case analogous to *Kumho Tire* this court wrote;

> In *Kumho*, the Supreme Court found that the exclusion of a qualified tire expert's use of visual and tactile examination of automobile tires was within the trial courts discretion, despite the fact that this methodology was generally accepted within the relevant field.[336] In so holding, the court found that it was not the general acceptance of the methodology that was relevant, "[r]ather, it was the reasonableness of using such an approach, along with [the expert's] particular

[334] *Id.*
[335] *Id.*
[336] *Id.* (citing Kumho Tire, 119 S.Ct. at 1176-77.

> method of analyzing the data thereby obtained, to draw a conclusion regarding the particular matter to which the expert testimony was directly relevant."[337] Because the Court found that the research method did not satisfy the four *Daubert* factors, and was not a reliable indicator of the results to which the expert would testify, it upheld the exclusion of the testimony.[338]

For testimony to surmount a *Daubert* challenge, the expert must utilize a real world analysis based in rational methodology. Supposition and speculation will not suffice since the testimony is then not relevant and the testimony itself will not past the *Daubert* standards.

§ 15.4 "Unabashed Speculation" Will Exclude Expert Testimony:

Jaurequi v. Carter Manufacturing Company,[339] was cited by the court in *Blue Dane Simmental Corporation v. American Simmental Association*.[340] This Eighth Circuit case was brought against a manufacturer of a corn head, a mechanical device, used to gather corn for a combine. The manufacturer moved to exclude the plaintiff's expert testimony and for summary judgment on all claims. The United States District Court for the Eastern District of Missouri, The Honorable E. Richard Webber, presiding, granted the motion.

In upholding the trial court's granting of the summary judgment, the appellate court held that (1) under the reliability prong of *Daubert*, the expert testimony of a mechanical engineer and a human factors engineer with a doctorate in experimental psychology that design and warnings for corn head were deficient; (2) and that expert testimony was irrelevant to support the claim that the warnings were deficient.

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[337] *Id.* (citing Kumho Tire, 119 S.Ct. at 1177).
[338] *Id.* at 1039.
[339] 173 F.3d 1076 (8th Cir. 1999).
[340] 178 F.3d 1035, 1039 (8th Cir. 1999).

Central to the plaintiff's case was the testimony of a mechanical engineer who was prepared to testify that the plaintiff was not provided with the "necessary detail" which would have enabled him to avoid the "hazard zone."[341] This expert admitted, however, that he had never observed the machinery at issue while it was running and that he had "never seen any corn head in operation except from the roadside during his various trips through the Illinois countryside."[342]

When asked about the basis for his opinion that the dangerous hooks are "invisible" he stated, "I guess as an engineer, I know what it looks like in the running mode."[343] His other opinion were without actual "hands on" support and he speculated that "had the warnings been designed as he suggests, they would not have been painted over. However, he admitted in his deposition that he had no basis for this belief." *Id.* Further, in an affidavit, he stated that it was his conclusion that the plaintiff was not appropriately warned. However, he "admitted that he had not evaluated [the plaintiff's] … behavior and had focused his analysis only on the question of whether the mechanical design of the corn head was defective. He also admitted that he did not actually know what [the plaintiff] knew or did not know."[344] Similarly, other opinions and conclusions had no factual or experimental support.[345]

The appellate court analyzed this case under *Frye* and *Daubert*.[346] In conjunction with Fed.R.Evid. 702. *Daubert* applies not only to novel scientific testimony but also to

[341] *Id.* at 1080.
[342] *Id.*
[343] *Id.*
[344] *Id.*
[345] *Id.* at 1080-81.
[346] *Id. at* 1081.

"engineering testimony regarding alternative designs in products liability cases."[347] The expert in the case at bar had not

> attempted to construct or even draw the suggested device, much less test its utility as a safety device or its compatibility with the corn head's proper function. Nor has he pointed to any manufacturer that incorporates awareness barriers into corn heads or similar farming machinery. In short, he has provided no basis for us to believe that his opinions are anything more than unabashed speculation.[348]

It is this "unabashed speculation" which is the hallmark for testimony which courts will exclude under the *Daubert* / *Kumho* standards.

§ 15.5 Unreliable Scientific Evidence; Fibromyalgia:

In *Black v. Food Lion, Incorporated*,[349] a slip and fall case, an expert witness testified that the customer's fall caused hormonal damage which lead to fibromyalgia. This testimony the court excluded as not being sufficiently reliable. A magistrate judge awarded $300,000 to the plaintiff since the plaintiff had been diagnosed with fibromylagia following this fall. Whether the plaintiff produced "reliable expert evidence" that the accident caused the elusive fibromyalgia was the fulcrum for the defendant's appeal.

The plaintiff sought treatment for "lower back and arm pain, a headache, and dizziness" but her physician was unable to identify any physical basis of the complaints."[350] All objective tests for pain, including an MRI, EMG, and discogram,[351] produced results within normal limits.[352]

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[347] *Id.* at 1082.
[348] *Id.* at 1084.
[349] 171 F.3d 308 (5th Cir. 1999).
[350]
[351] Instillation of a radio-opaque dye in order to visualize the intervertebral disc.
[352] *Id.*

The patient was then referred to a physician certified by the American Board of Physical Medicine and Rehabilitation and by the American Board of Pain Medicine, a physician who specialized in treating patients with persistent pain.[353] This doctor diagnosed the patient as having fibromyalgia syndrome, characterized by "complaints of generalized pain, poor sleep, an inability to concentrate, and chronic fatigue. The condition is most common in women between the ages of 30 and 50 and is often associated with hormonal problems."[354] This physician presented the hypothesis that the fall caused sufficient physical trauma to initiate "hormonal changes" which then caused the fibromyalgia.[355]

The defense attacked the expert's credentials and the fact that, the defense argued, the doctor was unable to link the fall to the fibromyalgia with "any degree of medical certainty"[356] mandated exclusion of the testimony. Over defense counsel's objections the court rejected the arguments, allowed the doctor to testify and awarded judgment to the plaintiff.[357]

The appellate court reviewed the trial court's factual finding for clear error and its conclusions of law de novo.[358] The plaintiff's burden under Texas law was "to prove to a reasonable degree of medical certainty, based on a reasonable medical probability and

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[353] *Id.*
[354] *Id.* To illustrate how this diagnosis differs from lumbo-sacral strain, a well accepted malady, for instance, consider that the lumbo-sacral strain diagnosis would be reached after an history of strain to the low back accompanied by pain in the lumbo-sacral musculature. There are no neurologic findings. Lumbo-sacral strain is a diagnosis which contains some observable physical component which at least approaches objective findings; the examiner would feel, perhaps, spasm in the muscle groups and the patient would report pain when the examiner palpates the area. The patient would experience a restriction in the range of motion of the low back. How would one differentiate the definition of fibromyalgia from situational depression … a common diagnosis in the population in general where there has been no inciting accident?
[355] *Id.*
[356] *Id.* at 309.
[357] *Id.* at 310.

scientifically reliable evidence, that her fall at Food Lion caused the fibromyalgia syndrome."[359] Here, the court cited *Merrell Dow Pharms., Inc. v. Havner*,[360] which held that "possibility, speculation, and surmise" are insufficient to support expert testimony regarding causation.

Further, this court cited *Daubert*, and noted that the doctor reached her opinion through a *process of exclusion*. The doctor reviewed the patient's history, ruled-out an intervening cause, and reviewed tests which the doctor performed.[361] Here, the court cited the *Kumho* decision which "governs a trial court's decision about how to determine scientific reliability."[362] Further, *Kumho Tire*, noted the court, refines in a common-sense way, but does not undermine, the use of the specific *Daubert* factors as a reference point for gauging the reliability of potential expert testimony.[363]

In reversing the trial court the judges wrote in an *en banc* opinion:

> More to the point, the magistrate judge's opinion does not even cite *Daubert*, although, giving his above-quoted statements the benefit of the doubt, the magistrate judge attempted objectively to justify the admission of [the doctor's] testimony. Unfortunately, he failed. [The doctor's] … testimony does not bear the necessary indicia of intellectual rigor, whether measured by *Daubert* or by the magistrate judge's reasoning. Because the magistrate judge misapplied the *Daubert* tests and failed to articulate any satisfying alternative standards, we hold that he abused his discretion in admitting [the doctor's] testimony.[364]

The scientific conclusion, here, the one supported by the *Daubert* four is supported by various accepted treatises, leads to the conclusion that there is a paucity of

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[358] *Id.*
[359] *Id.*
[360] *Id.* (citing 953 S.W.2d 706, 711-12 (Tex.1997)).
[361] *Id.* The appellate court accepted this expert as an expert witness, reversing the trial court.
[362] *Id.* (citing Kumho Tire, 119 S.Ct. at 1176)).
[363] *Id.* at 310-11.
[364] *Id.* at 311.

evidence to support the theory that trauma causes fibromyalgia.[365] While the court concluded that "data from the literature are insufficient to indicate whether causal relationships exist between trauma and [fibromyalgia]. The absence of evidence, however, does not mean that causality does not exist, rather that appropriate studies have not been performed."[366] Further, and fatal to the admission and acceptance of this causal evidence was that the evidence did not fulfill the "four non-exclusive factors to consider when assessing the scientific validity or reliability of an expert's testimony."[367]

About fibromyalgia, one medical author wrote:

> [T]here is no scientific evidence to suggest that the injury itself results in the pathophysiology of fibrositis syndrome, thus "whether an injury ... caused the patient's [fibromyalgia], a … causal proposition … can rarely be determined to be certainly true or certainly false."[368]

In addition, the court found other defects with this line of testimony:

> First, [the expert witness physician's theory in the case at bar] … has not, according to the evidence at trial, been verified by testing and, thus, has not been peer-reviewed. In fact, [the doctor] … acknowledged that fibromyalgia has no known etiology (i.e., medical science does not know if the cause of the condition is muscle, nerve, or hormone damage).[369]

The doctor testifying on behalf of the plaintiff confronted a serious problem here:

> If medical science does not know the cause, then [the doctor's] … "theory" of causation, to the extent it is a theory, is isolated and unsubstantiated. Even [the doctor] … recognized the limits of her opinion. When asked whether she had been able to identify the cause of [the plaintiff's] … fibromyalgia, she stated, "I didn't find the cause. I found an event that contributed to the development of the

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[365] *Id.* at 312 (citing Frederick Wolfe, *The Fibromyalgia Syndrome: A Consensus Report on Fibromyalgia and Disability*, 23:3 J. RHEUMATOLOGY 534, 534 (1996)).
[366] *Id.*
[367] *Id.* at 313. (citing Daubert, 509 U.S. at 593-95, 113 S.Ct. at 2796-97).
[368] *Id.* at 312-13. (citing Geoffrey Littlejohn, Medicolegal Aspects of Fibrositis Syndrome, 16 Journal of Rheumatology 169, 171-72 (Supp. 19 1989); *See*, Vancouver Report, 23:3 The Journal of Rheumatology at 534. *Id.* at 313.
[369] *Id.*

> symptom. I did not find the cause." On its own terms, [the doctor's] … opinion includes conjecture, not deduction from scientifically-validated information.[370]

In short, the fibromyalgia theory has no general acceptance in the medical scientific community,[371] and only an educated guess may be made on causation based on this patient's history. Finally, the causation theory has no known "potential rate of error." What the magistrate judge did was to either substitute his own standards of reliability for those in *Daubert*, or he confused the *Daubert* analysis by adopting an excessive level of generality in his gatekeeping inquiry.[372] **Gatekeeping does not mean a flood gate.**

In addition, the doctor followed an illogical pathway: because the doctor thought she had eliminated other possible causes of fibromyalgia, even though she does not know the real "cause," it had to be the fall.[373]

> This is not an exercise in scientific logic but in the fallacy of post-hoc propter-hoc reasoning, which is as unacceptable in science as in law. By the same "logic," [the doctor] … could have concluded that if [the plaintiff] … had gone on a trip to Disney World and been jostled in a ride, that event could have contributed to the onset of fibromyalgia.[374]

The lesson? The analysis by the exclusion process will never qualify as a scientific process under *Daubert*. "If not A then, it must be B," is unscientific analysis without an indication that B is factually present and the theory must be supported by sufficient indicia of reliability to qualify as a valid theory.

§ 16 The Court's Gate-Keeping Function:[375]

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[370] *Id.*
[371] *Id.*
[372] *Id.*
[373] *Id.*
[374] *Id.* at 313-14.
[375] See Michael D. Freeman, Arthur C. Croft & Mark Reiser, *Discrediting Defense Experts in Whiplash Cases*, TRIAL, March 1999 at p. 62. (discussing cross-examination of biomechanical experts who testify that a collision could not have resulted in "whiplash" injury. The essential point is that, in the plaintiff's view, these defense experts witnesses have relied upon faulty studies). See also, David M. Adkisson,

Admission of an expert is within the discretion of the court under Fed.R.Evid. 702.[376] These cases are reviewed under the abuse of discretion standard[377] and, in general, if the court has some logical basis for its decision, the decision will be upheld at the appellate level. For this reason, it is imperative, by exhaustive and precise preparation, to select experts with great care; to **pre-qualify experts**. Obviously, to come to trial with an expert who can not qualify under the preliminary inquiry of Fed.R.Evid. 104(a), represents a disaster of great magnitude and may, depending upon the circumstances, subject the trial lawyer, himself, to a professional negligence action.[378]

Wilson v. Woods[379] represents a case where the worst legal result befell the proponent of scientific evidence, illustrating how important it is to admit evidence with appropriate caution and attention to detail. After a motorist stopped at an intersection, a trucker proceeded into the intersection and struck the motorist's vehicle. Following a jury verdict which favored the defendant, the motorist appealed. The appellate court affirmed the trial court which held that the motorist's witness did not qualify in the field of auto accident reconstruction.[380]

To support the plaintiff's version of the collision the plaintiff sought to qualify an expert witness who would testify that "based upon information contained in the accident report, his calculations determined that Woods' truck was traveling 63 miles per hour at

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Attacking the Defense Biomechanical Engineer, TRIAL, June 2000 at p. 83. "True junk science in auto cases comes from defense experts who claim that low-speed collisions don't cause injuries."

[376] Ned Mittenberg, *Myths about "Neutral" Scientific Experts*, TRIAL, January 2000 at p. 62. Corporate-funded think tanks are urging judges to appoint "neutral" experts to screen out "junk science." But truly neutral experts do not exist, according to this author.

[377] Elec. Co. v Joiner, 522 U.S. 136 (1997)

[378] Refer to the disciplinary action against Mr. William Dade of Fredericksburg Virginia, *supra*. Mr. Dade was unable to qualify his own expert witness in a medical negligence action.

[379] 163 F.3d 935 (1999).

[380] *Id.* at 935.

the time of the accident."[381] The defendant objected to the admission of this witness as an expert since he was insufficiently qualified. The district court judge sustained the objection and refused to admit the testimony. Without this testimony the plaintiff's case disintegrated.

The "gate-keeping" responsibility is articulated and illustrated this way: A judge must be convinced that an expert witness under Fed.R.Evid. 702 is qualified to testify by virtue of his "knowledge, skill, experience, training, or education and the court should refuse to permit testimony if the witness is not qualified in a particular field or on a given subject even where the witness might qualify on other topics or in other fields.[382] The *Daubert* standard mandates this gate-keeping function.[383]

In the case at bar, the witness

> … earned bachelor of science and master of science degrees in mechanical engineering, but he never completed his doctorate degree. After concluding his educational endeavors, [he] … taught courses in mechanical engineering and industrial engineering at various colleges and vocational schools. During the past 25 years, his consulting work has concentrated on fire reconstruction and investigation; however, he testified that he recently shifted his professional emphasis to automobile accident reconstruction.[384]

Prior to the court admitting the witness as an expert, the defense conducted *voire dire* which revealed that

> 1) although Rosenhan taught college level courses, he never held professorial rank; 2) he never taught an accident reconstruction course or any other course that involved automobile accident reconstruction; 3) he had no degree or certification in accident reconstruction (but he was enrolled in a correspondence course from the Northwestern Traffic Institute); 4) he had not completed the requirements for certification by the Association of Accident Reconstructionists; and, 5) although

[381] *Id.* at 936.
[382] *Id.* at 937.
[383] *Id.* (citing Daubert, 509 U.S. at 590-93, 113 S.Ct. at 2795- 96).
[384] *Id.*

he had testified in various cases, one court had refused to qualify him as an expert in vehicle accident reconstruction based on his lack of qualifications. *Id.*

The court then questioned the witness and determined:

> 1) had never conducted any studies or experiments in the field of accident reconstruction; 2) did not take any measurements or collect any data from the accident scene in this case; 3) did not examine the tires or other mechanical parts involved in the accident; 4) based his calculations on publicly accessible data published by the National Highway Transportation Safety Administration; and, 5) was unable to show that his training or experience as a mechanical engineer gave him expertise in the field of accident reconstruction that was distinguishable from training received by other mechanical engineers.[385]

The appellate court was

> … not convinced that there is any such thing as an accident reconstructionist as an expert field; under the rules and guidelines set forth by the Supreme Court in *Daubert*. None of the people who seem to be testifying have published in the field, have done experimentation in the field; and other than getting a correspondence course from this Northwestern Traffic Institute, which pads the resume, none seem to have anything other than, in most instances, a general scientific background.[386]

While the appellate court recognized that this expert was well qualified in the field of the reconstruction of fire accidents, the court sustained the trial court's exclusion of him in the field of motor vehicle accident reconstruction.[387]

To admit this witness, who is "effective at what he does" would be an error since,

> "[h]ere, we don't have simple physics questions. If … [the court admitted this witness] then anyone who has any background in physics and mathematics, which any engineering graduate of any university in the country would have, would be capable of looking at whatever tables the government publishes and thereby become an expert. I don't think that's what an expert is supposed to be or is supposed to do in order to qualify as an expert.[388]

[385] *Id.*
[386] *Id.* at 937-38.
[387] *Id.* at 938.
[388] *Id.* at 938.

One important preliminary question, according to this case, the trial lawyer must ask is whether the "field of expertise" even exists. Is there some legitimate body of knowledge capable of scientific analysis? If not, then the court will, in all likelihood, not recognize the body of knowledge, not recognize the expert's qualifications, and not admit the witness as an expert in the non-existent field. *Daubert* requires this preliminary analysis as part of the court's gate-keeping functions. Here, when the court ruled that the field of expertise did not exist, the plaintiff was left without an expert who could qualify, without a witness who could speak to the mechanism of the witness … without a case.

The following case bears some similarities to the previous example but with the opposite result. In *Wilson* the witness was qualified as an expert witness but not in the right field for that litigation. Here, the defect is deeper. In *Watkins v. Telesmith, Inc.*,[389] the decedent was killed when a wire rope on a conveyor snapped. The estate sued and at trial the court excluded the plaintiff's expert witness. Finding no abuse of discretion in this regard, the appellate court affirmed. In some ways this case represents a battle of the experts which the plaintiff lost … but not without solid reasoning. The plaintiff's expert

> … lacks education in mechanical engineering, and his experience in machine design is limited to a project he conducted in one of his engineering classes in which he designed the base of a chair. He has never designed a conveyor, although he claimed to have designed "nuts and bolts and that kind of thing one at a time." [He] … has performed accident reconstruction for three conveyor cases, but only one was a belt conveyor; in those cases, he investigated whether the conveyors should have been designed with guards to prevent workers from being caught in the conveyor. Preparing for this case, [the expert] … twice examined the reconstructed conveyor as it operated on site. He reviewed manufacturer's design drawings for the Model 374 conveyor and studied photographs of the conveyor. He also considered the 1987 ANSI standard. Although [he] … testified that he made some sketches and calculations as part of his analysis, he had kept none of them because he did not consider them to be important. He

[389] 121 F.3d 984 (5th Cir. 1997).

> made no design drawings and conducted no tests of his proposed alternatives. [The expert] did not analyze how much the alternative designs would cost or what impact they would have on the conveyor's utility. He admitted that he reached his opinion in this case after one day's work.[390]

In contrast, and the reason the defense expert was admitted, was that

> … has a Master of Science degree in Mechanical Engineering and a Ph.D. in Engineering Mechanics and is a professor of mechanical design. He testified that the process of design, although varying slightly by product and company, includes several essential steps: identifying the problem, conceptualizing possible solutions, investigating the present art, evaluating the concept through engineering analysis, modeling, and testing, and selecting the alternative. [The witness] … described this as an iterative process that requires a number of attempts at each step. He testified that [the plaintiff's] … analysis reveals only an attempt at problem identification and proposing solutions, but no investigation of other designs, analysis, or testing of alternatives.[391]

The court will look to legitimate background, skills, experience as evidenced by legitimate education in legitimate institutions. OJT (on the job training) is a qualification where it is legitimate and not of recent acquisition or a pretense. Although the *Daubert* criteria and the inquiry required by Fed.R.Evid. 702 are "flexible,"[392] the "overarching subject is the scientific validity and thus the evidentiary relevance and reliability of the principles that underlie a proposed submission. The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate."[393]

In the case at bar, the appellate court discussed an inter-circuit split between the Fifth, Seventh, Eighth Circuits, and Ninth Circuit, revolving around whether *Daubert* applied only to medical testimony or to all testimony of all expert witnesses. It was this tension which led to the United States Supreme Court's decision in *Kumho Tire.*[394]

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[390] *Id.* at 987-88.
[391] *Id.* at 988.
[392] *Id.*
[393] *Id.* (citing Daubert, 509 U.S. 594-95, 113 S.Ct. at 2796).
[394] *Id.* at 989-90.

Further, the court analyzed that this witness' opinion "lacked the requisite indicia of reliability to derive from "scientific, technical, or other specialized knowledge"[395] under Fed.R.Evid. 702 since "the proper methodology for proposing alternative designs includes more than just conceptualizing possibilities. The district court appropriately noted the lack of testing of any of the proposed alternatives."[396]

Testing is not always required, but in this case, both sides agreed that it was a necessity. Further, this witness did not investigate designs of other systems and his experience with other conveyers was "vague." Without this expert testimony the "decision to grant judgment as a matter of law was mandated as the plaintiff had not produced evidence that the utility of the conveyor was outweighed by any dangers in its design."[397]

§ 17 State Case Analysis:

In federal courts, the courts follow the Federal Rules of Evidence and generally federal case law. In state cases, however, each state has elaborated on the federal rules. Some cases illustrate the effects of these modifications and further, illustrate how the state courts, like a deft tailor, tie together federal and state holdings with the threads from *Frye*, *Daubert*, and *Kumho Tire*.

In general, in ways which have been modified to meet each states' needs, all state cases follow the federal analyses and adhere to the principles carefully set out in *Frye*, *Daubert*, and *Kumho Tire* and the requisite interplay with Fed.R.Evid. 702 and

[395] *Id.* at 992.
[396] *Id.*
[397] *Id.* at 993.

Fed.R.Evid. 104(a). In short, the standards enunciated in *Frye*, *Daubert*, and *Kumho Tire* are the analytic standards against which any scientific evidence must be graded.

§ 17.1 Illinois Rejected *Daubert*:

As above mentioned, the states have each reacted to legal developments in *Frye*, *Daubert*, and *Kumho Tire* and, in particular, in Illinois, that state's appellate courts have applied the *Frye* test since *Daubert* in nineteen cases; the Illinois State Supreme Court has applied the test in three cases.[398] *Frye*'s general acceptance test remains the standard in Illinois.

The first district appellate court in Illinois rejected *Frye* in *Dotto v. Okan*,[399] in favor of the *Daubert* standard. *Dotto* may represent an anomaly since this was the first Illinois case to overrule *Frye* but this case has not been overruled.[400] Subsequent decisions by the Illinois Supreme Court have supported continued application of *Frye*.[401]

In *Van Holt v. National R.R. Passenger Corp.*,[402] The first district appellate court applied *Daubert* and it relied upon the *Dotto* decision[403] in permitting the plaintiff's expert witness to testify. In Illinois, the *Dotto* and *van Holt* decisions indicate that *Daubert* may be gaining acceptance in that state.

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[398] Joseph G. Feehan, *Life after Daubert and Kumho Tire: An Update on Admissibility of Expert Testimony*, 88 ILL. B.J. 134, 137 (2000). [hereinafter Feehan]
[399] 810 N.E.2d 1277, 1279 (Ill. App. 1995).
[400] *Id.* at 138.
[401] People v. Hickey, 687 N.E.2d 910 (Ill. 1997); People v. Miller, 670 N.E.2d 721, 731 Ill. 1996), *cert. denied* 520 U.S. 11576 (1997); People v. Moore, 662 N.E.2d 1215, 1225 (Ill. 1996) *cert. denied*, 519 U.S. 875 (1996).
[402] 283 Ill. App. 3d 62, 669 N.E.2d 1288 (Ill. App. 1996), appeal denied, 169 Ill. 2d 590, 675 N.E.2d 640 (1996), *cert. denied* 117 S.Ct. 1694 (1997).
[403] *Van Holt v. National R.R. Passenger Corp*., 283 Ill. App. 3d. at 70-71.

The most recent Illinois case to consider *Daubert* was *Harris v. Cropmate Co.*,[404] and adopted a six-part test, called the "*Frye* Plus Reliability Test"[405] which provides an analytical framework which included:

> First Inquiry: Precisely what evidence is being proffered?...
>
> Second Inquiry: Will the proffered testimony assist the trier of fact to understand the evidence or determine facts in issue, or can the trier of fact use its own knowledge and experience?...
>
> Third Inquiry: If the trial court determines that the proffered testimony will assist the trier of fact to understand the evidence or determine facts in issue, then the court must ask, does the evidence constitute "science" — that is, does the proffered testimony constitute "scientific" evidence? If the testimony does not constitute scientific evidence, then the *Frye* admissibility standard does not apply. Nonetheless, the trial court may still conduct a hearing into the reliability of the proffered testimony....
>
> Fourth Inquiry: If the trial court determines that the proffered testimony constitutes scientific evidence, then the court must ask, is that scientific evidence "novel," or does it involve instead a firmly established method or technique? In making this determination, the court should ascertain whether any controlling precedent, which is on point, exists....
>
> Fifth Inquiry: If the trial court determines that the scientific evidence is "novel," then the court must ask, does the evidence meet the *Frye* admissibility standard? The court can and should conduct a *Frye* evidentiary hearing when the evidence is "novel." At such a hearing, the court's first consideration is to identify the relevant scientific community to which the opinion witness belongs. Then, the court must determine whether the scientific technique or method is generally accepted within that scientific community....
>
> Sixth Inquiry: After having determined that the scientific technique or method is generally accepted in the relevant scientific community, a trial court must still ask, is this evidence reliable?[406]

In *Harris*, the court pointed out, consistent with the major federal holdings, that these criteria are non-inclusive, and the proponent need not satisfy each and every inquiry

[404] 302 Ill. App. 3d 364, 706 N.E.2d 55 (Ill. App. 1999).
[405] 302 Ill. App. 3d 364, 366.
[406] *Id*. at 368-76.

in order to introduce scientific evidence.[407] *Frye* remains the prevailing standard in Illinois on the admissibility of scientific evidence and, in several opportunities, where that Supreme Court could have adopted *Daubert*, it declined to do so.[408] Recently, however, in *People v. Miller*,[409] the Court indicated that it would decide the issue if presented with an appropriate case.[410]

§ 17.2 Restrictive Statutes: Florida and Virginia

Since Florida and Virginia are two states with restrictive statues with respect to the admission of expert witness testimony, it is instructive to review these states' analyses:

§ 17.3 Florida

In *Meyer v. Caruso*,[411] the trial court struck the testimony of the plaintiff's only expert in a medical negligence case and then directed a verdict in favor of the defendant. Here, the appellate court reversed. The lessons are important. The expert witness was Barry Singer, MD who testified on the standard of care issues in the case concerning the failure to adequately diagnose and treat cancer. Both sides listed Dr. Singer as an expert witness!

At trial, the defendant tried to have Dr. Singer excluded merely on the basis that he was a "frequent flyer" in medical negligence cases as an expert witness.[412] This ambit was unsuccessful. The next tactic was to pursue the qualifications. In this regard, Florida

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[407] *See*, FEEHAN 141.
[408] FEEHAN 142.
[409] 670 N.E.2d 721, 731 (Ill. 1996).
[410] FEEHAN 142.
[411] 1999 Fla. App. LEXIS 5120 (Fla. Dist. Ct. App. 1999).
[412] *Id.* at *3-*4. "Dr. Singer stated that he had reviewed more than 700 medical negligence cases, had given depositions in more than 200 cases, and had been qualified to testify as a medical expert in 30 states -- several times in Florida. He conceded that about 95% of his forensic medicine was on behalf of plaintiffs."

has a very restrictive statute on the production of specialists in medical negligence litigation which states:

> If the health care provider whose negligence is claimed to have created the cause of action is certified by the appropriate American board as a specialist, is trained and experienced in a medical specialty, or holds himself or herself out as a specialist, a similar health care provider' is one who: 1. Is trained and experienced in the same specialty; and 2. Is certified by the appropriate American board in the same specialty.[413]

In this particular case, the defendant was an gynecology-oncology surgeon,[414] Dr. Singer was a Board Certified Hematologist and Oncologist.[415] In terms of meeting the requirements of the statute, was he a "similar health care provider?"

> Dr. Singer … had never been board certified in any area of surgery or obstetrics. No court has ever accepted him as an expert in gynecology, obstetrics or gynecologic oncology. … never having any continuing education in gynecology. He … does not perform radical hysterectomies or … surgery of any kind. … does not practice in follow up gynecological care. … does not initially diagnose cervical cancer.… has not published in the field of cervical cancer.… [Does no] consider himself an expert in gynecological oncology because he is not board certified in that specific area.… would not see surgical patients who have not yet developed metastatic disease. … would not follow up a gynecological surgery patient through radiation.[416]

On the other hand, he was familiar with the standards for follow-up oncological care of cancer patients "who have undergone radical hysterectomies and radiation treatment. While he does not do pelvic exams, he does know what these oncology patients require in such follow up care. He emphasized that he was the Chairman of the Tumor Board at the hospital for 15 years and thus dealt with all kinds of cancers."[417]

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[413] FLA. STAT. § 766.102(2)(b) (1997). *Id.* at *6 n.3.
[414] *Id.* at *1.
[415] *Id.* at *3.
[416] *Id.*.
[417] *Id.* at *7.

Defendant presented numerous problems Dr. Singer had with prior statements made to other courts.[418]

Cutting through the chaff of Dr. Singer's background issues and the "cottage industry" of expert witnesses[419] the appellate court noted the three requirements "concerning the admissibility of expert opinion evidence … (1) that the opinion evidence be helpful to the trier of fact; (2) that the witness be qualified as an expert; and (3) that the opinion evidence can be applied to evidence offered at trial."[420]

The policy of admitting this evidence is a "liberal policy" rather than an exclusionary one.[421] Further, Florida statute added a fourth test which would bar evidence which, although technically relevant, presents a danger of unfair prejudice which would outweigh its probative value.[422] Here, then, the appellate court determined that the trial court applied "erroneous legal principles" in its analysis and reversed.[423]

What court's will seek are facts which show a unity in knowledge and in decision-making analyses not an absolute congruity of background, skills, training, or experience.[424]

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[418] *Id.* at *9 n. 7. "(1) a trial court in Ohio had concluded that Dr. Singer had changed his opinion after three years into litigation; (2) a federal court in Georgia had found that Dr. Singer had formed an opinion based on incomplete charts and records; (3) a deposition taken in Missouri showed that Dr. Singer had never examined the patient or spoken to her doctors and had not researched a certain drug before testifying in the deposition; (4) a federal court in New York had concluded that Dr. Singer had relied on documents that no practitioner in the subject field would use and that his affidavit was unreasonable; (5) in a deposition in North Carolina, Dr. Singer testified that he signed an affidavit prepared by a claimant's lawyer and that he was associated with a professional witness service for medical negligence claimants; and (6) in a case in South Carolina Dr. Singer offered an opinion in an area in which he had no experience and again testified to involvement in a case through a witness service."
[419] *Id.* at *10.
[420] *Id.* at *13.
[421] *Id.*.
[422] *Id.* citing FLA. STAT. §90.403.
[423] *Id.* at *14.
[424] See Myron v. South Broward Hosp. Dist., 703 So. 2d 527 (Fla. Dist. Ct. App. 1997) (pediatrician was qualified to give opinion as to negligence, if any, of neurosurgeon in failing to perform spinal tap on infant,

Note that Board certifications are not dispositive[425] under the Florida statute 766.102 and there is NO requirement that that either side produce "identically credentialled practitioner[s]."[426]

§ 17.4 Virginia

The Virginia Supreme Court case of *Fairfax Hospital System, Inc. v. Curtis*,[427] arose after the death of a neonate in the neonatal I.C.U..[428] The trial court excluded the testimony of the defendant's witness, a professor of pediatrics and the director of a pediatric I.C.U. who had been active in practice up to within one year of the date of the occurrence. In Virginia, an expert witness who is "familiar with the statewide standard of care shall not have his testimony excluded" merely because he does not practice in Virginia.[429]

The Virginia requirement is that the expert witness shall be permitted to testify if he "demonstrates expert knowledge of the standards of the defendant's specialty and of what conduct conforms or fails to conform to those standards and if he has had active

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as pediatrician was well qualified to offer opinion on necessity to perform spinal tap, even by neurosurgeon); Wright v. Schulte, 441 So. 2d 660 (Fla. Dist. Ct. App.), review denied, 450 So. 2d 488 (Fla. 1983) (in action against surgeon for alleged negligence in performing abdominal hysterectomy trial judge erred in refusing to permit gynecologist to testify as to standard of care); Lake v. Clark, 533 So. 2d 797 (Fla. Dist. Ct. App.), review denied, 542 So. 2d 1332, and 542 So. 2d 1334 (Fla. 1988) (physician should have been allowed to testify that standard of care was breached by defendants, in action involving alleged failure of physician and hospital to see to it that surgical team was ready to perform necessary emergency surgery to aid mother and save her babies, and exclusion of testimony was harmful necessitating new trial; physician had training in pediatric medicine, taught obstetrics and gynecology and pediatrics full time at university, and was certified in pediatrics, perinatal and emergency medicine, and as such, had qualifications similar to defendant physician who had specialized training in obstetrics and gynecology). All of the foregoing cases to one degree or another involve a medical expert credentialed in one discrete specialty testifying as to the standard of care of a health care provider credentialed in another. *Id.* at *19-20.

[425] *Id.* at *20.

[426] *Id.* at *25.

[427] 1995 VA LEXIS 60; 457 S.E.2d 66 (Va. 1995).

[428] *Id.* at 68.

[429] VA. CODE ANN. § 8.01-581.20. *Id.* at 70.

clinical practice in either the defendant's specialty or a related field of medicine within one year of the date of the alleged" occurrence.[430]

In *Griffett v. Ryan*,[431] a medical negligence case, the plaintiffs won but the court set aside the verdict. The case concerned the misdiagnosis and delay of lung cancer resulting in premature death. The defendants objected that the plaintiff's expert witness was unqualified to render an opinion on causation. Here the Virginia Supreme Court disagreed with the trial court and reversed. This expert witness was licensed in D.C, Virginia, and in Maryland. He was Board Certified in internal medicine and taught at Georgetown University. In addition, he diagnosed patients who had cancer.[432] The defendant was a gastroenterologist. The field of care was that of internal medicine and, since both were internists, the witness was qualified under VA. CODE ANN. § 8.01-581.20.[433]

The statute states, in relevant part:

> Any physician who is licensed to practice in Virginia shall be presumed to know the statewide standard of care in the specialty or field of medicine in which he is qualified and certified. This presumption shall also apply to any physician who is licensed in some other state of the United States and meets the educational and examination requirements for licensure in Virginia.[434]

Noting the unity between a gastroenterologist who would diagnose cancer and an internist who would do the same, the Court concluded "We do not believe that the duty to

[430] *Id.*
[431] 1994v.a. LEXIS 57; 443 S.E.2d 149 (Va. 1994).
[432] *Id.* at 152.
[433] *Id.* at 153.
[434] *Id.*.

review an x-ray contained in a patient's medical record should vary between an internist and a gastroenterologist."[435]

> Once the plaintiff established that Dr. Muller was licensed to practice in Virginia and, therefore, entitled to the statutory presumption of possessing knowledge of the statewide standard of care in the field of medicine in which he is qualified, the burden shifted to the defendants to show that the standard of care imposed upon a gastroenterologist did not require that gastroenterologist to review chest x-rays in the patient's hospital record.[436]

Henning v. Thomas[437] was a case where a woman sustained a permanent leg paralysis from injury to the peroneal nerve when she developed anterior compartment syndrome. She elicited testimony from an orthopedic surgeon who was then employed as the Medical Director for Aetna Life and Casualty Insurance Company.[438] The defense tried to exclude him on the basis that he did no know the Virginia standard of care but he testified that the medical case involved a national standard of care.[439]

The Virginia statute was changed after *Bly v. Rhoads*,[440] and Virginia enacted VA. CODE ANN. § 8.01-581.20. Virginia adopted a statewide standard and rejected a national standard.[441] The expert witness must testify that he does have a familiarity with the Virginia standard: this is absolutely crucial. This familiarity must derive from study or experience or both.[442] The expert witness qualified in this case by stating that

> … he attended meetings and seminars on the subject of knee surgery where various Virginia orthopedic surgeons were also present.… one of the professors of orthopedic surgery at the Medical College of Virginia had been one of his residents when [he] … was at Vanderbilt. He … subscribes to and reads the Journal of Bone and Joint Surgery, which he described as the standard reference

[435] *Id.*
[436] *Id.* at 154.
[437] 366 S.E.2d 109 (Va. 1988).
[438] *Id.* at 110-11.
[439] *Id.* at 111.
[440] 222 S.E.2d 783 (1976).
[441] 366 S.E.2d 109, 112.
[442] *Id.*

> journal for the specialty. He said that there are no state medical specialty journals. … [A]s a professor, he taught orthopedic surgery to students who might start their practice in any state in the union and that, as far as he was aware, no state had any additional or special requirements as a prerequisite to practicing orthopedic surgery.[443]

Further, the witness had conferred with physicians in Virginia who agreed with his analysis in the case. The court admitted this expert witness' testimony and this was sustained on appeal.

Finally, then, within this section, it is not Board Certification in the same field nor even practicing in the same field which will automatically permit one expert to qualify as an expert witness in a case but rather the unity of "doing" that which is in question. It is clear that cross-professional testimony will not be permitted where one discipline does not engage in similar responsibilities or enter into the same professional analysis with respect to patient care. Courts will permit a non-surgical specialist to testify in areas of surgery where the issue is not surgery but rather the decision-making process leading up to surgery or in post-surgical skills. It is important for trial lawyers to anticipate these issues and to intimately know their respective state statutes.

§ 17.5 New York Adopted *Daubert*:

In *Wahl v. American Honda Motor Company*,[444] this New York appellate court applied *Daubert* in an all-terrain three-wheeler products liability case where the plaintiff claimed improper design caused his injury. This court adopted the *Daubert* standard rather than using the *Frye* standard of general acceptance. Further this court permitted an engineer to testify, using the *Daubert* standard, about design defects involving the ATV's center of gravity.

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[443] *Id.* at 111.

In its decision, the New York court stated:

> Inasmuch as the testimony in the case at bar is that of an engineer, and inasmuch as the testimony is based upon, according to the witness, recognized technical or other specialized knowledge, the Court finds that the stricter general acceptance standard of *Frye* is not applicable. The Court will apply the reliability standard as derives from *Daubert* and *Kumho Tire*.[445]

Many states adopted the *Daubert* standard through either actual amendments to the states' respective evidence code or through judicial adoption as the New York case illustrates.

§ 18 Reconstruction Experiments Must be Substantially Similar:

In automobile litigation, it is important for the jury to understand "what happened." Following an accident, photographs often depict piles of junk assessment an accident scene. Answers to both how the accident happened and why the accident happen are fundamental to the liability prong of the tort analysis. For this reason attorneys will often submit their version of how and what happened to the jury. Accident reconstruction is an important part of the structure of an automobile negligence trial. How courts treat accident reconstruction evidence is germane for the attorney who wishes to litigate an automobile negligence case.

In *Metropolitan Life Insurance Company v. Tomchik*,[446] a podiatrist was operating a band saw while at home and he sliced off his thumb. He filed a claim with his disability insurer, the insurer denied the claim, the podiatrist filed a declaratory judgment, then counter-claimed. The issue was whether the injury was intentional.[447]

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[444] 693 N.Y.S.2d 875 (N.Y. App. Div. 1999) (slip op.).
[445] *Id.* at 877-78.
[446] 1999 WL 771282 (Ohio App. 1999) (unpublished).
[447] *Id.* at *1.

A jury found that the injury was intentional and found for the insurer. Citing nine points of error in this decision, the podiatrist appealed, but the appellate court affirmed the trial court on every point.

Relevant to this evidentiary analysis, the first point on appeal was that the court refused to permit the plaintiff to voire dire the defendant's expert witness; in essence to require the plaintiff to *disprove* the witness' qualifications.[448] Further, the plaintiff argued that the trial court reversed the burden of proof on the showing that the expert's testimony is "based upon the knowledge and experience of his or her discipline."[449] The trial court failed to restrain the expert witness to testimony within the scope of his field[450] and the court qualified the witness as an expert without stating precisely what was his field. The plaintiff complained that the defendant's expert witness engaged in a reconstruction of the accident which was inadequate and objected to an out-of-court experiment and to photographs which were the product of the experiment.[451]

Here, the court noted that the conditions between the accident and the experiment were "substantially similar" and, furthermore, the "purpose of the exercise was not to duplicate or reconstruct appellant's alleged accident, but simply to construct a model to assist the jury's comprehension of [the witness'] … testimony about kerf marks."[452] The court noted that "any dissimilarities between [the witness'] … model and appellant's

[448] *Id.*
[449] *Id.* (citing *Daubert*).
[450] *Id.*
[451] *Id.* at *3.
[452] *Id.* at *6. If one thinks about this "substantially similar" standard, what other standard would be possible? A standard which required "exact" similarity would be impossible since objections would never cease about the reconstruction of the physical events which take place in an automobile accident. A more loose standard would fail the *Daubert* analysis.

mishap were thoroughly explored during cross-examination, and adequately addressed by the cautionary instruction the trial court gave to the jury."[453]

Ohio's corresponding rule to Fed.R.Evid. 702 contains sub-parts, incorporating the *Daubert* criteria, which state:

> To the extent that the testimony reports the result of a procedure, test, or experiment, the testimony is reliable only if **all** [emphasis added] of the following apply: (1) The theory upon which the procedure, test, or experiment is based is objectively verifiable or is validly derived from widely accepted knowledge, facts, or principles; (2) The design of the procedure, test, or experiment reliably implements the theory; (3) The particular procedure, test, or experiment was conducted in a way that will yield an accurate result." The admission or rejection of evidence concerning out-of-court experiments is a matter peculiarly within the discretion of the trial court, and a reviewing court will not interfere with the trial court's determination absent an abuse of discretion.[454]

On the topic of out-of-court experiments, the Ohio Supreme Court rested its opinion upon a 1935 case and holds:

> (1) Evidence of experiments performed out of court, tending to prove or disprove a contention in issue, is admissible if there is a **substantial similarity** [emphasis added] between conditions existing when the experiments are made and those existing at the time of the occurrence in dispute; dissimilarities, when not so marked as to confuse and mislead the jury, go to the weight rather than the admissibility of the evidence. (2) The admission or rejection of evidence as to such experiments is a matter peculiarly within the discretion of the trial judge, and when such discretion has not been palpably abused reviewing courts will not interfere.[455]

Conditions need not be identical either, but only substantially similar to the accident conditions.[456] Only the absence of substantial similarity between the circumstances and the conditions of the disputed event and the experimental

[453] *Id.*
[454] *Id.* at *7.
[455] *Id.* at *7 (citing St. Paul Fire & Marine Ins. Co. v Baltimore & Ohio RR. Co. 195 N.E. 861 (1935)).
[456] *Id.* (citing Worthington City Schools v. ABCO Insulation, 616 N.E.2d 550 (1992).

reconstruction would there be grounds for the reviewing court to find an abuse of discretion, this court ruled.[457]

The defense expert did produce a substantially similar experiment, concluded the court:

> [T]he wood he used for the experiment was of the same type and dimension as that used by appellant. [he]... also stated that he had used a Sears Craftsman band saw of the same type as appellant's. Although the exact model numbers were not the same, the saw [he]... used had the same blade speed as appellant's. Additionally, [he]... used a one-quarter inch blade, the same as that on appellant's saw. As already noted, [he]... testified that he attempted to duplicate the cutting operation as described by appellant in his deposition testimony.[458]

A demonstration, an out of court reconstruction, an experiment utilized to understand the mechanism of an accident, a presentation designed to illustrate to the jury what happened, none of these must be created to reconstruct the exact conditions or circumstances of an accident. The rule is that a "substantially similar" reconstruction will suffice; as in horseshoes, "close" is good enough.

"Substantially similar" becomes an important evidentiary term as the next case illustrates. In *State v. Steen,*[459] a firefighter ruptured an aneurysm while he worked as a volunteer fireman at "a particularly horrific automobile accident."[460] This case involved delayed workmen's compensation benefits and the evidentiary issue here was whether the stressful activities were a "substantial factor" in causing this aneurysm to rupture.[461]

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[457] *Id.*
[458] *Id.* at *8.
[459] 1999 WL 743326 (Del.Super. 1999) (slip op.).
[460] *Id.* at *1.
[461] *Id.* Appellate court opinions tend to be dispassionate but here the court was deeply disturbed about an injustice visited upon this unfortunate man and his family. "On June 12, 1995, Wayne Steen was permanently injured as a result of an aneurysm that ruptured while he was working as a volunteer fireman at a particularly horrific automobile accident. Today, more than four years later, Mr. Steen's petition for workmen's compensation benefits remains unresolved. The Court believes that this lack of resolution is as tragic as the rupture of the aneurysm that disabled Mr. Steen. It is often said that the primary purposes of

The Industrial Accident Board heard testimony from two neurologists who concluded that the stress caused the intracranial aneurysm to rupture and it rejected the testimony from the State's expert witnesses who took an opposite view: stress did not cause the aneurysm to rupture.[462] The Board "noted that [the] Employer's experts acknowledged on cross-examination that a drastic increase in overall blood pressure could cause the brain's autoregulation system to fail, and possibly cause an aneurysm to rupture."[463]

The state appealed, arguing that the evidence itself was unreliable and did not meet the four *Daubert* standards which would assist the trial court in its "gate-keeping obligation in regard to the admissibility of expert scientific evidence."[464]

In affirming the Board, the appellate court examined the testimony from two Board certified neurologists who have treated "many patients" who suffered from intracranial aneurysms. In addition, one witness published a relevant study in the New England Journal of Medicine. The opinion, expressed to a reasonable degree of medical certainty, was that, because of the aneurysm's small size that it was "highly unlikely" that without the stress of an "external influence" it would not have ruptured.[465] The second neurologist testified similarly.

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workers' compensation law are to provide prompt payment of benefits without regard to fault and to relieve employees and employers of the costs of civil litigation. In this case, the statutory system has utterly failed to meet either of its intended purposes." *Id.* at *1.

[462] *Id.*

[463] *Id.*

[464] *Id.* The review of this administrative decision is based upon whether the decision is supported by substantial evidence on the whole record. "Substantial evidence" is evidence which is relevant and which a reasonable person might accept as "adequate to support a conclusion." *Id.* The appellate court "does not weigh the evidence, determine questions of credibility or make its own factual findings. It merely determines whether the evidence is legally adequate to support the Board's decision." *Id.* at *2.

[465] *Id.*

The court analyzed this matter under Fed.R.Evid. 702, the cases of *Frye*, *Daubert*, and *Kumho Tire*,[466] then examined Delaware law.[467] In an administrative case, such as this one before the Industrial Accident Board, the Board "is free to rely on the opinion of either expert, and such evidence constitutes substantial evidence for purposes of the Board's decision."[468] The Delaware Supreme Court opinion on this topic is enunciated: ""[i]t is settled in Delaware that an experienced practicing physician is an expert, and it is not required that he be a specialist in the particular malady at issue in order to make his testimony as an expert admissible."[469]

There was unanimity on one issue among experts from both sides:

> … all the experts agreed on one thing: the medical community is unsure of the precise mechanisms that cause a particular intracranial aneurysm to rupture at a particular time. As acknowledged in *Daubert*, "[s]cience is not an encyclopedic body of knowledge about the universe. Instead, it represents a process for proposing and refining theoretical explanations about the world that are subject to further testing and refinement.[470]

The quantum of proof must not be speculative, as other cases illustrated, but, as this case demonstrates, substantial scientific evidence when expressed by qualified experts will suffice.

§ 19 "Scientific" Testimony Must Contain "Scientific" Foundation:[471]

The next case comes from the Nebraska Supreme Court, *Phillips v. Industrial Machine*,[472] where a motorist sought recovery for personal injuries he sustained in a

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[466] *Id.* *2-3.
[467] *Id.* at *3.
[468] *Id.* at *3.
[469] *Id.* (citing DiSabatino Bros. v. Wortman, 453 A.2d 102 (Del. 1982)).
[470] *Id.* at *4 (citing Daubert, 509 U.S. at 590 (quoting Brief for American Association for the Advancement of Science et al. as Amici Curiae at 7-8).
[471] *See*, Bruce H. Stern, *Putting the Brakes on Low-Speed Collision Defense*, TRIAL, January 2000 at p. 30. (pointing out that in defending these cases, according to the plaintiff's bar, the defense expert witnesses rely upon "faulty studies and manipulated data").

motor vehicle accident. After a jury verdict, the defendant's moved for a mistrial since the trial court admitted testimony from a vocational rehabilitation counselor. The Nebraska Supreme Court held that vocational rehabilitation counselor's definition of "disabled" was too generic and lacking in certainty to be of value to the jury. Further that counselor's opinion as to the motorist's damages relied on the unsupported conclusion that she was disabled, lacked foundation and probative value, and, finally; the trial court found that the counselor's erroneously admitted testimony was unfairly prejudicial to the defendants. This conclusion was not an abuse of discretion.

This vocational rehabilitation counselor testified that he relied upon physicians, physical therapists, and client input to determine the client's medical restrictions or limitations. He, however, had no medical training, "does not personally diagnose or formulate opinions concerning limitations that should be placed upon a client's work activities, and that he was not aware that any medical doctor had placed a work restriction on [the client] … or determined a disability rating."[473]

Further, the vocational counselor made computations based upon ""New Work Life Expectancy Tables" published by "Vocational Econometrics," which tables were reasonably relied upon by vocational experts, and upon the definitions for disabilities used within the "State Vocational Rehabilitation Systems" as well as the definition used in the Americans with Disabilities Act."[474]

> The expert explained "that a worklife expectancy table is a statistical comparison between the worklife expectancy of a healthy portion of the work force and the "disabled" portion of the work force. Under the tables, the term "disabled" refers to a broad continuum of disabilities spanning from mild or transitory conditions to

[472] 597 N.W.2d 377 (Neb. 1999).
[473] *Id.* at 380.
[474] *Id.*

> conditions that result in total dependence on others for care. He admitted that no physician had determined [the client] … was disabled as the term is used in the tables.[475]

From what well of knowledge, precisely, did this "scientist's" opinion spring? His opinion was one balanced upon "statistical probabilities" which relied upon experts in the field but the table, itself, "did not distinguish between severities of disability."[476] On cross-examination, the expert admitted that no physician restricted this client's work abilities and, that in formulating his opinion, he relied upon physicians and physical therapists to determine medical restrictions and limitations.[477]

In the motion for a mistrial, which the court granted, the court concluded that the expert premised his opinion on his own factually unsupported and inadmissible conclusion that the client was disabled. His opinion lacked the necessary and proper foundation and should have been excluded.[478]

The concurring opinion written by Justice Gerrard contains an exhaustive review of Judge Learned Hand's thoughts on the use of expert witnesses and a review of the other federal seminal cases as well as a Nebraska state law analysis.[479]

§ 19.1 "OJT"[480] is not Enough Expertise:

In *Houghton v. Port Terminal Railroad Association*,[481] a railroad worker injured his back while on the job and he sued under the Federal Employers Liability Act (FELA) and under the Boiler Inspection Act (BIA), alleging the railroad's failure to properly

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[475] *Id.*
[476] *Id.*
[477] *Id.*
[478] *Id.* at 381.
[479] *Id.* at 384. For students of precise legal as a well as scientific analysis, this case opinion is admirable and one from which much may be learned.
[480] "On the job training."
[481] 1999 WL 459782 (Tex.App. 1999).

maintain equipment which caused his back injury. After a jury trial, the worker lost and he appealed. The trial court would not qualify a railroad engineer with specialized and lengthy experience as an expert in the field of the effects of wheel flattening and rough coupling of train cars.

On this gate-keeping role, here, the Texas trial court wrote that "[t]he role of the trial court in qualifying experts is to ensure 'that those who purport to be experts truly have expertise concerning the actual subject about which they are offering an opinion. The proponent bears the burden to show that the witness "possesses 'special knowledge as to the very matter on which he proposes to give an opinion.'"[482]

The plaintiff argued that the engineer's lengthy experience qualified him as an expert witness on the issue of "causal relationship between flat spots on the brakes and the rough coupling of railroad cars."[483] However, general experience does not qualify a witness as an expert. "What is required is that the offering party establish that the expert has 'knowledge, skill, experience, training, or education' regarding the specific issue before the court which would qualify the expert to give an opinion on that particular subject."[484]

The trial judge identified three opinions which this expert might offer to the jury: "(1) the manner in which the engine seat could become misaligned; (2) the fact that rough coupling of the two cars occurred in the accident; and (3) the engine brakes caused the rough coupling or contributed to the impact."[485] The expert's testimony was based, however, on the testimony of a previous witness so the trial judge excluded the testimony

[482] *Id.* at *6.
[483] *Id.*
[484] *Id.*

and, further, the court found that this witness was not an expert on railroad brakes and could not testify on his subjective belief that a flat spot on a wheel might affect the brakes thereby causing a rough coupling.[486]

The essential proof in this railroad accident revolved around a flat spot in a train wheel. The witness had been employed for over twenty years as a welder's helper, an engineer, and a technical trainer but he had no experience as a switchman, a machinist, or a mechanic. Although he was a "qualified instructor for operating rules, air brakes, safety, and radio rules and had received advanced training in freight car, air brake equipment and locomotive air brake and electropneumatic equipment through Westinghouse Air Brake Company," he provided no experience or advanced training which qualified him to express an opinion about the issues in this case. He knew nothing about "the effect of flat spots on braking, engine speed, and the forces generated in the coupling of railroad cars or whether he was merely qualified to testify about braking procedures and safety rules."[487]

OJT is valuable and may assist in qualifying an expert in some areas but not in others. Where a case requires on-point proof of as aspect which lies within expertise of science or other allied field, the witness must bring to the bar that precise bit of experience and knowledge and be prepared to analyze that precise case thread. "Close," by way of experience is not good enough.

§ 19.2 Medical Machines and Testing Equipment:

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[485] *Id.*
[486] *Id.*
[487] *Id.*

To what degree are testing machines reliable and their results admissible? In medicine, there are machines which perform laboratory tests and, in general, these machines are reliable, their analyses are based upon well accepted scientific principles, and because of this reliability, in most cases, in automobile litigation, no one challenges the results of these machines. That is not the case with machines which perform tests which are on medicine's periphery. To illustrate, hair analysis or fingernail analysis for rare metals, for instance, might be subjected to a *Daubert* challenge. "Thermography" to show where a person has pain is not an accepted techniques in many courts and the same is true with PET scanners based upon positron emission. DNA data is always tricky and subject to methodologic questions.

Whenever examining the potential admissibility of scientific data where a "machine" is involved, never forget the lesson of *Frye*. The test must actually test what the tester thinks he is testing — and nothing else. The test itself must be reliable and specific with well described limits of statistical confidence; reproducibility. The test must not be exceptionally subject to or dependent upon user error or user technique;[488] all testers should get the same result. Conceptually, consider the scientific tool, a scale. No matter who weighs the sample, the results should be the same.

In DWI cases, in most cases blood alcohol measurement machines are reliable and accurate with predictable measures of specificity and variabilities;[489] the results are

[488] Within measurable statistical norms, all data contain variability. It is this combination between variability and specificity which distinguishes "science" from witchcraft, alchemy, or other non-scientific tests. How may one "measure" the content of the human soul? As an example of a test which tested something beside what the testers sought to test, many witches were tested with the dunking stool, an ordeal which tested breath-holding rather than whether one's soul were impure.

[489] To illustrate: the test measure alcohol content in exhaled air — nothing else. If a person has been smoking, the test is unaffected. If the person has been ingesting marijuana, the test for expired alcohol remains unaffected. This test is "specific." If the test is performed on the same subject within three minutes

admissible. *State v. Mac Cardwell*,[490] was such a case where the defendant attempted to discredit the machine; the machine won.

Following convictions for DWI and reckless driving, the defendant appealed and the appellate court held, with respect to this evidentiary issue, that an enzyme testing machine used by the hospital to determine the defendant's plasma-alcohol concentration, and ratio used to convert her plasma- alcohol concentration to equivalent blood-alcohol concentration, were reliable. To prove reliability the state produced testimony by the chief of pathology at a clinical laboratory where the machine was kept. He testified that

> … he was familiar with the Analyzer, and that it has been in use at Moses Cone for "probably 20 years. … that the Analyzer is reliable, and that "[a] lot of hospitals use it for specific things. I would think that it would be relatively common in tertiary care medicine." … that a combination of elevated lactic dehydrogenase (LDH) levels and other factors could cause a false high alcohol reading on the Analyzer. [The pathologist] … testified he was convinced, from a review of Defendant's medical records, that although Defendant had elevated LDH levels due to liver damage caused by the accident, no other factors were present which, combined with Defendant's elevated LDH levels, could cause a false reading. … nothing in Defendant's medical record caused him to doubt the accuracy of the Analyzer's results in this case. On cross-examination, [the pathologist] … stated unequivocally that transfusions of saline, which had been administered to Defendant prior to the withdrawal of her blood samples, would not have affected the Analyzer's results.[491]

Based upon this and similar testimony from another forensic chemist, the court concluded that the analyzer itself was a reliable machine and the

> … mechanism for testing alcohol concentration and that 1 to 1.18 is a reliable conversion ratio. The trial court subsequently made the following pertinent findings of fact as to the reliability of the Analyzer and the 1 to 1.18 conversion

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the results will group around one number — the variability remains constant. If equally trained administrators perform the test, the results will be approximately identical. Since this is a biologic system, the results will not be precisely the same. If we measure ball bearings with high-tolerance calipers, however, the diameter will measure the same but within the instrument's tolerances expressed as an experimental variability of, to illustrate ± 0.001cm.

[490] 516 S.E.2d 388 (N.C. App. 1999).

[491] *Id.* at 391.

> ratio: 6. ... The [Analyzer] is of very good reliability. Similar instruments have been in use for over 20 years. This model is in common use in tertiary care hospitals throughout the United States [and] ... has gained general acceptance among metropolitian [sic] hospitals in North Carolina and hospitals throughout the United States. The principles underlying this instrument are scientifically valid. It is a reliable scientific instrument....12. ... It is generally recognized and accepted that an alcohol reading in plasma is higher than an alcohol reading in whole blood, so the reading must be converted to whole blood alcohol level for court purposes. The ratio used by the SBI is a conservative ratio. The ratio is 1 to 1.18. It has been used for at least 11 years by the North Carolina State Bureau of Investigation forensic laboratory. The ratio chosen by the SBI laboratory is a conservative ratio, at the mid-point in values in the recognized scientific and technical literature. This ratio is based on the published findings.... The 1 to 1.18 ratio is a reliable ratio. The 1 to 1.18 ratio is generally accepted in the field of forensic chemistry. The 1 to 1.18 ratio is considered sufficiently reliable by other experts in the field of forensic chemistry. The ratio is an established and respected ratio in the forensic community [and] is scientifically valid.... A plasma alcohol concentration here of 127 milligrams per deciliter, when the 1 to 1.18 ratio is used, gives a whole blood alcohol concentration reading of .10[7] per one hundred milliliters of blood.... Using 1 to 1.35, the result would be .094. [The pathologist] … education and experience well fit him for explaining the conversion factor and the result to the trial jury.[492]

There is a general rule here. As with John Henry and the steam drill, unless the lawyer can discover some procedural irregularity,[493] **it is very difficult to impeach *standard* medical machinery and laboratory data**.

On the other hand, the fact that a doctor *writes a letter* does not create admissible scientific evidence. In *Aziz v. French*,[494] the defendants sought to preclude the admission of a letter from a physician expressing an opinion on the causation of the alleged injury. The court allowed the motion.[495] Following an automobile accident the plaintiff required a feeding tube which was required to be replaced. The plaintiff told the defendant that it

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[492] *Id.* at 392.
[493] No Miranda rights; machine was not appropriately calibrated; the administration of the examination was improperly performed; a person who was not appropriately certified or trained administered the examination; the chain of custody was broken, etc..
[494] 1999 WL 377086 (Mass.Super. 1999).
[495] *Id.* at *1.

would call a physician as an expert witness at trial but then it decided not to do so. It intended to admit as evidence a letter written by the doctor which stated:

> This is in response to our (sic) inquiry concerning the accident that Eric Nolin was involved in on April 17, 1996. Eric had a fundoplication performed on July 8, 1994 because of gastroesophageal reflux. As you might be aware, this procedure has a high failure rate for various reasons. The usual quota rate of failure is eight percent per year. However, Eric needed his fundoplication redone again because of reflux on July 25, 1996. Obviously, the accident he was involved in preceded this redo fundoplication. As I have mentioned previously, eight percent (8%) of these operations fail spontaneously. However, in my opinion to a reasonable degree of medical certainty, a sudden increase in intra-abdominal pressure that was caused by the accident was a substantial contributing factor, but not the only factor, to the disruption of the fundoplication, necessitating the redoing of the fundoplication. As a further result, Eric now has a J-tube twenty-four hours per day, whereas before the accident, he had a G-tube at night. This difference affects his quality of life.…[496]

The defendants objected on a hearsay basis[497] and on the basis that that the letter, by itself, did not meet the reliability test required in *Daubert* and *Kumho Tire*.[498] The court here quickly noted that three distinct aspects of this letter raise reliability issues. Here is the court's analysis:

> … his apparent assumption that [the plaintiff] … experienced "a sudden increase in intra-abdominal pressure that was caused by the accident"; second, his implicit assertion that such an experience could cause the failure or disruption of a fundoplication as a general matter; and third, his opinion that it did so in this case. [The] … letter provides no hint of the source or basis of his factual assumption. The records provided in connection with this motion include no indication that Nolin had any such experience. To the contrary, they consistently reflect the absence of any sign of internal injury. The only possible source among the materials provided is [a witness'] … deposition testimony that she observed "redness ... a little tender ... a few little bruises throughout his upper body ... some indentations from the body jacket." It is hardly apparent, however, that such observations indicate "a sudden increase in intra-abdominal pressure," and [the doctor's] … affidavit states that they do not. If [the affiant physician who wrote the letter] … believes that they do, his letter does not say so. Without a foundation in the evidence for [his] … factual assumption, his opinion as to

[496] *Id.* at *2.
[497] Not discussed here.
[498] *Id.* Massachusetts adopted the rule of *Daubert* and then *Kumho Tire*. *Id.* at *5.

> causation is obviously unreliable; indeed it has no relevance whatever to the case. As to the second issue, [the doctor] … does not identify the basis for his apparent view that a "sudden increase in intra-abdominal pressure" can cause disruption of a fundoplication. He cites neither any medical publication nor anything in his own training or experience, and offers no explanation or elaboration. [Another doctor] … attests to the absence of any support for this assertion in the medical literature and in his own experience. Neither any of the four factors identified in Daubert, nor any other factors indicate the reliability of this aspect of [the doctor's] … opinion. Finally, [the letter] … offers no indication whatever of how he reaches his conclusion that the assumed sudden increase in pressure caused injury in this particular case. Although he acknowledges other causative factors, apparently both in general and in this case, he provides no analysis of the role of the various factors or the interaction among factors. He does not, for example, identify any change in the frequency or severity of [the plaintiff's] … reflux, or in his nutritional status, immediately after the collision. Indeed the only fact he cites as apparently bearing on his opinion is that the collision preceded the surgery. This alone is obviously insufficient to show the reliability of his opinion as to causation. In response to the defendants' argument under *Daubert*, the plaintiffs do not attempt to defend the reliability of [the] … letter. Their position, rather, is that G.L. c. 233, § 79G, exempts records within its scope from all evidentiary requirements, including the *Daubert* rule. As the cases discussed supra indicate, however, the statute provides only a limited exception to the hearsay rule; it does not eliminate the entire law of evidence from application to the records it covers. Here, even if that statutory exception to the hearsay rule applied to [the] … letter, the letter would not meet the reliability requirement of *Daubert*, and would be inadmissable on that independent ground.[499]

Unreliable evidence remains unreliable even when it might be subject to admission through an hearsay exception. The doctor had no basis for his conclusions.

§ 19.3 Horizontal Gaze Nystagmus Testing; Judicial Notice:

In *State v. Ito*,[500] in vacating a criminal DUI conviction, the Hawaii appellate court held that (1) the police officer took the proper precautions to minimize error in horizontal gaze nystagmus (HGN) test results; the Court took (2) judicial notice of reliability of HGN results and that this acceptance was proper; (3) that there was insufficient evidence to establish that the officer was qualified to administer HGN test or

[499] *Id.* at *6.
[500] 978 P.2d 191 (Haw. Ct. App. 1999).

grade test results; and (4) that the officer failed to properly administer HGN test to defendant.

Ordinarily when a lawyer wishes to introduce scientific evidence, in order to qualify the evidence, an expert witness must testify about the evidence. In this case, however, the state presented no expert testimony about the reliability of the test and the defendant appealed on that basis. Further, the defendant argued that it is error for the court to take judicial notice of a scientific test. The police officer who administered the test also admitted that he did not conduct one part of the test;[501] he failed to determine the angle of onset of the nystagmus.[502]

At the appellate level the court was concerned that an unqualified officer performed the test and vacated the conviction. The police performed the field sobriety tests and performed the HGN test:

> While administering the HGN test to Defendant, [one officer] … observed that both of Defendant's eyes failed to follow [the officer's] finger smoothly and demonstrated distinct nystagmus at the edge of Defendant's field of vision. [The officer] … candidly admitted, however, that in administering the HGN test, he usually did not check for the onset of nystagmus at an angle of forty-five degrees, one of the components of the test, and failed to do so in this instance. Nevertheless, based on Defendant's overall performance on the FSTs, [the officer] … arrested Defendant for DUI.[503]

What is so interesting in this case is that the appellate court permitted the trial court to accept the test by judicial notice, a legal analysis reserved for knowledge within

[501] *Id.* at 193, 195.
[502] *Id.* at 195.
[503] *Id.* at 193-94.

the court's grasp.[504] Since some courts do admit some scientific evidence by judicial notice, it is worthwhile to explain this analysis here.

> Judicial Notice: "HRE Rule 201 (1993) provides, in relevant part: Judicial notice of adjudicative facts. (a) Scope of rule. This rule governs only judicial notice of adjudicative facts. (b) Kinds of facts. A judicially noticed fact must be one not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court, or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned. (c) When discretionary. A court may take judicial notice, whether requested or not. (d) When mandatory. A court shall take judicial notice if requested by a party and supplied with the necessary information. (e) Opportunity to be heard. A party is entitled upon timely request to an opportunity to be heard as to the propriety of taking judicial notice and the tenor of the matter noticed. In the absence of prior notification, the request may be made after judicial notice has been taken. (f) Time of taking notice. Judicial notice may be taken at any stage of the proceeding.[505]

The appellate court discussed HGN and then noted that the test "has been well-documented through research studies over the years that alcohol intoxication affects eye movement and nystagmus becomes more pronounced with alcohol consumption."[506] The court referenced various well accepted medical and legal treatises, the use of HGN under the auspices of the department of Transportation, DOT, and the NHTSA, National Highway, Traffic Safety Agency.[507]

Based on this research, the NHTSA, in 1977, formulated and endorsed for police use a battery of three FSTs--the walk-and- turn, the one-leg-stand, and the HGN--that were determined after research to be the most effective for detecting alcohol impairment. … The HGN test is based on the observation of three different physical manifestations

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[504] One need not "prove" that the Hawaiian Islands lie in the South Pacific Ocean. The court would adopt that bit of information by judicial notice … Evidence adopted by judicial notice is evidence which is well known: "everyone knows *that*!"
[505] *Id.* at 207 n.8.
[506] *Id.* at 197.
[507] *Id.*

which occur when a person is under the influence of alcohol: (1) the inability of a person to follow, visually, in a smooth way, an object that is moved laterally in front of the person's eyes; (2) the inability to retain focus and the likelihood of jerking of the eyeball when a person has moved his or her eye to the extreme range of peripheral vision; and (3) the reported observation that this "jerking" of the eyeball begins before the eye has moved 45 degrees from forward gaze if the individual's BAC [(Blood Alcohol Content)] is .10 [percent] or higher.[508]

Thirty seven states have addressed the admissibility of the HGN test and only Mississippi has explicitly declared that HGN tests are not admissible because the test is not "not generally accepted within the scientific community."[509]

Further, what could be easier than to administer this test?

> The only equipment needed to administer the HGN test is a stimulus, such as a pen, penlight, or the officer's finger. The stimulus is positioned about twelve to fifteen inches in front of a suspect's eyes. … As the officer gradually moves the stimulus towards the suspect's ear and out of the suspect's field of vision, the officer observes the suspect's eyeballs to detect three signs of intoxication: an angle of onset of nystagmus (measured from the suspect's nose) of forty-five degrees or less; distinct or pronounced nystagmus at the eye's maximum horizontal deviation; and the inability of the eyes to smoothly pursue the stimulus.[510]

HGN is accepted in the "vast majority" of courts in the USA.[511] but what has divided the courts is **what is the proper foundation for admissibility of these test results**.[512] Many courts view this test as no different from the traditional field sobriety tests and admit the test into evidence without scientific foundation or expert

[508] *Id.*
[509] *Id.* at 206.
[510] *Id.*
[511] *Id.* at 199
[512] *Id.*

interpretation.[513] A second group regard the HGN as scientific based and not generally known by lay jurors.[514]

It is in these states that "[d]ue to this scientific nature, HGN test results are not admitted by these courts unless expert testimony meeting the criteria set forth in [*Frye* and *Daubert*] [citations omitted] or a pertinent state rule of evidence is adduced to demonstrate the reliability and acceptability of the test."[515] These courts require that the HGN test is to undergo scientific validation in each individual case "or at least recognized as scientifically valid once by an appellate court within the jurisdiction."[516]

Under Hawaii law, the admissibility of scientific or technical evidence is governed by Hawaii's Rules of Evidence which follows the federal rule.[517] The Hawaii code mentioned neither *Frye* nor *Daubert*,[518] but, the case of *State v. Montalbo*[519] observed that Rule 702's assistance requirement contemplated expert testimony based upon "a sound factual foundation ... an explicable and reliable system of analysis ... [and having the capacity to] add to the common understanding of the jury." The reliability determination "could include the Frye test," … but is not so limited: "[I]t is possible that a court could also consider the scientific procedure itself, as well as other evidence of the procedure's reliability."

Montalbo anticipated Hawaii's present Rule 702 amendment, thereby confirming the drafters' belief that the amendment makes explicit what was formerly implicit in the

[513] *Id.*
[514] *Id.*
[515] *Id.* at 200.
[516] *Id.*
[517] *Id.*
[518] *Id.* at 201.
[519] *Id.* (citing 828 P.2d 1274 (1992)).

assistance criterion. General acceptance in the scientific community is highly probative of the reliability of a new technique but should not be used as an exclusive threshold for admissibility determinations.[520]

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence. The court may, however, disallow testimony in the form of an opinion or inference if the underlying facts or data indicate lack of trustworthiness.[521]

The Hawaii Supreme Court has held that under Hawaii Rule of Evidence 702[522] and 703,[523] the following factors should be considered in determining the admissibility of scientific evidence at trial:

> 1) the evidence will assist the trier of fact to understand the evidence or to determine a fact in issue;
> 2) the evidence will add to the common understanding of the jury;
> 3) the underlying theory is generally accepted as valid;
> 4) the procedures used are generally accepted as reliable if performed properly;
> 5) the procedures were applied and conducted properly in the present instance...
> (6) whether admitting such evidence will be more probative than prejudicial.[524]

The Court made a distinction between scientific and technical knowledge. Expert testimony deals with "scientific knowledge" when it involves the validity of the scientific principles and the reliability of the scientific procedures themselves. In contrast, expert testimony deals with "technical knowledge" when it involves the mere technical application of well-established scientific principles and procedures. In such a situation,

[520] *Id.* at 201.
[521] *Id.*
[522] Adopted in 1985.
[523] Adopted in 1993.
[524] *Id.*

because the underlying scientific principles and procedures are of proven validity / reliability, it is unnecessary to subject technical knowledge to the same type of full-scale reliability determination required for scientific knowledge. Thus, although technical knowledge, like all expert testimony, must be both relevant and reliable, its reliability may be presumed.[525]

This case at bar rose through the court system just as the United States Supreme Court decided *Kumho* and the Hawaii court left room to revisit this issue in order to reconcile the disparate analysis in Hawaii between scientific and technical testimony as opposed to the unity found in *Kumho Tire*.[526] Whether reliability may be presumed depends upon the "validity of the technique applying that principle, and the proper application of the technique on the particular occasion,"[527] concluded this Court.

The HGN potential rate of error has a 70% accuracy rate when the BAC exceeds 0.10%,[528] but there are other causes of nystagmus aside from alcohol consumption,[529] the court conceded in its analysis. There is an incidence, for instance, of benign familial nystagmus or even asymmetrical nystagmus which is not alcohol related. The court concluded here however, that "[i]n the case of HGN testing, it seems to be undisputed that a correlation exists between alcohol impairment and nystagmus."[530]

The court engaged in a detailed *Frye* / *Daubert* and state evidentiary law analysis and then concluded that

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[525] *Id.* at 202. [paraphrasing].
[526] *Id.*
[527] *Id.* at 203.
[528] *Id.*
[529] *Id.*
[530] *Id.* at 205.

> In light of the foregoing analysis, we conclude that HGN test results have been sufficiently established to be reliable and are therefore admissible as evidence that police had probable cause to believe that a defendant was DUI. Since the issue was not presented, we do not decide whether HGN test results are admissible at trial as evidence of a defendant's intoxication.[531]

Since "judicial notice relieves the offering party of the burden of producing evidence on these issues" a court may take judicial notice only after a scientific principle which is sufficiently established.[532]

Whereas Hawaii took judicial notice of HGN, the conclusions are different in other states. For instance, New Mexico did not permit admission of the HGN test by judicial notice in *State v. Torres*.[533] Under the laws of New Mexico, "it is improper to look for scientific acceptance only from reported case law [from other jurisdictions]."[534]

This obstacle was not Hawaii's, however, so that HGN may be admitted by judicial in Hawaii.[535]

Since *State v. Torres,*[536] took an opposite view to the Hawaii case with respect to HGN and judicial notice, it is helpful to analyze that court's decision. As noted in the previous case, the New Mexico Supreme Court concluded that the "results of horizontal gaze nystagmus (HGN) testing constitute scientific evidence that must meet the standard of evidentiary reliability."[537] This Court held that testimony as to the results of a horizontal Gaze Nystagmus (HGN) test should not have been admitted at trial because the state failed to lay a proper foundation for the admission of expert witness testimony. The

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[531] *Id.* at 207.
[532] *Id.* at 208.
[533] *Id.* at 209. (citing 976 P.2d 20 (N.M. 1999)).
[534] *Id.* (citing Torres, 976 P.2d at 32).
[535] *Id.* at 209.
[536] 976 P.2d 20 (N.M. 1999).
[537] *Id.* at 23.

state qualified a police officer as an expert in administering the test but it failed to show the evidentiary reliability of HGN testing.[538]

New Mexico Rule of Evidence 11- 702 controlled this area of evidence and the New Mexico Supreme Court observed that there was conflicting law on the subject of the admissibility of the HGN test. The New Mexico Rule of Evidence parallels the federal rule and the New Mexico Supreme Court has delineated three pre-requisites for the admission of expert testimony: "(1) experts must be qualified; (2) their testimony must assist the trier of fact; and (3) their testimony must be limited to the area of scientific, technical, or other specialized knowledge in which they are qualified."[539] The court referenced *Daubert*,[540] and then noted that it is error to admit "expert testimony involving scientific knowledge unless the party offering such testimony first establishes the evidentiary reliability of the scientific knowledge."[541]

The first case in New Mexico to follow *Alberico* was *State v. Anderson*,[542] which took up this issue of deoxyribonucleic acid (DNA) typing under the restriction fragment length polymorphism (RFLP) method.[543] In its *Torres* analysis, one problem this court considered was that there is disagreement whether the HGN test represents scientific evidence at all.[544] New Mexico adopted the view that HGN is scientific evidence and that it must meet the standard of evidentiary reliability "articulated" in *Alberico* and *Daubert*. The court reasoned this way:

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[538] *Id.*
[539] *Id.* at 28.
[540] *Id.*
[541] *Id.* (citing See State v. Alberico, 861 P.2d 192, 202 (N.M. 1993).
[542] 881 P.2d 29, 32-35 (1994).
[543] *Id.*
[544] *Id.* at 30.

> [W]hile most of the field sobriety tests are self-explanatory, HGN is not. When courts have taken judicial notice of the common physical manifestations of intoxication, horizontal gaze nystagmus is not included. Horizontal gaze nystagmus is not just a symptom such as slurred speech or bloodshot eyes, which are commonly understood signs of intoxication.... The phenomena being tested are predicated on a scientific or medical principle that the automatic tracking mechanisms of the eye are affected by alcohol.... [T]he significance of the HGN observation is based on principles of medicine and science not readily understandable to the jury.[545]

In *Torres*, since the trial court failed to consider any of the required *Daubert* factors prior to admitting this scientific evidence, the court misapprehended the law and the New Mexico Supreme Court reversed this decision.[546] Precisely what is the required foundation to admit this HGN testing? In Ne• Mexico the following seems to suffice: "a showing of the officer's training and experience in administering the test, and a showing that the test was in fact properly administered."[547] On the other hand, however, "if police officers are not qualified to testify about the scientific bases underlying the HGN test, they are not competent to establish that the test satisfies the relevant admissibility standard."[548]

New Mexico takes the view that "[i]t is improper to look for scientific acceptance only from reported case law."[549] The thrust of the policy behind the various New Mexico cases is to broaden the trial court's role in admitting evidence of scientific knowledge. A trial court may admit evidence of scientific knowledge which is adequately scientifically valid to be sufficiently reliable from an evidentiary viewpoint. General acceptance within

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[545] *Id.*
[546] *Id.*
[547] *Id.* at 32.
[548] *Id.*
[549] *Id.* at 32.

a particular scientific discipline is neither necessary nor a sufficient condition for evidentiary admissibility.[550]

Finally, New Mexico differed with Hawaii in the ability for a court to admit this evidence by judicial notice.

> This court, since early territorial days, has expressed the view that courts will take judicial notice of matters of common and general knowledge. The matter of which a court will take judicial notice must be a subject of common and general knowledge. The matter must be known, that is well established and authoritatively settled. Thus, uncertainty of the matter or fact in question will operate to preclude judicial notice thereof.[551]

Depending upon the jurisdiction, the attorney will be able to recognize whether HGN or other scientific evidence should be admitted under judicial notice.

In *Ford Motor Company v. Ammerman*,[552] after a rollover accident, the judge entered judgment in favor of the plaintiffs in the amount of $4.4 million dollars in compensatory damages and $58 million dollars in punitive damages. The court then granted the defendant's request to reduce the punitive damages to $13.8 million dollars. The manufacturer appealed and the plaintiffs cross-appealed.

In sustaining the punitive damage award of $58 million dollars, here, the appellate court held on the issue of the admissibility of the scientific evidence of the emergency avoidance maneuver tests (EAM) that this evidence was admissible. One theory the plaintiff's advanced at trial was that Ford ignored its engineers' recommendations to give the Bronco a higher SI.[553]

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[550] *Id.*
[551] *Id.* at 33..
[552] 705 N.E.2d 539 (Ind. App. 1999).
[553] The tendency to roll over is caused by a low static stability index ("SI"). The SI describes the relationship between a vehicle's track width and the height of the vehicle's center of gravity. The lower the

At trial, the plaintiff argued that Ford made a conscious decision not to provide the Bronco with an higher SI. "[H]ad Ford taken appropriate steps to increase the index to 2.25, the accident would not have occurred,"[554] it argued and in support of this theory they offered expert testimony from an engineer with a PhD in "solid mechanics" who testified that the vehicle's SI is determinitive whether the vehicle is stable and would tend to turn over.[555] The engineer and his partner presented the results of their own emergency avoidance maneuver tests (EAM tests) which involved driving the utility vehicles around pylons as they simulated emergency maneuvers.[556] There were specific criteria for these tests yet Ford objected to the "avoid and correct" protocol as unscientific and inadmissible under Rule 702.[557] The trial court admitted the tests and the expert testimony.

On appeal, the court analyzed this EAM under *Daubert* noting that "(a)n expert's opinion must be based on more than subjective belief or unsupported speculation."[558] and the state Rule of Evidence 702(b) which provides that "[e]xpert scientific testimony is admissible only if the court is satisfied that the scientific principles upon which the expert testimony rests are reliable."[559] The trial court functions as gatekeeper to ensure that the expert's testimony "rests on a reliable foundation and is relevant to the issue at hand."[560]

To determine reliability, the court should engage in the *Daubert* criteria analysis and it should focus on the "principles and methodology behind the science rather than the

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SI, the higher the risk of rolling over. A vehicle with a narrow track and a high center of gravity is more likely to roll. *Id.* at 545.
[554] *Id.* at 549.
[555] *Id.* at 550.
[556] *Id.*
[557] *Id.*
[558] *Id.* (citing *Daubert*, 509 U.S. 579, 590).
[559] *Id.*

conclusions generated."[561] The court stringently delved into the protocols and observed that Ford did not object to the EAM tests in general, rather their objection challenged the opinion offered due to the procedures utilized during the EAM tests.[562]

The court found no abuse of discretion and upheld the admission of the evidence stating:

> … [T]he conflict at issue here, test protocols and instrumentation, or lack thereof, did not require the exclusion of Dr. Kaplan's testimony and, accordingly, the court did not abuse its discretion in allowing the evidence. Such conflicts did certainly go to the weight of the evidence and, as such, were properly put before the jury. After listening to the examination on foundation, the court stated that it found Dr. Kaplan's tests were capable of producing reliable results, the tests were themselves capable of being tested, they were documented sufficiently to allow peer review, and other entities had used similar testing. The court did express concern about the Daubert element dealing with the known or potential rate of error but stated that much of the preliminary questioning had touched on that factor and it was the court's view that under the circumstances the potential for error should be left to the jury in determining the weight to be given the evidence.[563]

The ultimate test to scientific testimony comes through the jury's analysis of the testimony. The opinion stated:

> Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence. [citations omitted] Ford also maintains the evidence to which Dr. Kaplan testified was not generally accepted by the scientific community, and therefore, was unreliable. According to Ford, no other entity uses a test similar to the [EAM] … test to assess vehicle stability. The [plaintiffs] … counter that EAM tests similar to the one at issue are widely used by a variety of entities, including automobile manufacturers. General acceptance within the relevant scientific community does have a bearing on the inquiry into whether a test is reliable. [citations omitted] Acceptance, however, is not a rigid requirement although the trial court may consider widespread acceptance when ruling evidence admissible. [citations omitted] In addition, whether a known technique attracts only minimal support is also relevant to the admissibility

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[560] *Id.* [citations omitted].
[561] *Id.* at 551. (citing Daubert, 113 S.Ct. at 2797).
[562] *Id.* at 552.
[563] *Id.* at 552-53.

> inquiry. … It is important to note that this approach is more liberal than the traditional "general acceptance" standard established by *Frye v. United States* [citations omitted]. Instead of wholesale exclusion under an uncompromising "general acceptance" test, appropriate means of attacking shaky evidence include vigorous cross- examination, presentation of contrary evidence, and careful instruction on the burden of proof.[564]

Scientific evidence will be weighed by the jury after cross-examination and that adversarial approach further assures a fair hearing of the evidence as well as ensures rigorous evidentiary scrutiny within the judicial system.

§ 19.4 Speculative Opinion Inadmissible; Not Relevant:

In *Modelski v. Navistar International Transportation Corporation*,[565] a man was killed while operating a tractor made by Farmall and at trial, the defense won. The plaintiff appealed and the appellate court reversed, remanding for a new trial based, in part, upon the erroneous admission of speculative opinions by the tractor manufacturer's reconstruction expert.

The decedent was killed when he was struck by the blades of a tractor mower and was found prone with terrible lacerations to his head and upper body. There were no witnesses to the accident and the case theory for the plaintiff was that the man was ejected to the rear of the tractor when bolts failed and he fell beneath the blades.

The defendant's reconstruction expert posited a theory that the decedent was mowed down when he started the tractor while he was actually standing on the ground. The plaintiff moved to exclude this testimony as speculative but the trial court allowed the testimony.[566]

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[564] *Id.* at 553.
[565] 707 N.E.2d 239 (Ill. App. 1999).
[566] *Id.* at 242.

Illinois adopted the Federal Rules of Evidence[567] and Rules 703 and 705 permit an expert witness to base his opinions on information that has not been admitted into evidence "so long as that information is reliable and is of a type reasonably relied upon by experts in that field."[568] Where an expert's opinion includes so many varying or uncertain factors that he is required to guess or surmise to reach an opinion, the expert's opinion is too speculative to be reliable. "Mere surmise or conjecture is never regarded as proof of a fact,"[569] the court reasoned.

Under Rule 401, speculative evidence is not relevant[570] since it could not operate to make the existence of any fact which is of consequence to the determination either more or less probable.[571]

> In this case, [the expert witness] … had no factual basis to support his opinion that [the plaintiff's] … tractor stalled and he, thereafter, dismounted to make repairs, leaving the tractor in gear and the [mower] … engaged. [The witness] … admitted on cross-examination that there was no physical evidence to support these notions. We would hardly expect "expert" opinion testimony to be objective in the traditional sense of the term, but neither would we expect it to take the form of fictional musings as to what might have happened. From [the expert's] admissions elicited through cross-examination, it is quite apparent that his opinions regarding a mechanical breakdown necessitating [the plaintiff] … to dismount the tractor were based on sheer speculation and should have been stricken as unreliable and totally irrelevant.[572]

§ 19.5 Not Novel:

In *Harris v. Cropmate Company*,[573] the appellate court reviewed a toxic chemical tort litigation where farm operators who suffered damage to their crops sued the company

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[567] *Id.* at 244.
[568] *Id.*
[569] *Id.*
[570] *Id.* at 244
[571] *Id.* at 245.
[572] *Id.* at 245.
[573] 706 N.E.2d 55 (Ill. App. 1999).

which had sprayed herbicide on an adjacent tract of property, and on its employee. The plaintiff alleged that negligent spraying of herbicide containing 2,4-D had caused damage. In a bench trial, the trial court granted a directed verdict to the employee, and entered judgment in favor of farmers on the damage claims against the company.

Here, the chemical company appealed and the appellate court affirmed the trial court holding that: (1) the "Frye plus reliability" standard applies in determining the admissibility of novel scientific evidence; (2) the opinion testimony of witnesses who were, respectively, seed salesman, a doctoral student in weed science, and a research biologist, was not scientific testimony subject to Frye test; and that (3) their testimony in any event was not "novel" for purposes of Frye.

Despite the *Daubert* decision, the State of Illinois represents an example where old ways die hard; Illinois continues to adhere to the "general acceptance" standard of *Frye*.[574] According to this appellate court, this is a matter left for the legislature or for the Illinois Supreme Court.

The court quoted Professor Michael H. Graham made the following comments:

> *Daubert* boxed the courts into working within a structure that has not functioned as anticipated by the Supreme Court and can fairly be said not to have functioned well at all. The Supreme Court sought to encourage liberal admissibility. It believed that it was abolishing a strict Frye test in favor of a more liberal factor[-]balancing analyses. In fact, liberality of admissibility has not occurred."[575]

Further, Professor Graham reasoned that "imposing the Frye admissibility standard serves to accomplish the following:

> (1) ensure that a minimal reserve of experts exist who can critically examine the validity of a scientific determination in a particular case, (2) promote a degree of uniformity of decision, (3) avoid the interjection of a time-consuming and often

[574] *Id.* at 58.
[575] *Id.* (citing 2 M. Graham, Handbook of Federal Evidence § 702.5, at 34 (4th ed. Supp.1999)).

> misleading determination of the reliability of a scientific technique into the litigation, (4) assure that scientific evidence introduced will be reliable, [citation omitted], and thus relevant, (5) provide a preliminary screening to protect against the natural inclination of the jury to assign significant weight to scientific techniques presented under circumstances where the trier of fact is in a poor position to place an accurate evaluation upon reliability, and (6) impose a threshold standard of reliability, in light of the fact that cross-examination by opposing counsel is unlikely to bring inaccuracies to the attention of the jury.'"[576]

The court observed that "[s]imply because scientific principles relate to aspects of an opinion witness' testimony does not transform that testimony into "scientific" testimony."[577] Where the line lies between scientific and non-scientific is unclear:

> … the scientific/nonscientific dichotomy may best be viewed as a continuum, at one end of which the distinction between "scientific" and "nonscientific" evidence is clear, such as in the case of the beekeeper versus the aeronautical engineer. Moving down the continuum, the distinction begins to blur, and at the opposite end, no obvious clear demarcation exists between "scientific" and "nonscientific" evidence, such as in the case of a forensic document examiner, for example.[578]

This analysis illustrates the winnowing process:

> Here, botany and chemistry were undisputedly implicated in the testimony of Kregel (a seed salesman with several years' experience applying 2,4-D), Hager (an extension specialist and doctoral student in weed science who had read the literature and conducted field research on the effects of 2,4-D), and Scott (a research biologist who had become acquainted during the course of his work as an extension specialist with the effects of phenoxy-type herbicides, including 2,4-D, on cucurbits). However, none of these experts purported to have relied on some particular scientific principle or methodology to determine whether exposure to 2,4-D had caused the injuries to the Harris crops. (Unlike Dr. Thomas Monaco, one of Cropmate's opinion witnesses, who had performed a "calculation" to determine the concentration of 2,4-D that had drifted from a nearby field onto the Harris field.)[579]

[576] *Id.* at 59-60. (Handbook of Federal Evidence § 702.4, at 562).
[577] *Id.* at 61-62.
[578] *Id.* at 62.
[579] *Id.*

Indeed, the three experts, Kregel, Hager, and Scott, all acknowledged that they did not know and had not calculated the minimum concentration of 2,4-D necessary to cause crop yield loss. Instead, akin to the beekeeper, the experts reached their conclusions that exposure to 2,4-D had caused the injuries to the Harris crops by combining (1) their generalized knowledge of agriculture, including crops and weeds; (2) their firsthand experience with and observations of the effects of exposure to 2,4-D upon cucurbits; and (3) the type of deductive process that is common to everyone. The court then concluded that the causation testimony of the expert witnesses did not constitute "scientific" evidence and, consequently their opinion testimony fell outside *Frye's* scope.[580]

Here, the Illinois court reasoned that if the trial court determines that the proffered testimony constitutes scientific evidence, then the court must ask, "is that scientific evidence 'novel,' or does it involve instead a firmly established method or technique? In making this determination, the court should ascertain whether there is any controlling on-point precedent.[581]

Here the court concluded that the methods employed by the opinion witnesses constituted scientific methods and thus fell within the realm of "scientific" evidence, but that these methods are not "novel." None of the witnesses relied upon some "[s]trikingly new, unusual, or different" method in reaching their opinions.[582] The evidence presented demonstrated that the specific method at issue here[583] was only a method commonly used and generally accepted by agricultural extension specialists, farmers, and other persons otherwise qualified to diagnose plant injuries. Certain techniques or tests have been held

[580] *Id.*
[581] *Id.* at 62
[582] *Id.* at 63.

admissible without a *Frye* hearing when those techniques or tests are undoubtedly generally accepted in the relevant scientific community.[584]

In *Ducharme v. Hyundai Motor America*,[585] the trial court excluded testimony from a motorist's expert's opinion that the automobile did not comply with federal safety standard requirements on grounds that it was based on nothing more than conjecture and speculation. Further, the appellate court upheld the trial court's exclusion of evidence of automobile crash test performed under conditions somewhat different from motorist's collision was properly admitted to contradict motorist's version of how accident occurred.

A nineteen year old college student, wearing a seat belt, suffered massive facial injuries resulting in total permanent blindness when he drove his 1986 Hyndai Excel into a tree at forty miles per hour. He argued that his injuries were more severe than they would have been due to design defects in the automobile. A jury found for the defendant and the plaintiff appealed. The appellate court affirmed the jury verdict.[586]

The trial court judge refused to permit the plaintiff's expert to testify that "the Excel did not comply with the requirements of Federal Motor Vehicle Safety Standard 208, 49 C.F.R. § 571.208 (1997)."[587] The expert witness testified that in his opinion, the plaintiff's Hyundai Excel would not have satisfied FMVSS 208's requirements for occupant protection but he offered no objective evidence to support his conclusion. He then was forced to concede that in forming his opinion he failed to employ any of the objective criteria specified in the FMVSS 208 test protocol. His opinion was based solely

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[583] The visual examination of plants to determine whether they have suffered herbicide or other injuries.
[584] *Id.* at 63
[585] 698 N.E.2d 412 (Mass. App. 1998).
[586] *Id.* at 414.
[587] *Id.* at 416.

on his review of crash test reports involving other Hyundai Excels, all of which conformed with the requirements of FMVSS 208, and his post-collision inspection of the victim's vehicle.

This was a purely subjective opinion "based on nothing more than conjecture, surmise, and speculation" the appellate court concluded that the trial judge had properly excluded the opinion as "gatekeeper" against unreliable expert testimony.[588]

Conversely, according to the plaintiff, the judge permitted the defendant's expert witness to testify about crash tests which was not admitted into evidence but which was performed according to specifications provided by the defense expert witness.[589]

Notice here, again, as seen in other cases, the standard for admissibility does not require precise replication. An "expert may base an opinion on "facts or data not in evidence if the facts or data are independently admissible and are a permissible basis for an expert to consider in formulating an opinion."[590]

"Evidence of tests or experiments, which do not exactly replicate the conditions giving rise to the alleged injury, are admissible upon a showing of ... substantial similarity between experimental conditions and the conditions that gave rise to the litigation."[591] The trial court discretion determines whether an experiment, demonstration or reenactment sufficiently resembles the actual event so as to be fair and informative.[592]

During voir dire, the witness testified that he intentionally placed the test dummy upright in the seat even though he believed that the victim was slumped in his seat, in

[588] *Id.*
[589] *Id.* at 417.
[590] *Id.*
[591] *Id.*
[592] *Id.*

order to demonstrate the physical principle that the dummy would continue to move forward following impact until something stopped it, as well as to illustrate that a properly restrained occupant in the upright position would not have hit the steering wheel. Thus, the challenged evidence was not offered "to show that the accident occurred in the precise manner indicated by the test[ ]" but to demonstrate, in part, that the plaintiff's version of events might be inaccurate.[593]

The plaintiff argued that the test vehicle's speed of 46.8 miles per hour differed markedly from the actual speed of his vehicle when it hit the tree, and that the type of barrier used in the test, a twenty inch steel pole filled with concrete and covered with plywood, was substantially dissimilar from the tree in question. trial evidence indicated that the plaintiff's vehicle traveled somewhere between "forty-one and forty-seven miles per hour when it struck the tree, which measured approximately eighteen to twenty-two inches in diameter."[594] For this court, then, the circumstances were substantially similar.

In *Sears, Roebuck & Company v. Kunze*,[595] Mr. Kunze sliced off four fingers on his left hand while using a radial saw and he brought a products liability action. The jury returned a verdict of $2.5 million dollars and the defendants appealed the verdict. One basis for the appeal concerned the exclusion of testimony relating to an out-of-court test performed by the defendant which showed that the accident could not have happened as the plaintiff described the accident. This appellate court affirmed the judgment.[596]

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[593] *Id.*
[594] *Id.* at 418 n. 7.
[595] 996 S.W.2d 416 (Tex. App. 1999).
[596] *Id.* at 420-21.

In its review, the court considered "only the evidence and inferences that tend to support the jury's finding, and disregard all evidence and inferences to the contrary."[597] In its scrutiny, "(i)f there exists any evidence to support the finding, the point will be overruled and the finding upheld."[598] In terms of the factual sufficiency of the evidence, the court "must weigh all of the evidence in the record,"[599] overturning findings "only if they are so against the great weight and preponderance of the evidence as to be clearly wrong and unjust."[600]

Sears argued that the trial court erred when it excluded evidence relating to an out-of-court test which they contended disproved the plaintiff's theory of how the accident occurred. The defendants contended that they performed their test under conditions "substantially similar" to those which the plaintiff described. What is the standard for the admissibility of these reconstructions?

The general rule in Texas is that "[a] test that a party offers at trial regarding how an accident occurred will be admissible only if the trial court determines that there is a substantial similarity between the test conditions and the accident conditions."[601] Guided by the Texas Rules of Evidence 702, the court must determine relevancy of the test[602]

> The many factors that the trial court may consider in making the threshold determination of admissibility include, but are not limited to: 1. the extent to which the theory has been or can be tested; 2. the extent to which the technique relies upon the subjective interpretation of the expert; 3. whether the theory has been subjected to peer review and/or publication; 4. the technique's potential rate of error; 5. whether the underlying theory or technique has been generally

[597] *Id.* at 421.
[598] *Id.*
[599] *Id.* at 422.
[600] *Id.*
[601] *Id.* at 424.
[602] *Id.* (citing E.I. duPont de Nemours & Co., Inc. v.. Robinson, 923 S.W.2d 549, 557 (Tex.1995).

> accepted as valid by the relevant scientific community; and 6. the non-judicial uses that have been made of the theory or technique.[603]

In this case here is the relevant discussion about how the test was performed:

> The test in question was sponsored by the testimony of Dr. Gary Deegear, a former practicing physician who, at the time of trial, was a technical director and consultant for Biodynamic Research Corporation. He indicated that his firm did primary research in using human tissue substitutes and interacting with power tools to see how injuries occur. With respect to the test in question, he indicated that it consisted of a subject feeding a work piece through a slit in a screen. At some point in the test, a person on the other side of the screen would suddenly yank it away from the push stick, causing the push stick that the subject was applying to the end of the work piece to slip suddenly. He said that at that point he was hoping to capture what the normal reflexes would demonstrate. He testified that the circumstances and conditions of the demonstrations were substantially similar, though not exactly similar, to the circumstances and conditions existing at the time of the accident as described by Kunze. He acknowledged that there was no real saw blade used because of the danger and that there was no kickback situation because of the danger and because the push stick did not slip in kickback experiments. Deegear conceded that he was not aware of any other medical professional who had performed similar testing that had been published in peer review journals, that his study had not been published in peer review journals, that any potential rate of error was probably based upon the frame rate of the videotapes, (i.e., based upon the measuring device, not the population selected), and that the test was not used for any nonjudicial purpose. The trial court excluded testimony of the test, finding that Dr. Deegear's theory and technique had not been tested in the past, that it relied upon a subjective determination, that it had not been subjected to peer review, that no potential rate of error was established, that the underlying theory or technique had not been generally accepted as valid by the scientific community, and that there had been no nonjudicial uses of the technique.[604]

This court then referenced the *Daubert* factors and the gatekeeping obligation of the trial court judge and cited *Kumho Tire*, as well.[605] So long as a re-enactment or reconstruction is substantially similar, the results will be admissible on that basis.

Finally, here, on this issue of the non-scientific analyses, in *Weisgram v. Marley Company*,[606] the trial court did not exclude the testimony of three expert witnesses

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[603] *Id.*
[604] *Id.* at 424.

concerning the causal connection between a heater and the victim's death from carbon monoxide poisoning.[607] The defendant requested a judgment as a matter of law on the grounds that the plaintiffs failed to meet their burden of proof on the issue of the heater's defect and on causation. The defendant asserted that the expert testimony was unreliable and therefore inadmissible.[608]

In review, the Eighth Circuit ruled that the JML should have been granted since the expert witness testimony supporting the product defect was speculative and not shown to be scientifically sound. Therefore, the evidence was incompetent to prove the case.[609] The court concluded that, "[i]nadmissible evidence contributes nothing to a legally sufficient evidentiary basis."[610]

Weisgram is a very important case for litigants to understand since it stands for the premise that when expert evidence is incompetent, then the court shall strike the testimony. Only scientific evidence which is competent may support a verdict. An appellate court may enter a judgment as a matter of law and the burdened party is not entitled to a new trial. This is a scientific version of "you snooze, you lose." What the attorneys offer to the court at the trial level will be dispositive. There is no second "whack at this evidentiary apple."

§ 20 Expert Qualifications:

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[605] *Id.*
[606] 528 U.S. 440, 120 S.Ct. 1011 (2000).
[607] *Id.* at 1012.
[608] *Id.* at 1013.
[609] *Id.*
[610] *Id.* at 1314. [internal quotations omitted]

In *Gammill v. Jack Williams Chevrolet, Incorporated*,[611] the Texas Supreme Court held that a mechanical engineer was not qualified to testify as an expert, another mechanical engineer was qualified to testify but his opinion was not reliable and the reliability standard applies to all scientific expert testimony, including scientific opinion based on individual skill, experience, or training.

Upon reading these conclusions one might deduce that the Texas Supreme Court substantially erred thinking that such "legitimate" experts should be permitted to express their opinions. Recall, however, the rule that there are no "generic experts," experts who can testify about anything. Expert witnesses may only express their opinions in the are in which they have been qualified.

The analysis in *Gammill* is extremely important for any trial lawyer to digest and, at the conclusion, it will be seen that the rigorous analysis is reasonable and that the conclusions present a most important lesson about scientific evidence and what really is scientific evidence in modern litigation.

The defendants achieved a dismissal through summary judgment and the Texas Supreme Court, in affirming the lower court's decision, examined whether the two expert witnesses were qualified to give the opinions they gave and whether the proponent had demonstrated that the opinions were relevant and reliable.[612]

Briefly, the facts of this accident were that a mother lost control of her vehicle, swerved across the roadway where the vehicle struck a utility box and several trees. One child died while the other received minor injuries. The plaintiff's case theory was that the

[611] 972 S.W.2d 713 (Tex. 1998).
[612] *Id.* at 715.

driver lost control when the accelerator pedal was caught in a wiring harness beneath the dashboard and that the child died as a result of a seat belt failure.

The defendants inspected the vehicle and then, following completion of the inspection, filed for a summary judgment. Affidavits submitted by two engineers, one of whom was also a physician, stated:

> … [T]he wiring harness could not have blocked the accelerator pedal, and even if it could have, it could not have prevented application of the brakes in time to avoid the collision; [The child] … was not wearing her seat belt at the time of the accident; the rear restraint system was not defective; and if [the child] … had been wearing her seat belt, her injuries would not have been fatal.[613]

The plaintiffs substituted new counsel several times and eventually moved to strike the experts' testimony on the grounds that they were not qualified to give the opinions they gave and, based upon the *Robinson* decision, the experts' opinions were unreliable.[614] The plaintiff then produced expert witnesses which the defendants moved to strike since they should be disqualified from testifying since their opinions were not reliable.[615] The court did not rule on those issues but the plaintiff responded to the defendants' motion for summary judgment using affidavits submitted for the plaintiff's motion to inspect the vehicle.[616]

The plaintiffs sought inspection of the vehicle despite seven other opportunities for plaintiff's expert witnesses to inspect the vehicle on twelve occasions.[617] The district court offered to permit further inspection if there were "some reason" to do so. The expert's qualifications, analysis, and conclusions were the following:

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[613] *Id.* at 715-16.
[614] *Id.* at 716.
[615] *Id.*
[616] *Id.*
[617] *Id.* at 718.

> Huston, a licensed professional engineer with a bachelor's, master's, and doctoral degree in mechanical engineering from the University of Pennsylvania, has been a professor of mechanical engineering at the University of Cincinnati since 1962. He has conducted research in mechanics, dynamics, biomechanics, vehicle occupant kinematics, and vehicle occupant restraint systems. Huston has had occasion to examine and test many vehicle restraint systems. His tests on restraint systems have focused on retractor locking dynamics, buckle integrity, premature buckle release, and belt positioning on occupants. Huston has written over 100 journal articles, 125 conference papers, 45 technical reports, and two books summarizing the results of his research. Since 1975, he has worked as a consultant in litigation matters, testifying as an expert in over 325 depositions and more than 145 trials. Huston has previously tested seat belts like those in the Gammills' vehicle, and at their instance, he inspected the rear seat belt in their vehicle that Jaime was alleged to have been wearing. Huston also reviewed accident photographs, the police report, Jaime's x-rays and medical records, her shirt, the depositions taken in the case, and defendants' experts' affidavits. Based on this information, Huston concluded in his affidavit that: Deborah "was wearing her seat belt, but this did not prevent her incapacitating injuries from the impact and occupant compartment intrusion"; Jaime "received [a] fatal head injury from striking the right rear corner of the driver's seat back" where Huston found a dent, a tear in the seat cover material, and blood; Jaime "was wearing her seat belt at the beginning of the accident as evidenced by gliding abrasions found on her body, markings on the shirt she was wearing, apparent shirt fibers observed in the seat belt webbing, marks on the seat belt webbing, and the impact location on the driver's seat back"; Jaime's "seat belt prematurely released during the impact of the accident"; "[a] properly fitting and secure lap and shoulder seat belt system (three-point system) would have prevented Jaime Gammill's fatal injuries"; "[t]he webbing loop at the buckle of the right rear seat belt allowed the webbing to flow through the loop in turn allowing looseness to occur in the webbing"; "the use of a side push button buckle release on the right rear seat belt and with the buckle positioned approximately 5 inches away from the seat bottom/back rest crease created a configuration ideally suited for premature release upon impact"; and "[t]he use of the webbing loop and buckle release ... were design defects allowing the fatal injuries of Jaime Gammill to occur."[618]

Another expert witness was David Lowry who was also a licensed professional engineer with a bachelor's and master's degree in mechanical engineering from Texas A & M University. He was employed by Lockheed Martin Tactical Aircraft, where he is responsible for incorporating design details in the F-22 fighter plane's construction. “He

[618] *Id.* at 716-17.

has previously worked on a high speed anti-radiation missile for Texas Instruments and on the F-111 fighter plane for General Dynamics."[619] Lowry consults as "Forensic & Analysis Consulting Technologies, Inc." while pursuing his master's degree. Further he worked as an automobile mechanic, installed cruise controls, replaced rear ends and transmissions, and repaired brakes, water pumps, cylinder heads, engine mounts, electrical shorts, and universal joints. On other occasions, this engineer served as an expert in other automotive products liability cases. In this particular case, he inspected the vehicle three separate times and reviewed the police reports, the decedent's medical records, the autopsy report and photographs, and the affidavits of defendants' experts. He concluded that "the throttle return springs could have pulled the throttle pedal arm into the harness in such a way as to slightly buckle the mylar shroud and press the corner into the bundle of wires."[620] This would have had the effect to hold the pedal in place. Further, he concluded that the child was wearing her

> seat belt at the time of the initial impact of the vehicle with fixed objects. I believe the seat belt served as a pivot about which Jaime rotated as her body was carried forward. She was released from the seat belt restraint and then struck the back of her mother's front seat. This movement is evidenced by a relatively low impact on the seat back approximately 10 inches above the height of the rear seat bottom. If she had not been belted, Jaime would have impacted the front windshield and possibly gone through it, or in any event would have struck the rear of the front seat backs much higher than markings of the seat show. Had the seat belt functioned properly, it would have been heavily loaded and it would have saved Jaime's life. The restraining force of the seat belt was equivalent to the force required to produce the dislocated hip, bruised pelvis, and bruised chest that Jaime incurred immediately prior to her head injuries resulting in her death. The seat belt caused injuries to the young girl, and was defective in that it failed to keep her restrained but released her to impact.[621]

[619] *Id.* at 717.
[620] *Id.*
[621] *Id.*

Before summary judgment, the trial court disqualified two expert witnesses since the plaintiff failed to designate them in a timely fashion but reserved its ruling on whether Huston and Lowry should be disqualified.[622] The court permitted them to inspect the vehicle so long as they did no destructive testing.[623]

Finally, in the context of an hearing to determine whether the plaintiff should be allowed to remove the entire rear seat belt assembly to look for fibers from the child's shirt, the defendants argued that the plaintiff had shown no purpose for further examination, urged the court to disqualify the experts, and the court deferred the ruling to permit mediation.[624] The case did not settle and the court then heard the motion for the inspection where it granted the defendants' motion to disqualify the experts. The court held that these experts

> … were not qualified to testify about the matters in their affidavits, and that their opinions were not scientifically reliable. The court later signed orders setting out findings and conclusions regarding Huston's and Lowry's qualifications and opinions. The court also denied plaintiffs' motion for further inspection of the vehicle and granted defendants' motion for summary judgment.[625]

The court of appeals reviewed these experts qualifications and affirmed the trial court since their opinions were not shown to be reliable. Additionally, since seven other experts had already combed the wreckage, the trial court had not abused its discretion in denying the request to inspect.

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[622] *Id.* This case illustrates the sort of procedural body blows parties engage in when participating in this sort of hotly contested litigation where so much is at stake for either party.
[623] Tex.R. Civ. P. 167(1)(g) states "Testing or examination shall not extend to destruction or material alteration of an article without notice, hearing, and prior approval by the court." *Id.* at 716 n.4. see ELLIOTT B. OPPENHEIM, THE MEDICAL RECORD AS EVIDENCE §4-28(a)(Lexis 1998) (discussing destructive testing in the medical context of spoliation of evidence).
[624] *Id.* at 718.
[625] *Id.*

At the Texas Supreme Court level, the plaintiff did not argue that the defendants' experts' affidavits were insufficient to support summary judgment and that put them in the precarious position that if their argument failed, then the trial court's judgment "must remain undisturbed."[626]

The Texas Supreme Court's analysis stands as a lesson on the law of evidence and the expert witness. The court began its analysis by citing Texas Role of Evidence 702, which sets the expert's requirements: knowledge, skill, experience, training, or education. In the court's discretion, that witness may then testify "on scientific, technical, or other specialized subjects if the testimony would assist the trier of fact in understanding the evidence or determining a fact issue."[627] The actual qualification of the expert witness falls under Rule of Evidence 104(a) and this is a preliminary issue to be decided by the court.[628] Under Texas law, even where a witness has many degrees, as did these witnesses, the witness must "'possess[es] special knowledge as to the very matter on which he proposes to give an opinion.'"[629] This decision is the judge's and, as followed nationwide, absent abuse of discretion, an appellate court will not disturb these decisions.[630] This appellate court "no difficulty" in holding that the trial court did not abuse its discretion.

> Just as not every physician is qualified to testify as an expert in every medical malpractice case, not every mechanical engineer is qualified to testify as an expert in every products liability case. Trial courts must ensur[e] that those who purport to be experts truly have expertise concerning the actual subject about which they are offering an opinion."[631]

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[626] *Id.*
[627] *Id.* at 718.
[628] *Id.*
[629] *Id.* (citing Broders v. Heise, 924 S.W.2d 148, 151 (Tex.1996).
[630] 972 S.W.2d 713, 718-19.
[631] *Id.* at 719.

The court explains why this highly trained and well educated engineer was unqualified to provide the opinion evidence he provided:

> Lowry was shown to be experienced in designing and testing fighter planes and missiles, but he was not shown to have any training or experience in the design or manufacture of automobiles or their relevant components. Indeed, his only experience with automobiles at all was while working part-time as a mechanic doing general repairs while completing his master's degree. Lowry has not been shown to have any expertise that would qualify him to testify about design defects in a vehicle's accelerator or restraint system. Nor has Lowry been shown to be qualified to testify as to the cause of Jaime's injuries or death.[632]

The next engineer was also defective in terms of his qualifications on causation but not about the seat belt:

> Huston, too, lacks any qualifications to testify concerning the cause of Jaime's death. However, Huston has been shown to be qualified to testify about defects in the rear seat belt of the Gammills' vehicle. He is a licensed engineer with a long academic career. He has researched vehicular restraint systems, some of them like the system in the Gammills' vehicle, and has published articles on the subject. He has also testified in numerous cases involving allegations of seat belt defects.[633]

For these reasons, then the court concluded that "the district court abused its discretion in holding that Huston was not qualified to testify that the rear restraint system in the Gammills' vehicle was defective."[634] On the other hand, however,

> [o]nly Lowry opined that the wiring harness in the Gammills' vehicle was defectively placed. Because Lowry was properly disqualified as an expert, the Gammills have no evidence to contradict defendants' experts' affidavits that the wiring harness was not defective and could not have caused the accident. Thus, the Gammills have failed to raise an issue of fact regarding defendants' liability for Deborah's injuries. The statement in Huston's affidavit that Deborah's seat belt "did not prevent her incapacitating injuries from the impact and occupant compartment intrusion" merely states the obvious; Huston's affidavit does not say that Deborah's seat belt should have prevented her injuries. The Gammills do not allege any defect in Deborah's seat belt.[635]

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[632] *Id.*
[633] *Id.*
[634] *Id.*
[635] *Id.*

The court then analyzed the next issue, whether

> Huston's affidavit regarding the rear seat belt raises fact issues concerning defendants' liability for Jaime's injuries and death. This issue is not resolved by our conclusion that Huston was not qualified to opine on the cause of Jaime's death. Defendants' summary judgment evidence is that Jaime was not wearing her seat belt and that it was not defective.[636]

In this summary judgment analysis, the court proceeded to consider the fact issue whether the child would have died even if the seat belt was defective … as the plaintiffs allege. If the fact issue remained concerning whether this seat belt were defective, then the summary judgment was improper.[637] In reaching its conclusion, the court relied upon Texas Rue of Evidence 702, *Daubert*, the Texas Court of Criminal Appeals decision in *Kelly v. State*[638] and the *Robinson* case. A proponent of scientific evidence through testimony must demonstrate that the evidence is (1) relevant and (2) reliable before it may be admitted.[639]

While the plaintiffs conceded that the Huston's testimony was scientific, based, as it was in mechanical engineering, the reliability prong "is reserved for opinions based on novel science, as opposed to established science."[640] Are opinions based upon an expert's individual skill, training, or experience, subject to this *Robinson* reliability test? Some theories are so well established, thermodynamics, for instance, that they are admitted subject to judicial notice.[641]

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[636] *Id.* at 719-20.
[637] *Id.* at 720.
[638] *Id.* (citing 824 S.W.2d 568 (Tex.Crim.App.1992)).
[639] *Id.* at 720.
[640] *Id.*
[641] *Id.* at 721.

The Texas court cited *Kelly* and stated that the holding in that case did not limit the two-pronged relevance-reliability standard to novel scientific evidence.[642] Can there be a different rule for "hard core science" and another rule for "quasi science?" Could it be possible, perhaps, that some science is more reliable than other science or is all science real, dependable, reliable *science*? The Texas Supreme Court reasoned out the answer to this exact topic:

> The Supreme Court in *Daubert* directly addressed the issue in a footnote, stating "[a]lthough the *Frye* decision itself focused exclusively on 'novel' scientific techniques, we do not read the requirements of Rule 702 to apply specifically or exclusively to unconventional evidence."[643] The Supreme Court noted that "under the Rules, the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable."[644] We likewise see no value in having a different standard of admissibility for novel scientific evidence.[645]

Further this court concluded that there is a consensus of the federal courts on *Daubert's* scope in that it is not limited to novel scientific methodologies but that it extends to all scientific evidence. Science must be scientific at all levels whether innovative or not and the same standard applies in all analyses.[646]

The rule in Texas is that all scientific testimony, of whatever nature, falls into the same reliability analysis, and moreover, Texas will follow the various federal circuits. To

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[642] *Id.*
[643] *Id.* (citing Daubert, 509 U.S. at 593 n. 11, 113 S.Ct. at 2796 n. 11.
[644] Id. at 589, 113 S.Ct. at 2795 (emphasis added).
[645] *Id.*
[646] *Id.* at 721 n. 22. (citing Watkins v. Telsmith, Inc., 121 F.3d 984, 991 (5th Cir.1997) ("We cannot agree ... that Daubert only applies when 'unique, untested or controversial methodologies or techniques' are relied on by the expert."); Southland Sod Farms v. Stover Seed Co., 108 F.3d 1134, 1143 n. 8 (9th Cir.1997) ("Daubert 's holding applies to all expert testimony, not just testimony based on novel scientific methods."); Peitzmeier v. Hennessy Indus., Inc., 97 F.3d 293, 297 (8th Cir.1996), cert. denied, --- U.S. ----, 117 S.Ct. 1552 (1997) (refusing to limit Daubert 's application to novel scientific testimony); Tyus v. Urban Search Management, 102 F.3d 256, 263 (7th Cir.1996) ("[W]e do not agree ... that [Daubert 's application] is limited to cases of novel scientific theories or methodologies."). But cf. Compton v. Subaru of America, Inc. 82 F.3d 1513, 1519 (10th Cir.1996) ("Subsequent to Daubert, we have continued to apply essentially the same Rule 702 analysis except in cases involving unique, untested, or controversial methodologies or techniques.").

illustrate this point about some experts being expert in one field but not another or the facts that some knowledge is "common" and requires no expert testimony the court quoted from *Berry v. City of Detroit*.[647]

> [I]f one wanted to explain to a jury how a bumblebee is able to fly, an aeronautical engineer might be a helpful witness. Since flight principles have some universality, the expert could apply general principles to the case of the bumblebee. Conceivably, even if he had never seen a bumblebee, he still would be qualified to testify, as long as he was familiar with its component parts. On the other hand, if one wanted to prove that bumblebees always take off into the wind, a beekeeper with no scientific training at all would be an acceptable expert witness if a proper foundation were laid for his conclusions. The foundation would not relate to his formal training, but to his firsthand observations. In other words, the beekeeper does not know any more about flight principles than the jurors, but he has seen a lot more bumblebees than they have.[648]

> We conclude that whether an expert's testimony is based on "scientific, technical or other specialized knowledge," Daubert and Rule 702 demand that the district court evaluate the methods, analysis, and principles relied upon in reaching the opinion. The court should ensure that the opinion comports with applicable professional standards outside the courtroom and that it "will have a reliable basis in the knowledge and experience of [the] discipline." We agree with the Fifth, Sixth, Ninth, and Eleventh Circuits that Rule 702' s fundamental requirements of reliability and relevance are applicable to all expert testimony offered under that rule. Nothing in the language of the rule suggests that opinions based on scientific knowledge should be treated any differently than opinions based on technical or other specialized knowledge. It would be an odd rule of evidence that insisted that some expert opinions be reliable but not others. All expert testimony should be shown to be reliable before it is admitted.[649]

A court should never admit evidence simply on the authority of the expert witness' background, skills, training, or experience. The court must look outside of that

[647] 25 F.3d 1342 (6th Cir.1994).
[648] 972 S.W.2d 713, 724-25. (quoting Berry, 25 F.3d 1342, 1349-1350).
[649] *Id.* at 725-26.

authority to meet the *Daubert* standard and, in this case, those of *Robinson*.[650] Admission of scientific evidence is never based upon an expert saying that "it is so."[651]

In conclusion on this crucial topic, then, the Texas Supreme Court stated:

> … [T]he clear weight of federal case law supports applying the relevance and reliability requirements of Rule 702 to all expert evidence offered under that rule, even though the criteria for assessing relevance and reliability must vary, depending on the nature of the evidence. Because we are persuaded that this construction of federal Rule 702 is correct, because our rule is identical but for one comma, and because there is much to be said for maintaining as much uniformity in state and federal evidence rules as possible, we hold that the relevance and reliability requirements of Texas Rule 702 apply to all evidence offered under that rule, and that the trial court must determine that these requirements have been met before admitting the evidence.[652]

Where the district court judge concluded that Huston's testimony was unreliable, there was "simply too great an analytical gap between the data and the opinion proffered."[653] The "analytical gap" between the data in this case and Huston's opinion was not shown to be due to his techniques in assessing the vehicle restraint system. On the contrary, Huston based his conclusions on observations and testing similar to those employed by defendants' experts. Rather, the "gap" in Huston's analysis was his failure to show how his observations, assuming they were valid, supported his conclusions that Jaime was wearing her seat belt or that it was defective. The district court was not required, in Joiner 's words, "to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert."[654]

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[650] *Id.* at 726.
[651] *Id.* (citing Merrell Dow Pharmaceuticals, Inc. v. Havner, 953 S.W.2d 706, 712 (Tex.1997) (citation omitted).
[652] *Id.* at 727.
[653] *Id.* (citing General Electric Co. v Joiner, 522 U.S. 136, XXX, 118 S.Ct. 512, 519 (1997).
[654] *Id.* at 727 (citing Joiner, 522 U.S. at ----, 118 S.Ct. at 519).

Huston based his opinion on his opinion that the child was wearing her seat belt on abrasions which were found on the body and upon clothing fibers found in the seat belt webbing but he did not specify "the gliding abrasions" on the body or his basis to attribute them to the seat belt. Further, he failed to explain the basis for his conclusion that the markings were distinctive or in what way they were typical for seat belt loading. Additionally he only concluded that the fibers were apparent shirt fibers, not that they were, in fact contained in the seat belt webbing. In addition, he failed to explain the post-accident position of the body.[655] The court concluded that his opinion represented "little more than [a] subjective belief or unsupported speculation."[656]

§ 20.1 Accident Reconstruction Experiment Fails Admission:

First Midwest Trust Company v. Rogers,[657] concerned an accident reconstruction where the issue was whether drivers could see one another; one driver in a snowplow, the other in an automobile. When a municipal snowplow drove across Route 45 at the intersection with County Road 500N, the snowplow driver did not see the car which traveled northbound on Route 45. The snowplow driver plead guilty to failure to yield the right of way; the automobile vehicle driver died.

> Jerry suffered severe injuries, including a closed head injury resulting in bleeding into the brain, facial lacerations, multiple rib fractures, a lacerated and ruptured lung, broken left leg and hip, dislocated hip, and right ankle, spinal, skull, and jaw fractures for which he underwent several surgical procedures. He remained hospitalized for 3 1/2 months during which he was given an artificial airway and feeding tube and placed on a respirator. He remained in a coma for many months, gradually regaining consciousness during the summer of 1993. In June 1993, he was moved to a nursing home. He had continuous difficulty with infections and was occasionally readmitted to the hospital for treatment. In September 1993, he returned to the hospital for rehabilitation. In December 1993, he was discharged to

[655] *Id.*
[656] *Id.* at 728.
[657] 701 N.E.2d 1107 (Ill. App. 1998).

> the Oddfellows Nursing Home, where Dr. Mark Dettro took charge of his medical care. Dr. Dettro testified that Jerry's head injury had caused a central nervous system dysfunction, leaving him unable to walk, speak, swallow, feed himself, or reposition himself in bed. He never regained those functions, receiving all food, liquid, and medication through a feeding tube and spending 95% of his time in bed. On October 14, 1995, Jerry died of pneumonia. Jerry's medical treatment and nursing home care costs totaled $761,531.70.[658]

Settlement negotiations broke down[659] then the case went to trial and the jury awarded damages based upon the snowplow driver's negligence but found 50% comparative negligence. Both parties appealed. One evidentiary issue on appeal was whether the trial court erred in allowing the defendant's accident reconstruction expert to testify. The plaintiff objected on the basis that the experiment the expert performed and his opinions which derived from those experiments did not meet the admissibility standards. The appellate court agreed and reversed.[660] The plaintiffs filed motions in limine prior to trial to exclude this expert's testimony on several important grounds:

> (1) accident reconstruction testimony should not be admitted when eyewitness testimony is available; (2) [the expert's] … proposed testimony did not meet the standards for admissibility of expert reconstruction testimony because it lies within the ken of the average juror; (3) [the expert's] … testimony was based on unreliable data because experimental conditions did not substantially replicate the conditions at the time of the accident; and (4) [the expert's] … testimony was highly speculative.[661]

> The trial court considered the expert's testimony by deposition which showed

> that (1) weather and road conditions during the experiment differed substantially from conditions at the time of the accident; (2) [the expert's] … methodology was subjective; (3) he made several assumptions regarding the conduct of … [the respective drivers]; and (4) he was unable to use his usual formula for calculating experimental values.[662]

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[658] *Id.* at 1109-10.
[659] *Id.* at 1111. The pre-trial settlement offer was $4.5 million dollars.
[660] *Id.* at 1112.
[661] id
[662] *Id.*

Despite this analysis, the judge permitted the expert witness to testify and he expressed his opinions exactly as he did in his deposition:

> What I tried to do was estimate the speeds of the two vehicles at impact. I calculated their relative speeds with a momentum analysis. I estimated the absolute speed of [… the snowplow] from experimental data which I took on 9 May [1995], and then I did some calculations … to show where [Jerry] would have been at the moment that [Rogers] began to move [forward from the stop sign]." One of the values Metz needed to complete his calculations is the common velocity of the vehicles after collision, which is normally calculated using a formula based on the friction characteristics of the road (friction coefficient) and how far the two vehicles slid. However, Metz was unable to use the normal formula because (1) the vehicles rolled over rather than slid; and (2) he was unable to determine the friction coefficient for Route 45. Instead, Metz designed an experiment to provide him with the necessary information. Metz described his experiment as follows: "I had Mr. Rogers stop at the stop sign as he testified he did on the day of the accident. I instructed him to drive the vehicle straight across the road as closely as he could remember to the way he drove it when the accident occurred and I had him repeat it two or three times to get the feel of it and we took five successive runs' worth of data." In his deposition, Metz acknowledged that he did not know of any authority in the literature for utilizing this type of experiment for reconstruction, but stated, "I've done it many other times, both experimentally and theoretically." As a result of this experiment, Metz determined that Rogers' vehicle was moving at "a little over seven miles per hour" at the time of the collision. He based all other calculations and his opinions on this experimental data. Metz calculated Jerry's speed at impact (37 to 38 miles per hour). He then calculated the distance it would take Jerry to stop his vehicle, based on (1) a normal perception reaction time (the interval between first perceiving danger and then reacting to it) beginning when Rogers first pulled away from the stop sign; (2) an assumed friction coefficient for Route 45 of 0.7; and (3) two different assumptions for the speed of Jerry's vehicle, 55 miles per hour and 40 miles per hour. Based on either speed assumption, he concluded that Jerry could have avoided the accident by "simply lifting his foot off of the throttle when Mr. Rogers first began to move from the stop sign." On cross-examination, Metz testified that the stop sign was located about 30 feet back from the edge of Route 45, and Jerry was traveling north in the lane farthest away from Rogers' vehicle. When Jerry first saw the snowplow move, it would have been moving slowly, having 30 feet within which to come to a stop before it even reached the west side of Route 45 (at the southbound lane). According to Metz, Jerry could reasonably have assumed that (1) the snowplow was going to (a) stop again at the highway's edge, or (b) turn south on Route 45 (rather than cross it); and, (2) if he could see the snowplow, its driver could see him.[663]

[663] *Id.* at 1112-13.

This court began its analysis with the point that the proponent bears the burden, when introducing experimental reconstruction evidence, "to show that the essential conditions of the experiment were the same as those at the time of the accident."[664] This court used the "substantially similar" standard found in other case analyses but this determination lies within the court's "sound discretion."[665]

This was the experimental regime and the court's analysis:

> [T]he essential conditions include (1) the road configuration, (2) road conditions, (3) weather conditions, (4) the snowplow vehicle, and (5) Rogers' driving. Two conditions were similar; the road configuration had not changed and the snowplow used was the same one Rogers had driven the day of the collision. (The snowplow supposedly contained an amount of rocks to replicate the amount of snow it contained on the day of the collision, but Metz admitted it was impossible to know whether it was loaded identically.) However, other essential conditions of the experiment differed substantially from conditions on the day of the collision--namely, the road and weather conditions and Rogers' driving. Rogers testified that on the day of the accident, it had been snowing, the sky was gray and overcast, and snow was on the roads. In contrast, on the day of the reenactment, the roads were clear and dry and it was not snowing. Metz conceded that he was unable to completely reconstruct this accident because the weather was very different on the morning of the collision. He also had essentially no information regarding the road surface conditions on Route 45 and County Road 500N or their friction coefficients. More important, Metz admitted that his methodology was subjective. He asked Rogers to drive the snowplow in a manner similar to the way he drove on the day of the collision. Regarding the effect of Rogers' driving on the experiment results, Metz testified: "If Mr. Rogers had accelerated on the day of the accident fast enough to spin his wheels, let's say, then the ultimate traction between tire and snow would make a difference, but he accelerated[,] in fact, very gently [during the experiment] and anyone can do that." Putting aside Rogers' self-interest in driving particularly carefully during the experiment, we note that Metz recorded five trials with times varying from 7 to 10 seconds, a difference of 30%, according to Metz. Metz then used the mean derived from these five trials to perform his calculations. In the present case, the road and weather conditions--two essential conditions--during the experiment varied significantly from those at the time of the collision. Additionally, the trial court had no way of knowing whether Rogers' driving duplicated his driving at the time of the collision. Because the essential conditions of the experiment varied

[664] *Id.* at 1113.
[665] *Id.*

> significantly from those existing at the time of the collision giving rise to litigation, the court here should have excluded the evidence derived from the experiment.[666]

The court then went on to conclude that this "experiment" could never meet the *Frye* standard.[667] This whole activity was far too speculative to meet *Frye*.[668] "If the basis of an expert's opinion includes so many varying or uncertain factors that he is required to guess or surmise to reach an opinion, the expert's opinion is too speculative to be reliable."[669] Additionally, the defendants

> point to no scientific literature addressing or testing this method, nor to any scientist or expert (other than Metz himself) using such an experiment in accident reconstruction. In fact, Metz admitted that, although he had used this type of experiment many times, he knew of no authority in the scientific literature that supported it. In this case, the experiment results provided the foundation for all of Metz's calculations, conclusions, and opinions. Yet the experiment's reliability and validity are highly questionable because of the differing conditions, subjective methodology, and assumptions on which it was based.[670]

The experiments failed the more "liberal" *Daubert* standards as well for the admission of novel scientific evidence.[671]

§ 21 Junk Science:

This discussion has now progressed to the point where it is time to introduce the concept of "junk science;" an area of law and science dominated by grays, confusion, mistrust, and hard feelings between both plaintiff and defense lawyers. This is where, in the law of scientific evidence, "where the rubber *almost* meets the road," where the trial court's intellectual and powers of legal analysis in its discretion is the most tested and

[666] *Id.* at 1113-14
[667] *Id.* at 1114.
[668] *Id.*
[669] *Id.* [citation omitted]
[670] *Id.* at 1115.

where the most intense scrutiny is placed on cases like *Frye*, *Daubert*, and *Kumho Tire* and their progeny.

Succinctly, the term "junk science" refers to unsupported science to which experts will testify. Some examples include electromagnetic radiation from power lines causing injury to livestock; cellular phones causing brain cancer; the whole arena of the "environmentally sensitive" patients including folks who claim to suffer from infinitesimal levels of formaldehyde or from exposure to radon gas to those who claim sensitivities to dairy products; high frequency sound waves, imperceptible to the human ear causing depression; and, finally, all of the undiagnosable conditions which abound in modern personal injury litigation. Some examples include reflex sympathetic dystrophy, fibromyalgia, and the sequelae from the low speed collision. One side points to injuries without much or any objective evidence; the other side points to no injury. The fact that a theory is novel does not make it "junk science." What makes a theory "junk" is the failure to meet or to even approach the "*Daubert* four;" where the theory is based upon speculation or conjecture; introduced with "smoke and mirzors," where the "king" is paraded around for all to see but "he wears no real clothes."

§ 21.1 Junk Science, Greed, and Admissibility of Evidence:

There is a cottage industry in tort litigation which attempts to transform and manufacture unscientific evidence into an admissible "product."[672] Both sides of the

[671] *Id.* (citing *Daubert* v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 594-95, 113 S.Ct. 2786, 2797-98 (1993).
[672] *See*, Bruce H. Stern, *Representing the Mildly Brain-Injured Client*, TRIAL, September 2000 at p. 48. This article discusses the need to present testimony, in these case, of a biomechanical engineer, a neurologist, a physiatrist, a life-care planner, and a vocational economist.

counsel table participate.[673] The industry exists in automobile litigation as well as in medical negligence litigation and is seen in criminal prosecution as well as in defenses. Consider the "twinkie defense," for instance, where a youthful murderer claimed too much sugar impaired his reason.

In automobile litigation, what one experiences are medical claims of fibromyalgia leading to total disability following a collision which occurred at less than 5 miles per hour. Another claim is the development of reflex sympathetic dystrophy in a limb following low speed collision.

Junk science oozes out in the low impact collision case where a case traditionally worth $1,000 can ascend in value, with favorable testimony, to $100,000. From the defense side, the converse is also true; a case worth $100,000 may be diminished to $10,000 with "favorable science."

To understand what the "junk" proferrers argue, let's return to the physics equation which began the monograph: $m_1v_1 = m_2v_2$. The plaintiff argues that all that energy, even at low speed, went right to the driver's neck; the defense argues the opposite.[674]

The Colorado Trial Lawyers Association recently held a CLE program entitled *New Approaches to Low Impact Automobile Collision Litigation* in which they featured discussion on numerous topics including Mr. Mark Reiser's talk "Debunking the Professional Engineer's Basis of Concluding No Property Damage Means no Injury." Other topics included how to deal with minor impact, soft tissue defenses. Suffice it to

[673] According to one source, "over $29 billion [dollars] per year is spent on whiplash injuries in litigation in the United States alone." M.D. Freeman, *A Study of Chronic Neck Pain Following Whiplash Injury*, UMI Dissertation Services, Ann Arbor, MI (1998) no. 9820108.

say that all of this lies at the periphery of what is admissible under *Frye*, *Daubert*, and *Kumho Tire*. The general litigation momentum is to permit an expert to testify and for the jury to then weigh the weight and credibility of the testimony. The threshold, however, would be whether the theory itself "holds water" and typically this is decided in the pre-trial motion in limine.

The plaintiff's Bar has also developed challenges to defense "junk science" defenses. In particular there is Richard Howard, MD, a professional witness who offers opinions on biomechanical issues as his stock and trade. According to a brief filed in a case, his background, skills, training and experience in this area is nil; the bases for his opinion have been characterized as unproven, unsubstantiated, and scientifically rejected. The defense uses this witness to show that clients suffer no injury in motor vehicle accidents.[675] There are other physicians and other scientists who work for either the plaintiff or the defense in this gray area.

A chiropractor, Arthur C. Croft, DC, M.Sc., F.A.C.O., wrote an article entitled *Whiplash Injuries and Low Speed Collisions: Confessions of an Accident Reconstructionist*,[676] where he has detailed the physics behind his interpretation of the injury mechanisms of low speed collisions. According to his article "large epidemiological studies have shown that nearly 80% of whiplash injuries occur at crash speeds below about 12 mph."[677] He points out that, in his conclusions, vehicle damage

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[674] That no energy was transferred to the patient's neck.
[675] *in re* Rattler, Cause No. 94-CI-12882, 150th Judicial Court, Bexar County, Tx. For information contact Mr. David Adkisson, 850 Alamo National Building, 105 S. St. Mary's St., San Antonio, TX 78205; phone: 210-472-0500, fax 210-472-0515.
[676] Arthur C. Croft, DC, M.SC., F.A.C.O., wrote an article entitled *Whiplash Injuries and Low Speed Collisions: Confessions of an Accident Reconstructionist*, FORUM July/August 1997 at page 10. (This magazine is published by the Consumer Attorneys of California.
[677] *Id*. at 11.

does not correlate to occupant injury in the low impact ranges. He supports his theories with twenty literature references.

Since admissibility of this "science" is at the trial court's discretion, counsel for both sides must be aware when to challenge the testimony and when to leave it alone. Sometimes it is better to have the opponent offer a preposterous trial theory and let the jury dispose of the theory in their deliberations. Juries have a sense of "reason," a sense of fairness and of propriety, and, frankly, juries are expert "rat detectors." Juries will "smell a rat" and will retaliate when it senses that one party is trying to "head fake,"[678] to pull the wool over the jurors collectively keen eyes.

There is considerable jeopardy of trying to "get" more than that which a jury might ordinarily be willing to provide. Favorable verdicts are rarely overly generous and, in this author's opinion and experience, to complicate and potentially compromise a marginal to good case by offering questionable scientific evidence may destroy what would be otherwise a successful outcome … for either party.[679]

§ 22 Cross-Examination Ameliorates Evidentiary Discretion:

No trial court is perfect and some judges will see an admissibility issue one way while another judge will see it in a different way; each, as the above cases have demonstrated, having a legitimate analytic basis. As has been hammered in the analyses which proceeded these line of cases, appellate courts rarely disturb these evidentiary "calls." If appellate courts were willing to provide "instant replay" services, no case would ever conclude. There is, however, a powerful force with which evidentiary

[678] To borrow a basketball term meaning to go in one direction while really moving in an opposite direction.

discretionary calls may be fine tuned and "adjusted." This is the fine art of cross-examination.

When confronted with what one side may perceive as a "terrible call," the judge admitted a witness or the judge permitted testimony on a subject with which counsel does not agree, take out the cross-examination bat, and stand up to the plate. Cross-examine on credentials; cross-examine on the *Daubert* four; cross-examine on the faulty assumptions which underlie the testimony; whack at the faulty logic, the unscientific posture opposing counsel has taken. Then allow the jury to decide.

Any expert has vulnerabilities. For instance, typically expert witnesses do not see the patient as a "patient." Their review is a "paper" review. Exploit that avenue. "So you have never seen Ms. Jones, yet you are certain that your opinion _____ is accurate?"

Nearly any expert may be cross-examined on a variance in specialized knowledge with respect to the other proffered testimony. "You are a neurosurgeon, but not an orthopedist? So, since your background, skills, and experience are different, your analysis here of _____ differs from Dr. Smith, who does these procedures "every day of the week?"

Look for a lack of knowledge of this case, in records reviewed, in a failure to read crucial depositions. Look for arrogance and exploit these factors. "Your opinion would change had you gone to the trouble to see the MRI films?; Had you read the [the

[679] My mother has always advised, "Don't be a *chazer*." A *chazer* is the Yiddish term for "pig." Lawyers who try to "get too much," who attempt to overreach, on either side, risk disaster, in this author's, and in the author's mother's, opinion.

plaintiff's][680] deposition, you would have known _____, and that would have affected your opinion?"

Sometimes a direct assault on the scientific opinion is warranted and this may be accomplished in a most direct way by the use of cross-examination. Use standard authorities which the witness has cited, deposition testimony in the case at bar, and former testimony and oppose these with what the witness says at trial. Who "is telling the truth" will be revealed. Further, when an inexperienced witness is confronted in this manner, the response may be hostile and offensive. Consider an interchange like this, for instance:

Q: Doctor Wilson, your position is _____. Yet, Dr. Watson, a full professor in neurosurgery at the Mayo Clinic says that _____. He has supported his theory with these articles [a six inch stack], this text book, which he wrote, and depositions by these other nine expert witnesses in this case. Yet you believe that you are correct on this causation issue?

A: Yes. They might think that way, but they are wrong.

Q: All wrong?

A: Yes

Q: Doctor, would you please produce for the jury the articles which support your theory? The testimony of other experts who agree with you? Your clinical professorships you have held in the past 40 years as did Dr. Watson.[681]

[680] Never refer to the plaintiff as THE PLAINTIFF when she is your client. The converse is true with THE DEFENDANT. These terms ring harshly in the juror's ears. Always use "Mr." or "Ms." or "Mrs." The court room is a formal setting, the proceedings are austere. No juror would feel as if the attorney were disrespectful by this approach. For these reasons, the author recommends that attorneys not refer to parties or any witnesses by their first name … except in opening and closing statements or where a dramatic humanizing effect is desired. Never refer to any person by using a diminutive form as a way to belittle or to harass. For example, "Dr. Bob [his first name], with no scientific support anywhere, you expect the jury to accept this theory as true?" Sarcasm, innuendo, doubt are the "surgical" tools of the trade of cross-examination, but great care must be taken not to offend juror sensibility by "cutting to the bone" with the tools. One technique which is respectful and dignified, yet devastating, is to have an expert witness write the support for the opposing theories on one side of a black board and to then write the support for his theories on the other. Since both theories are equally treated, and there is no disrespect, sarcasm, innuendo, or mockery, the jury will comprehend the differences and be able to logically analyze which theory should prevail.

A:

[He produces nothing and muddles around the witness box …]

This next case illustrates some of these principles in action.[682]

In *Lai v. St. Peter*,[683] after an automobile collision, the plaintiff sued and the jury found for the defendant. On appeal one issue was the admission of expert physician testimony and the cause of the plaintiff's injuries. Since this evidence was sufficient to support the jury verdict, the plaintiff was not entitled to a new trial.

The defense qualified a neurosurgeon as an expert witness in neurosurgery as well as in the field of the "care, treatment, studies, and causes of back injuries" and the court then heard testimony about an independent medical examination (I.M.E.) he had performed on the plaintiff.[684] The defense medical examiner ascribed the "back injury" not to the accident but as a consequence of "prolonged sitting."[685] This expert witness differentiated tissue injuries resulting from these low-speed injuries, less than five miles per hour, from the back as it would appear after prolonged sitting. His opinion was based upon "engineering studies he had learned about at an American Back Society seminar, as well as his own findings and experiences."[686]

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[681] The lawyer has the option of drawing this out for quite some time … but again, beware. Once the point is well made, jurors favor the underdog and to embarrass and humiliate an expert witness may throw some mud on the examiner, as well.

[682] To anticipate adverse ruling comes from experience. The lawyer must be ready to move ahead with a grueling, but not offensive, cross-examination. Remember, in cross-examination, with leading questions, it is the lawyer's opportunity to testify!

[683] 869 P.2d 1352 (Haw. Ct. App. 1994).

[684] *Id.* at 1358.

[685] *Id.*

[686] *Id.*

Under the Hawaii Rule of Evidence 703,[687] an expert witness may rely upon evidence which was not actually admitted at the trial:

> If [the evidence is] of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence. The court may, however, disallow testimony in the form of an opinion or inference if the underlying facts or data indicate lack of trustworthiness.[688]

For the plaintiff, this was a serious challenge. The plaintiffs argued that there was no evidence on the record about the actual speed of the collision so the expert witness should not have been permitted to testify about such an assumption. The neurosurgeon based his opinion, however, on hypothetical data that the car was traveling at less than five miles per hour.[689] Since expert witnesses "may rely upon '(f)acts, data, and opinions not yet received in evidence ... subject to later introduction,'"[690] as well as data which *never* is introduced into evidence, the trial court did not abuse its discretion. This expert witness was taken out of order so that the basis for some of his opinion had yet to be introduced.

The doctor then testified as follows:

> Q. So let me turn then to your opinion, Doctor, to a reasonable degree of medical certainty as to what is the cause of the dysfunction that Ms. Lai is complaining of?
> A. When I saw her it was because of a sacroiliac joint dysfunction. That joint in the area of the buttocks. It's related to prolonged sitting. It's not related to any discrete trauma that happened when this automobile accident occurred. Another thing I should mention, I didn't mention this before, at our last American Back Society meeting which was in December last year we had some scientific lecture [sic] pointed out that low velocity under five miles an hour, does not cause tissue damage.
> [PLAINTIFFS' COUNSEL]: Objection, Your Honor. No foundation as to qualify as to the velocity of collisions, Your Honor.

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[687] Substantially similar to Fed.R.Evid. 703 *Id.* at 1359.
[688] *Id.*
[689] *Id.*
[690] *Id.* at 1360.

> THE COURT: I'm sorry. Approach the bench on the record.
> (Bench conference out of the hearing of the jury:)
> THE COURT: On the record I don't understand your objection.
> [PLAINTIFFS' COUNSEL]: He's not testifying as on how velocity versus low velocity in the force impact. This is an area of physics, Your Honor. He's a doctor of neurosurgery. He's not a doctor of forces of impact, Your Honor, and there's no--there has been no foundation he's had studies in it. There's no foundation that he's made any studies that there has been no foundation; he wasn't qualified for that purpose.
> THE COURT: Overruled. The rules of evidence allow inquiry into the basis of the conclusion which he has rendered in this case or opinion. In this case the evidence has, I am sure, was given to him as a history within the case important of a low velocity impact. Therefore, inquiry into the area has been appropriate. Further he based history significance or his pain somewhat on the study that it was represented to him at the last meeting. It is something that he can present to the jury. You can cross-examine if you want.[691]

The court found this witness qualified to express his opinion,[692] and, although he did not have personal experience with the low-impact velocity impact and repetitive trauma studies, "his lack of experience and knowledge of the subject matter goes to the weight, rather than the admissibility of his testimony."[693]

The plaintiff objected that the basis of the testimony was based upon a study which lacked proper foundation and constituted hearsay. The study author was never disclosed, the study was never marked as an exhibit or even entered into evidence, and "there was no showing that the test conditions upon which the study was based were substantially similar to the rear-end collision in the instant case. Moreover, Plaintiffs argue that there was no evidence presented that the theories espoused by the study were accepted by the medical community."[694]

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[691] *Id.* at 1361.
[692] *Id.*
[693] *Id.*
[694] *Id.*

Hawaii Rule of Evidence 703 has a liberalized view of the bases for expert testimony and "an expert is allowed to express an opinion based on facts and data which are not admissible into evidence if the facts and data are "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.'"[695]

The court reasoned:

> … [b]ecause of the Federal Rules[']s emphasis on liberalizing expert testimony, doubts about whether an expert's testimony will be useful should generally be resolved in favor of admissibility unless there are strong factors such as time or surprise favoring exclusions. The jury is intelligent enough, aided by counsel, to ignore what is unhelpful in its deliberations.[696]

Cross-examination is liberal in Hawaii under Haw. R. Rv. 702.1 provides:

> Cross-examination of experts. (a) General. A witness testifying as an expert may be cross-examined to the same extent as any other witness and, in addition, may be cross-examined as to (1) the witness' qualifications, (2) the subject to which the witness' expert testimony relates, and (3) the matter upon which the witness' opinion is based and the reasons for the witness' opinion. (b) Texts and treatises. If a witness testifying as an expert testifies in the form of an opinion, the witness may be cross-examined in regard to the content or tenor of any scientific, technical, or professional text, treatise, journal, or similar publication only if: (1) The witness referred to, considered, or relied upon such publication in arriving at or forming the witness' opinion, or (2) Such publication qualifies for admission into evidence under rule 803(b)(18).[697]

Here, the Hawaii court analyzed the difference between lay and expert witnesses:

> An expert witness differs from a lay witness principally in his ability to draw and to testify to inferences that are beyond the competence of the trier of fact. In addition, the expert is not restricted to firsthand knowledge and may base his opinions and inferences on a wide variety of data and facts perceived by him or made known to him, whether or not they are admissible in evidence, [citation omitted] Such a broad testimonial range suggests the need for an equally broad cross- examination, and subsection (a) of this rule provides the appropriate latitude.[698]

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[695] Haw. R. Rv. 703. *Id.*
[696] *Id.*
[697] *Id.* at 1361.
[698] *Id.* at 1361-62.

With ample opportunity to cross-examine, there was no reversible error, but, perhaps, with better cross-examination, the jury might have seen the case in other light.

§ 22 Basis of Expert Witness Analysis:

Fed.R.Evid. 703 permits an expert witness wide latitude upon which she may base her opinion: "… a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject." There is no requirement that an expert witness consider all evidence in a case or, as the next case illustrates, every bit of data the claimant may wish the expert witness to consider.

In *Johnson v. Talley*,[699] two years after a rear-end collision, from which the plaintiff never sought medical treatment, she claimed that she had a torn right rotator cuff. Evidence showed that she failed to disclose prior injuries to her own treating physician and to the defense medical examiner.[700] The plaintiff claimed that the examiner did not adequately consider her medical conditions and wanted to exclude his testimony as unreliable on that basis. The court did not trifle with this issue and affirmed.

An expert witness, in coming to her opinions, may review materials as she chooses and the opinion will go to the weight and credibility of the witness but not to whether the opinion itself is admissible. Once the expert witness is herself qualified in the field, she may base her upon as much or as little data as she deems is necessary to form her opinion. The witness would be subject to cross-examination and to jury excoriation, however, where the witness chose to selectively review materials.

§ 22.1 Police Officer may Testify on How the Accident Happened:

[699] 1999 WL 61008 (Ohio App. 1999) (unpublished opinion).
[700] *Id.* at *1.

In *Wester v. Bruggink,*[701] the defendant crossed the center line and collided head-on with the plaintiff. The investigating officer gave the opinion that the point of impact was in the defendant's lane. After a generous verdict, the defendant appealed about whether the officer's testimony was properly admitted as either lay or expert opinion testimony. This court concluded that the policeman's testimony was not proper lay opinion testimony because it was not based upon his perception of the event. However, the testimony was proper expert testimony. To what degree are policemen expert witnesses? And what, precisely is their field of expertise?

At trial, there was the battle between the experts. The plaintiff's expert saw the accident circumstances this way: "… a gouge mark in [the plaintiff's] … lane showing where "the [the plaintiff's] … vehicle hit the roadway and made an actual displacement in the asphalt surface."[702] Further, he based his conclusions upon the resting positions of the vehicles after the collision. Finally, there were no gouge marks in the defendant's lane.

> The defense came at this from another angle, so to speak, basing
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> … his conclusions in part on descriptions of the physical evidence provided in the investigating officer's accident report and supplemental report. The expert testified that the description was that "there were a pair of skid marks in the eastbound lane produced by … [defendant's vehicle] , that the skid marks were roughly twenty feet long and then had a sharp bend or kink to them, and that, at that point where the bend or kink to the skid marks was located ... an area of maximum engagement." The engagement point was characterized by gouge marks.[703]

Interestingly, the defendant's expert did not go to the accident scene, whereas, the plaintiff's accident reconstructionist expert did go to the scene. The judge never decided

[701] 527 N.W.2d 373 (Wis. Ct. App. 1994).
[702] *Id.* at 376.
[703] *Id.*

whether the officer was qualified as an expert witness but ruled that his background, training, and experience made him competent to testify and to offer opinions.[704]

In general, in Wisconsin, citing *Milwaukee v. Bub*,[705] policemen are not qualified to testify about the analysis of point of impact data in an automobile collision and "it takes an understanding of technical and scientific accident reconstruction principles to assess the point of impact from gouge and skid marks and debris at the accident scene."[706] This area of expertise lies within the realm of science, requiring

> a solid understanding of mathematics, physics, mechanics, and the other scientific principles involved, a keen eye for recognizing important but sometimes nearly obscure evidence, judgment in assessing the significance of the available and often times conflicting evidence, and patience to continue to ferret out all of the facts surrounding accidents so that the pieces of the puzzle are fit together to produce reasonable and sound conclusions.[707]

In this particular case

> [b]oth experts testified that the location of gouge marks is an important indicator of point of impact. [The defendant's] … expert testified that skid marks leading to gouge marks is an indication of point of impact. The officer similarly testified to the importance of gouge marks and that he relied on his knowledge about gouge and skid marks to make his assessment, as did both experts. Thus, we hold that the foregoing facts of record support the admissibility of the officer's expert opinion testimony.[708]

In some ways, doesn't this analysis bear a resemblance to the court's analysis in the admission of scientific evidence by judicial notice? Anyone can see how the accident happened? What seemed to persuade the court here was that the "experts" analyzed the

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[704] *Id.* at 377. (If opposing counsel notices this lapse, for purposes of having a "clean" trial record, he should (a) ask for a side bar — do not risk a mistrial; (b) out of the jury's hearing, move that the judge make a determination whether this witness is testifying as a lay witness or whether he is an expert witness and in what precise field of expertise; (c) make certain that the determination is on the record; (d) object if necessary; (e) make an appropriate objection on the record; (f) voire dire the witness; (g) ask the judge to rule on the objection; (h) move on with the case.
[705] 118 N.W.2d 123, 128 (1962).
[706] *Id.* at 378.
[707] *Id.*

same data. One wonders whether an appropriate objection to the admission of the policeman as an "expert," which was never done, would have made all the difference.

> **Practice Tip:** Whenever a witness testifies about material which requires expertise — not mere facts — make certain that the court makes a determination on whether that witness is an expert in that particular field.

The results in the appellate courts, in the majority, will sustain the trial court. Had the policeman been restricted to his measurements, to the admission of photographs, but been restricted to any opinion, the case may Ave. gone the other way.

§ 22.2 Speed of Collision:

Bryant v. Buerman,[709] was a rear-end collision case which occurred at low speed; the plaintiff sued and won; the defendant appealed. The defendant contended that the trial court erred when it excluded expert witness testimony regarding the speed of the collision. The appellate court reversed.

Here, the defendant testified himself about the collision speed since he worked as a body shop repairman. He stated "the way my rails were crushed, and my experience-- and I consider myself a professional, because I've done it for over thirty years-- this car was hit well over thirty to forty miles an hour to do that kind of damage."[710]

To rebut this testimony, the plaintiff offered the testimony of a physicist and accident reconstructionist and the proponent assured the court that the testimony would be limited to speed and force of collision and would not, consistent with the rule enunciated in *Mattek v. White*.[711] *Mattek* held that a physicist who testifies on accident reconstruction and biomechanics is not qualified to testify that a victim did not suffer

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[708] *Id.*
[709] 1999 WL 701803 (Fla.App. 1999) (opinion not yet released).
[710] *Id.* at *1.

permanent injury and in the case at bar, the intended testimony would not include an expert opinion that the motorist did not suffer permanent injury from this accident. The court excluded this witness "concluding that speed was not an appropriate subject for expert testimony and further finding that there was sufficient lay witness testimony from which the jury could make a determination of speed."[712] The issue of impact speed was crucial to either sides' argument. Where an expert witness's testimony will be helpful to the jury in the decision, that opinion should be admitted, ruled this court in its reversal of the trial court.[713]

> The speed of appellant's vehicle at the time of the accident was a highly contested factual issue at trial. Appellee claimed that appellant's van was traveling at 45 miles per hour and as a result of the high speed and impact, he sustained permanent injuries to his back, neck, knee, and hands. In contrast, appellant testified that her van was practically stopped in dense traffic and moving at no more than 10 miles per hour when it collided with appellee's vehicle. She argued that appellee's injuries could not have been caused by the slow-speed, low-impact accident. Rather, appellant contended that appellee's injuries resulted from two previous car accidents and various other physical activities. The expert's testimony on the issue of speed could have aided the jury in its search for the truth, particularly under the circumstances of this case, where such testimony was not merely cumulative but critical in resolving the factual issues and "leveling the playing field" imbalanced by admission of appellee's testimony that his speed estimate was based upon his "expertise" and thirty years of experience as a "professional" body shop mechanic.[714]

In the opinion, the court referenced the wide discretion the trial court has in the admission or exclusion of expert testimony and this subject formed the basis for a concurring opinion by The Honorable Justice Klein analyzed further:

> In the present case, as the majority opinion shows, it is well settled that an expert in accident reconstruction can render an opinion about the speed of a vehicle and force of impact. Whether that issue can be the subject of expert testimony is not

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[711] 695 So.2d 942 (Fla. 4th DCA 1997).
[712] 1999 WL 701803 at *1.
[713] *Id.* at *2.
[714] *Id.* at *2-*3.

> controversial. Under these circumstances, the trial court has little, if any, discretion, and appellate courts will not hesitate to find error. Accordingly, the broad discretion rule is of little help to appellee.[715]

The point of this case is an important one. The trial court has wide discretion but when the expert opinion testimony is central to the ability to either side proving its case, assuming the witness is qualified to express the opinion, the testimony must be admitted … even where one of the "expert witnesses" is the defendant.

In *Genovese v. Ferrygood*,[716] following a rear-end collision, the plaintiff sued and moved in limine to exclude the defendant's expert witness' testimony concerning the "amount of G-force exerted by impact and the effect it had on the plaintiff's back."[717] The plaintiff's argued that the physician's testimony did not satisfy the four *Daubert* standards which were adopted in Louisiana by *State v. Foret*.[718]

> To qualify as scientific evidence, an inference, assertion, or opinion must be derived by scientific method.... First, the trial judge must determine in a preliminary hearing whether the expert is proposing to testify to actual scientific knowledge. Second, the trial judge must determine whether such knowledge will assist the trier of fact in understanding or determining a fact in issue. … The court should consider both the validity of the reasoning or methodology and whether that reasoning or methodology properly can be applied to the facts at issue.... It may consider ... the following factors in determining the admissibility of expert testimony: 1. The "testability" of the expert's theory or technique, 2. Whether the theory or technique has been subjected to peer review and publication, 3. The known or potential rate of error, and 4. Whether the methodology is generally accepted in the scientific community.[719]

There is an important and crucial procedural wrinkle to this case which bears emphasis. Under Louisiana procedural rules, the doctor's testimony was perpetuated by deposition and the parties stipulated that ""all objections will be made during this

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[715] *Id.* at *3.
[716] 734 So.2d 977 (La. Ct. App. 1999).
[717] *Id.* at 981.
[718] 628 So.2d 1116 (La.1993).

deposition, and are hereby not reserved until such time as this deposition, or any part thereof, may be used or sought to be used in evidence.[720] The plaintiff failed to preserve the appellate point and waived his objection since he did not object at the deposition to the opinion testimony about the G-force.[721]

In this case, the appellate court did not find that a failure to satisfy *Daubert* created reversible error since the outcome would not have been affected.

> The G-force testimony was far from the only evidence on which the jury could rely. More telling, in our view, was the testimony by three doctors … that there was no change in plaintiff's MRI studies between 1992 and November 1996. That testimony, added to the evidence that plaintiff worked replacing sheetrock and doing home repair and renovation even after the September 1996 accident, establishes a reasonable basis for the jury to conclude that plaintiff's bulging disc on the left L4-L5, for which he had the January 1997 surgery, was not causally related to the accident.[722]

The rule: If evidence does not affect the outcome, even if it is incorrectly admitted and the jury hears the evidence, there will not exist sufficient error for reversal.

§ 22.3 Reenactment not Substantially Similar:

re-enactment of an accident differs from accident reconstruction. After a low-speed rear-end collision and a defense verdict in *Tittsworth v. Robinson*,[723] the plaintiff appealed on the issue of whether the trial court erred in permitting expert testimony in mechanical engineering and gravity acceleration impact analysis and biomedical engineering and biomechanics) which concluded that the accident could not have caused

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[719] 734 So.2d 977, 981-82.
[720] *Id.* at 982 (citing La. Code Civ. Proc. art. 1421).
[721] *Id.*
[722] *Id.* at 982.
[723] 475 S.E.2d 261 (Va. 1996).

the plaintiff's injuries. The experts created a reenactment which was "not substantially similar to the conditions existing in the present case."[724]

Precisely what makes a reenactment unreliable and hence inadmissible? In its reversal of the trial court, the Virginia Supreme Court held that the testimony was speculative since the recreation was not substantially similar, "founded upon assumptions lacking a sufficient factual basis, relies upon dissimilar tests, and contains too many disregarded variables."[725] For those reasons, the testimony was unreliable as a matter of law.[726]

§ 22.4 "Spinoscope" is Inadmissible; No General Acceptance:

The next case contained a very detailed analysis of what is meant by "general acceptance" against the federal background of *Frye*, *Daubert*, and *Kumho Tire*. In *Castrichini v. Rivera*,[727] after a rear-end collision, the plaintiff suffered debilitating back pain. The defense brought a motion to exclude evidence of spinoscopic test results. Here, the court excluded this evidence since the spinoscope examination is not generally accepted in the scientific community.

The "machine" is a non-invasive machine which purportedly provides objective measurements of limitation in function due to low back pain. The plaintiff obtained treatment with a specialist in Physical Medicine and Rehabilitation and he used the spinoscope to measure the plaintiff's limits in range of motion.

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[724] *Id.* at 263.
[725] *Id.* at 263.
[726] *Id.* at 263-64.
[727] 669 N.Y.S.2d 140 (N.Y. App. Div. 1997).

The defendant moved to exclude this evidence since spinoscopy and the spinoscope have not gained general acceptance in the scientific community.[728] The following illustrates the problem presented to the court by this novel theory:

> A *Frye* hearing was held last Friday during trial outside of the presence of the jury, during which the testimony was taken of the spinoscope's inventor, Associate Professor Serge Alain Gracovetsky, Ph.D. of Concordia University, Montreal, Quebec. Dr. Gracovetsky is also president of Spinex Medical Technologies, Inc., the manufacturer and marketer of the lumbar spinoscope. He has sold 71 machines
> since the first one was manufactured in 1988, and delivered to a Utah purchaser. Gracovetsky estimates that some 50-60 are in actual use today. They cost approximately $150,000 each. Two of these are in New York, one in Dr. Dobson's office in Rochester, and another somewhere, Gracovetsky thinks, in Long Island. Gracovetsky acknowledged in his testimony that he came to Rochester as a favor to Dr. Dobson, and in an effort to secure wider acceptance of spinoscopy. Spinoscopy proceeds on the assumption that a conventional clinical examination of a patient who has suffered so-called soft tissue back damage is largely unavailing, and that there is a need for standardization in the field of diagnosing and treating low back pain. The spinoscope is a non-invasive "machine" employing a high resolution, computer aided system which tracks the motion of skin markers (infrared light emitting diodes) placed over the spine or spinus processes and iliac crests. A dynamic imaging system is used to measure spinal function which employs a high-resolution infrared three- dimensional camera system. As the subject moves, the camera system collects, at a rate of some 180 images per second, kinematic data from the strategically placed skin markers. At the same time, the activity of paraspinal muscles in the L5 region are recorded with bilateral surface electromyography employing skin surface electrodes. The measurements are then analyzed and otherwise combined with conventional clinical evaluation data. Gracovetsky published a study in 1995, which discovered that consistent patterns of skin marker motion exist among normal subjects, which provide a database for normal lumbar spine skin marker movement during flexion- extension and lateral bending, whether under load or not.[729]

The machine's inventor in this paper concluded that:

> … the "variation of patterns among normal individuals is small, in spite of the [normal] subject's freedom of motion," and that this data "supports the hypothesis that spinal motion contains invariant patterns perhaps more related to the species than the individual." The authors concduded, however, that further study was

[728] *Id.* at 141.
[729] *Id.*

needed "to ascertain if these patterns are pertinent to the identification of pathology."[730]

The proponent submitted other papers written by Gracovetsky and he concluded that "because conventional clinicians collect information via multi-disciplinary considerations beyond the sensory range of the spinoscope, use of the spinoscope, "[l]ike all paramedical tests, ... must be done in conjunction with a full clinical examination, and its results integrated by the clinician."[731]

At the *Frye* hearing, Gracovetsky testified that 100-150 insurance companies in the United States reimburse for spinoscopic examinations, but he also acknowledged that the list of companies which do not reimburse "is as long as the list of companies that do."[732]

The plaintiff then produced exhibits letters from two users of the spinoscope,[733] from Florida and Arizona, where they extolled their success with the machine. In addition, plaintiffs produced a letter from the President of the Spinoscopic Association, and a letter from a member of the Pennsylvania Medical Society Liability Insurance Company attesting to his use of the machine and that insurance coverage would be provided.[734] Finally, the plaintiff produced a favorable report from a Rhode Island insurance company risk management outfit.[735]

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[730] *Id.* (quoting Gracovetsky & Newman, et al., *A Database for Estimating Normal Spinal Motion Derived from Noninvasive Measurements*, SPINE 20: 1045 (1995). (Parenthetically, this spinoscopic technique contains some elements of hucksterism but it does contain some element of legitimacy. To that extent it is unlike other medical machines which purport to measure magnetic auras and fields, identify disease by taking pictures of the eyes' iri, and where "specially trained" practitioners, by waving their hands over a person's body are able to detect disturbances in the "aura.")
[731] *Id.* at 142.
[732] *Id.* at 142-43.
[733] Testamentary evidence is never a valid scientific modality.
[734] Still not scientific methodology.
[735] *Id.* at 143.

> Gracovetsky conceded, however, that the spinoscope, or spinoscopy in general, are not terms included in Stedman's Medical Dictionary, nor is a spinoscope listed as a diagnostic tool in the American Medical Association, Guidelines to the Evaluation of Permanent Impairment (4th ed.1995). Given that his studies date back only to 1996, it is doubtful that Gracovetsky's work would be included in works published before then. But the court's own research discloses that the spinoscope is not listed in the 1997 edition of the Medical Device Register either. Because the spinoscope test results are "presented as novel scientific evidence[,] [the court] requir[ed] a determination as to [their] reliability."[736]

The court analyzed that pursuant to *Frye* the court must determine whether the proposed expert testimony is based on "a principle or procedure [which] has 'gained general acceptance' in its specified field."[737]

While "the particular procedure need not be 'unanimously indorsed' by the scientific community but must be 'generally acceptable as reliable.' "[738] The court considers the following:

> The first--the Frye hearing--asks whether, theoretically, the accepted techniques, when performed as they should be, generate results generally accepted as reliable within the scientific community.... Next, a foundational inquiry must be satisfied before such evidence is placed before the jury: in each case the court must determine that the laboratory actually employed the accepted techniques.... Finally, infirmities in collection and analysis of the evidence not affecting its trustworthiness go to weight, to be assessed by the jury.[739]

Here, the court noted that Fed.R.Evid. rule 702 permits consideration of general acceptance in the scientific community under *Daubert* but that acceptance standard is only one of at least four factors which ultimately must be considered together, but need not individually be attained, in the "more flexible" admissibility determination applicable in federal courts. Under the *Frye* test applicable in New York, general acceptance in the

[736] *Id.* at 142.
[737] *Id.*
[738] *Id.*
[739] *Id.*

relevant scientific community is the sole test applied at the *Frye* hearing, or first stage inquiry.[740]

> To the extent that this answer can be regarded as an affirmation of general acceptance, the opinion is not supported by the evidence produced at the hearing. But the terms of his answer belie any affirmation of general acceptance. Gracovetsky's answer implicitly acknowledged the fledgling nature of his discipline in the scientific community. Even if his answer may be interpreted as affirming general acceptance, Dr. Gracovetsky's foundation for his opinion of general acceptance was limited to three categories of evidence, none of which alone or in combination with the other categories establishes general acceptance of spinoscopy in the diagnosis and treatment of so-called soft tissue or low back pain injury.[741]

In addition the court reasoned further:

> Another aspect of the Gracovetsky literature that is urged on the court to establish general acceptance concerns the peer review process which studies of this sort must undergo and survive before acceptance for publication. Plaintiffs' contention that peer review and acceptance for publication signals, without more, general acceptance of spinoscopy in the relevant scientific community is without merit. Peer review by way of independent validation or replication of Gracovetsky's techniques, together with associated critical analysis in peer reviewed literature, would, of course, be highly relevant to the general acceptance question.[742]

Similarly, a complete failure to publish in a peer reviewed scientific journal would be highly relevant.[743]

> But here, neither circumstance is present because Gracovetsky's technique has only been introduced beyond the realm of those to whom he has sold machines, i.e., to the broader scientific community, within the last 18 months. There are no "efforts in the field to 'validate by replication' the methods employed at [Spinex Medical Technology]; there ha[s] been neither refutation nor support of the technique in the professional literature.[744]

The consequence of admission of spinoscopy is enormous since to accept the technique would mean that any novel procedure or methodology would gain general

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[740] *Id.*
[741] *Id.* at 144.
[742] *Id.*
[743] *Id.*

acceptance upon its appearance in a peer review journal. Such a rule thoroughly would "conflate" the relaxed *Daubert* standard of admissibility with the *Frye* standard which seeks to determine general acceptance. Since *Daubert* focuses on reliability of the methodology, *Frye* focuses on general acceptance of the methodology in the relevant scientific community.[745]

The difference in the two is significant since the *Frye* test emphasizes "counting scientists' votes, rather than on verifying the soundness of a scientific conclusion."[746]

> The peer review of articles written by Gracovetsky is geared toward the former (reliability), but does not indicate, by itself or in combination with the other evidence adduced at the hearing, general acceptance in the relevant scientific community. Putting aside for the moment the question whether Gracovetsky's work, even if peer reviewed, should not alone establish general acceptance because of his acknowledged interest [citation omitted] a point on which the Court of Appeals appears to have divided without a clear majority of the court commanding either position, peer review and general acceptance are not coterminous, as Daubert recognized when it made them separate aspects of the four part inquiry required under the federal rules.[747]

Moreover, publication in a peer review journal cannot alone establish the adequacy of peer review, at least to show acceptance of a methodology since publication is but one element of peer review.[748]

Accordingly, the fact that Gracovetsky have published their work recently in peer reviewed journals is relevant to the particular reliability of their technique and that of the spinoscope, but, the court recognized, without more than that does not determine general acceptance criterion. Is spinoscopy generally accepted as clinically useful in the diagnosis

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[744] *Id.* at 144-45.
[745] *Id.* at 145.
[746] *Id.* (quoting Jones v. United States, 548 A.2d 35, 42 (D.C.Ct.App.1988).
[747] *Id.*
[748] *Id.* at 145. Further, although the court did not say this, it is crucial to point this out — even peer reviewed journals represent unscientific fan clubs of various theories highly subject to the inertia of fame,

and treatment of soft tissue back injury resulting in low back pain? The court concluded that it is not and supported its conclusion by the inherent limitations of the peer review process recognized in the literature.[749]

This decision highlights the difference between *Daubert* and *Frye*. Under *Daubert*, the party proffering evidence need only show "reliability of the methodology, and in addressing that question the court and the parties are not limited to what is generally accepted."[750] Under *Frye*, the party proffering scientific evidence had to show it was based on the method generally accepted in the scientific community."[751] Thus, under *Daubert*, "the fact that one party's experts use a methodology accepted by only a minority of scientists would be a proper basis for impeachment at trial."[752] *Frye*, however, gives another slant; the fact that the proffered expert uses a methodology accepted by a minority of scientists in the relevant field is a basis for exclusion, because that fact manifestly negates "general acceptance."[753]

The second category of evidence relied upon by plaintiff is the fact that some 50-60 of the machines are currently in use today throughout the United States and Canada. Gracovetsky testified that many of his machines are used by several clinicians in the

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fortune, and the politics of "fashion" in science. Galileo, Copernicus, and Newton would not have been able to publish in their era!

[749] Citing A. Pelman & M. Angell, *How Good is Peer Review*, 321 N. ENGL. J. MED. 827, 828 (1989) ("peer review is not and cannot be an objective scientific process, nor can it be relied on to guarantee the validity or honesty of scientific research, despite much uninformed opinion to the contrary"). See generally, on the shortcomings of peer review, DARYL E. GRUBIN & EDWARD J. HACKETT, PEERLESS SCIENCE: PEER REVIEW AND U.S. SCIENCE POLICY (1990) (leading study of peer review); Sheila Jasnoff, THE FIFTH BRANCH: SCIENCE ADVISORS AS POLICYMAKERS 64-76 (1990) (illustrative shortcomings of peer review); Symposium, *Editorial Peer Review in Biomedical Publication: The First International Congress*, 263 J. AM. MED. ASS'N. 1317-1444 (1990); Steven Harnad ed., PEER COMMENTARY ON PEER REVIEW; A CASE STUDY IN SCIENTIFIC QUALITY CONTROL (1982). *Id.* at 145-46.

[750] 669 N.Y.S.2d 140, 145. (citing Daubert, 43 F.3d at 1319 n. 11).

[751] Id.

[752] Id.

[753] *Id.* at 146 n.3.

communities in which they are placed, not just the actual purchaser of the spinoscope, and that some 300,000 patients have been evaluated.[754] No estimate of what percentage this is of the total low back pain evaluation pool was offered. In addition, the plaintiff offered a few current users' letter endorsements of spinoscopy and their use of a spinoscope. The fact, however, that Gracovetsky and a number of his followers have been employing spinoscopy for a time "does not establish its acceptance in the scientific community" in general.[755]

The third category of evidence relied on by plaintiffs concerns the acceptance of some insurance companies and risk management boards of reimbursement claims for spinoscopic evaluations. Plaintiffs sought at the hearing to extrapolate from the fact that many such companies have medical departments or boards, a conclusion that there is general acceptance in the medical community of spinoscopy. The plaintiffs did not produce evidence which linked reimbursement to scientific integrity of the theory itself. Even if such a link could be inferred, Gracovetsky conceded that the number of companies denying reimbursement approaches or equals the number who do reimburse for spinoscopic exams.

Finally, plaintiffs' evidence did not identify the medical practitioners employed by or consulting with a reimbursing insurance company as members of the "relevant

[754] Excellent sales never supports a scientific methodology or general acceptance; general acceptance is "scientific" not a degree of market penetration. For instance, if Gracovetsky were correct, McDonald's could argue that because they sell so many hamburgers, that their food is scientifically "better" than other foods.
[755] *Id*. at 146.

scientific community,"[756] a case heavily relied upon throughout this entire lengthy analysis.

Any lawyer who tries cases in personal injury law will encounter "machines" which measure all manner of "scientific evidence." Keep a copy of *Castrichini v. Rivera* in the trial notebook for easy reference and remain "on track" in the case science and with the appropriate approach to the "general acceptance" theory.

§ 22.5 Accelerometer; Admissible:

In contrast to the vagaries within the admission of the spinoscope, in *Perret v. Nelson*,[757] the trial court admitted the use of an accelerometer and the appellate court upheld. Following a low-impact rear-end collision, at trial the judge admitted testimony of an accident reconstruction expert. On appeal, at issue was the use of an accelerometer to test G forces. This device was sufficiently reliable to make the test results admissible. The appellate court affirmed the trial court's decision.

In this case, the plaintiffs appealed an insufficient judgment complaining that the trial court's improper admission of this accelerometer testimony cause the jury to provide inadequate compensation of $22,620 instead of the $200,000 which they sought. In the case at bar, the defense offered the testimony of an accident reconstructionist, the plaintiff objected by way of a motion in limine based upon *Daubert*, adopted by the Louisiana case of *State v. Foret*.[758]

According to the plaintiffs' objection, the testing performed by the defense expert did not meet the four Daubert criteria in order to qualify as scientific evidence. The test

[756] *Id.* (citing *Frye* and People v. Wesley, 83 N.Y.2d 417, 422, 611 N.Y.S.2d 97, 633 N.E.2d 451 (1994).
[757] 722 So.2d 1118 (La.App. 1999).
[758] 628 So.2d 1116 (La.1993). *Id.* at 1122.

"was not subject to peer review, nor published … there was a potential rate of error which could not be calculated, and [the expert witness testified that] … he knew of no other accident reconstruction experts who would attempt to measure the force of the impact in this manner."[759]

The court analyzed by using the *Daubert* standards and then the Louisiana Rule 702.[760] The plaintiffs' only real objection was to the admission of the accelerometer test, not to the admission of the expert testimony in other areas.

> The specific method of testing to which plaintiffs object involves the testing of G forces on the automobile and the occupant. [The expert]... explained that in the reconstruction of this accident he attempted to measure such G forces by testing the forces on the automobile. To measure the forces on the head and neck, and the back accelerations, one must measure the forces in more than one plane and direction. The equipment used measured only the G forces in one direction. Because he knew the impact was directly from the rear, he used the accelerometer to measure the G forces on the automobile. [The expert]... testified that the use of the accelerometer to measure G forces is industry-wide and not unusual. [The expert]... acknowledged the G force on the occupant would be different from that of the vehicle and that he knew of no specific endorsement of this procedure by the National Association of Professional Accident Reconstruction Specialists. However, [the expert]... testified that there have been many articles discussing the differences in forces on the vehicle and on the human occupant [the expert]... explained that his test was to measure the G forces of the vehicle and not of the occupant. He acknowledged that estimating G forces on the occupants of the automobile was not within his area of expertise and his testimony would not include such an estimate. It is also clear from his testimony that his method of measuring G forces of the vehicle with an accelerometer is an accepted industry procedure.[761]

In finding no error in the trial court's discretion in the admission of the accelerometer test results, the appellate court noted that the witness took a comprehensive and exhaustive approach to the accident analysis apart from the accelerometer results.

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[759] *Id.* at 1122-23.
[760] *Id.* at 1123.
[761] *Id.* at 1123-24.

Further, the explanation behind the testing and the basis founded in physics was scientifically sound.[762]

In reviewing case upon case, notice how the court "smells" scientific evidence. It uses the *Daubert* standards. This is uniform throughout the nation.

Finally, in one example which is of a more theoretical nature than the last two, and from medical negligence litigation, the Montana Supreme Court evaluated whether informed consent was a scientific process subject to the *Daubert* analysis. In Montana, it is not. The case was *Gilkey v. Schweitzer*,[763] where the Montana Supreme Court held that the *Daubert* test did not govern the admissibility of a physician's expert opinion about informed consent.

In a deposition an expert witness testifying for the plaintiff expressed the opinion that the defendant physician departed from the standard of care with respect to the informed consent aspect of the care rendered. The defense objected on the basis that the opinion was not based upon "scientific evidence supported by reliable methodology or research."[764] Here, the trial court granted summary judgment to the defendant since the plaintiff failed to establish its *prima facie* case. The Montana Supreme Court reversed.

Did the trial court err in its reliance on *Daubert* to exclude opinion evidence to prove that the defendant breached the standard of care? What is the scientific legal status of an opinion in Montana?

The trial court concluded that the plaintiff's efforts to establish a standard of care of informed consent through expert witness testimony were efforts to introduce "novel

[762] *Id.* at 1124.
[763] 983 P.2d 869 (Mt. 1999).
[764] *Id.* at 870.

scientific evidence" of the type the court contemplated in the Daubert decision and, in Montana, in *Hulse v. State*.[765] The rule in Montana is that *Daubert* applies only to "novel" scientific evidence and, since the doctor's opinion required the "specialized knowledge of a medical professional … [i]t did not involve novel scientific evidence."[766] Hence, the testimony "was not subject to the *Daubert* foundational requirements."[767] Various arguments surrounding the informed consent went to the weight of the evidence, not to its admissibility.[768]

§ 23 Fed.R.Evid. 703 and the 2000 Amendments

Here, in Rule 703, the bases of Opinion Testimony by Experts, the proposed new text is:

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert's opinion substantially outweighs their prejudicial effect.

Rule 703 has been amended to emphasize that when an expert reasonably relies on inadmissible information to form an opinion or inference, the underlying information is not admissible simply because the opinion or inference is admitted. Courts have reached

[765] 961 P.2d 75 (Mt. 1998).
[766] *Id.* at 872.
[767] *Id.*
[768] *Id.*

different results on how to treat inadmissible information when it is reasonably relied upon by an expert in forming an opinion or drawing an inference.[769]

When information is reasonably relied upon by an expert and yet is admissible only for the purpose of assisting the jury in evaluating an expert's opinion, a trial court applying this Rule must consider the information's probative value in assisting the jury to weigh the expert's opinion on the one hand, and the risk of prejudice resulting from the jury's potential misuse of the information for substantive purposes on the other. The information may be disclosed to the jury, upon objection, only if the trial court finds that the probative value of the information in assisting the jury to evaluate the expert's opinion substantially

outweighs its prejudicial effect.[770]

If the court admits otherwise inadmissible evidence under this balancing test, the trial judge must give a limiting instruction upon request, informing the jury that the underlying information must not be used for substantive purposes.[771] In determining the appropriate course, the trial court should consider the probable effectiveness or lack of effectiveness of a limiting instruction under the particular circumstances.

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[769] Compare United States v. Rollins, 862 F.2d 1282 (7th Cir. 1988) (admitting, as part of the basis of an FBI agent's expert opinion on the meaning of code language, the hearsay statements of an informant), with United States v. 0.59 Acres
of Land, 109 F.3d 1493 (9th Cir. 1997) (error to admit hearsay offered as the basis of an expert opinion, without a limiting
instruction). Commentators have also taken differing views. See e.g., Ronald Carlson, Policing the Bases of Modern Expert
Testimony, 39 Vand.L.Rev. 577 (1986) (advocating limits on the jury's consideration of otherwise inadmissible evidence used as the
basis for an expert opinion); Paul Rice, Inadmissible Evidence as a Basis for Expert Testimony: A Response to Professor Carlson, 40
Vand.L.Rev. 583 (1987) (advocating unrestricted use of information reasonably relied upon by an expert).

[770] A party opposing admission of this line of evidence must properly object, make an offer of proof, if appropriate, and then receive the court's ruling. Failure to appropriately object will preclude any appellate relief on the evidentiary ruling.

The amendment governs only the disclosure to the jury of information that is reasonably relied on by an expert, when that information is not admissible for substantive purposes. It is not intended to affect the admissibility of an expert's testimony. Nor does the amendment prevent an expert from relying on information that is inadmissible for substantive purposes.

Nothing in this Rule restricts the presentation of underlying expert facts or data when offered by an adverse party.[772] Of course, an adversary's attack on an expert's basis will often open the door to a proponent's rebuttal with information that was reasonably relied upon by the expert, even if that information would not have been discloseable initially under the balancing test provided by this amendment.

In some circumstances the proponent might wish to disclose information that is relied upon by the expert in order to "remove the sting" from the opponent's anticipated attack, and thereby prevent the jury from drawing an unfair negative inference.[773] The trial court should take this consideration into account in applying the balancing test provided by this amendment.

This amendment covers instances where facts or data that cannot be admitted for any purpose other than to assist the jury to evaluate the expert's opinion. The balancing test provided in this amendment is not applicable to facts or data that are admissible for any other purpose but have not yet been offered for such a purpose at the time the expert testifies.

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[771] Advisory Committee Notes (2000). See Rule 105.
[772] See Rule 705.
[773] Advisory Notes.

The amendment provides a presumption against disclosure to the jury of information used as the basis of an expert's opinion and not admissible for any substantive purpose, when that information is offered by the proponent of the expert. In a multi-party case, where one party proffers an expert whose testimony is also beneficial to other parties, each such party should be deemed a "proponent" within the meaning of the amendment.

§ 23 Challenging Scientific Evidence:

To challenge scientific evidence, the challenger may initiate the challenge by a motion to dismiss the case or part of the case through summary judgment, Fed. R. Civ. Proc. 56, or as a motion to exclude evidence under Fed.R.Evid. 104(a). These motions may be brought together or individually and may be brought at any timely moment in the litigation. There are tactical advantages as to when to bring these motions and this discussion appears below.

Whether the motion to exclude is wrapped into a summary disposition or not, the issues are identical although the court may consider different issues in varying orders.[774] The court uses the same standard to analyze scientific evidence no matter how it is brought before the court.

§ 24 The Challenge and the Burden of Proof:[775]

The burden of proof in a Rule 104(a) hearing requires the witness opponent "to come forward with evidence showing deficiencies in the expert's testimony before the

[774] In a summary judgment motion, the defense may claim defects in any of the tort elements and include the defect that the scientific evidence is insufficient.
[775] *Beauty and the Beast*.

court has any obligation to engage in a Rule 104(a) analysis."[776] In these motions, in its struggle to interpret Fed.R.Evid. 702, courts will also weigh evidence under Fed.R.Evid. 403. Even in instances where the court engages in a *Daubert* analysis, confusion may result at the Rule 403 stage.[777]

§ 24.1 Appellate Review under Fed.R.Evid. 702:

Taking all of the issues together, at the appellate level, whether to admit an expert witness' testimony is entirely discretionary with the court[778] and this decision will not be disturbed absent an abuse of that discretion.[779] Courts employ either the "abuse of discretion" or the "manifestly erroneous" standard in their reviews of trial court decisions about expert evidence.[780]

Courts do look "closely and harshly" at questionable testimony[781] and in *Frymire-Brinati v. KPMG Peat Marwick*, [782] as an example, the Seventh Circuit reversed a plaintiff's verdict when it concluded that the trial court failed to conduct an adequate review of an accounting expert's testimony. Generally, though, where a trial court

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[776] Margaret A. Berger, *Evidentiary Framework*, [hereinafter *Framework*] n. 5, at 50-51, in FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE (Joe S. Cecil *et al.* eds., 1994) [hereinafter FJC MANUAL]. FRAMEWORK identified whether, for admissibility purposes, there is a difference between untested and untestable theories. FRAMEWORK 75. This issue relates to the situation where scientists attempt to extrapolate between animal and human studies. *Id.* at 78-80. *See*, also, EEPG 64-65.

[777] Usher v. Lakewood Eng'g & Mfg. Co., 158 F.R.D. 411 (N.D.Ill. 1994); Martincic v. The Urban Redevelopment Auth. Of Pittsburgh, 844 F.Supp. 1073, 1076 (W.D. Pa. 1994) (illustrating that these courts do not provide much of an "explanatory gloss," EEPG 67, in their respective Rule 403 analyses).

[778] *In re* Joint Eastern & Southern District Asbestos Litigation v. United States Mineral Products Co., 52 F.3d 1124, 1132 (2nd Cir. 1995).

[779] General Electric Company v. Joiner, 522 U.S. 136, 139 (1997). The abuse of discretion standard applies to trial court's decision to exclude scientific evilence. *See*, also, Poust v. Huntliegh Healthcare, 998 F.Supp. 478, 490 (D.N.J. 1998); United States v. Bonds, 12 F.3d 540, 554 (6th Cir. 1993).

[780] EEPG 69 n.281. (citing numerous cases in which courts have applied these standards).

[781] EEPG 69-70.

[782] 2 F.3d 183 (7th Cir. 1993).

excludes testimony after conducting a *Daubert* review, the appellate court will generally sustain the exclusion.[783]

The landmark case which decided that abuse of discretion applies to the appellate review of scientific evidence was *General Electric Company v. Joiner*.[784]

> **Practice Tip:** The standard for appellate review is important since, in *de novo* review, the reviewing court would apply its reasoning to the issue, giving no deference to the trial court. Typically, *de novo* review applies to matters of law; [785] abuse of discretion or clearly erroneous standards of review applies to matters of fact or mixed matters of fact and law.[786]

In *Joiner*, an electrician sued General Electric claiming that he had been injured by toxic substances while performing his work and that he contracted a small cell lung cancer as a consequence of this employment exposure.[787] In depositions, expert witnesses testified that PCB's alone can "promote" cancer. Similarly, furans and dioxins can promote lung cancer.[788] Further, the witnesses testified that, in their opinions, since this man had been exposed to PCB's, furans, and dioxins, "such exposure was likely responsible" for the claimant's cancer.[789]

The defendants moved for summary judgment and the District Court ruled that there was a genuine issue of material fact as to whether Joiner had been exposed to

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[783] American & Foreign Ins. Co. v General Elec. Co., 45 F.3d 135 (6th Cir. 1995) (sustaining the exclusion of testimony about the cause of a fire by a short circuit).
[784] 522 U.S. 136, 139 (1997).
[785] FKM 621. *See,* U.S. v. Mississippi Valley Generating Co., 364 U.S. 520, 526 (1961).
[786] FKM 621. *See,* Inwood Labs., Inc. v. Ives Labs., Inc. , 456 U.S. 844 (1982). When an appellate court reviews matters other than witness credibility, for instance, actual physical evidence or other documentary evidence, or inferences from facts, the United States Supreme Court rejected the use of any other standard besides abuse of discretion or that of clear error in Anderson v. Bessemer City, 470 U.S. 564 (1985). *See,* generally, FKM 622.
[787] *Id.* at 139.
[788] *Id.* at 140.
[789] *Id.*

PCB's.[790] The district court then granted summary judgment because there was no genuine issue as to whether he had been exposed to furans and dioxins and, additionally, the experts failed to show that there was any link between PCB exposure and small cell cancer in this smoker. In the trial court's analysis and conclusion, the expert testimony did not rise above "subjective belief or unsupported speculation."[791]

The Court of Appeals for the Eleventh Circuit reversed,[792] holding that "[b]ecause the Federal Rules of Evidence governing expert testimony display a preference for admissibility, we apply a particularly stringent standard of review to the trial judge's exclusion of expert testimony."[793] What is a "particularly stringent" standard of review?

The United States Supreme Court interpreted the term "particularly stringent" as announcing no new standard of review[794] and, furthermore, the Court has held in numerous cases that abuse of discretion is the proper standard of review of a district court's evidentiary rulings with cases going back as far as 1878.[795]

While a court of appeals may apply the abuse of discretion standard to review the admission of scientific evidence, it "may not categorically distinguish between rulings allowing expert testimony and rulings which disallow it."[796] The United States Supreme Court rejected that a different standard should apply even when the decision is outcome

[790] Polychlorinated biphenyls, PCB's, are organic substances which are extremely biochemically active.
[791] *Id.*
[792] *Id.*
[793] *Id.*
[794] *Id.* at 141.
[795] *Id.* at 142 (citing Spring Co. v Edgar, 99 U.S. 645, 658 (1878) (stating that "cases arise where it is very much a matter of discretion with the court whether to receive or exclude the evidence; but the appellate court will not reverse in such a case, unless the ruling is manifestly erroneous").
[796] *Id.* (comparing Beech Aircraft Corp. v. Rainey, 488 U.S. 153, 172 (1988), applying abuse of discretion review to a lower court's decision to exclude evidence, with United States v. Abel, 469 U.S. 45, 54 (1984), applying abuse of discretion review to a lower court's decision to admit evidence).

determinative.[797] The Court concluded that "[i]n applying an overly 'stringent' review to that ruling, it failed to give the trial court the deference that is the hallmark of abuse of discretion review."[798]

> **Practice Tip:** To emphasize, here, practitioners must be wary of this appellate standard since the trial court's holding in a *Daubert* motion will not be disturbed absent abuse of discretion.

§ 24.2 Motion Timing:

Timing of these motions to exclude is "everything" although trial courts do have an obligation to review expert testimony "at the outset,"[799] as a preliminary matter. The court "must ensure that such testimony truly derives from the field of expertise at issue, and that it is reliable and relevant enough for the purposes of the law.[800]

One technique favored by the defense is to bring a *Daubert* motion under Fed.R.Evid. 702, to exclude the witness, after each deposition. For instance, the defense takes an accident reconstructionist's deposition, then moves to exclude. The defense then takes an engineer's deposition and moves to exclude. The, after the dust settles, when a plaintiff's medical expert witness expresses an opinion on the client's longevity, the defense will then move to exclude. The costs to the plaintiff become oppressive, phenomenal, in fact and can crush a plaintiff's case where the plaintiff's lawyer lacks capital.

In many cases, perhaps most, as the case approaches trial, the parties, as they narrow issues, bring respective motions in limine and motions on the scientific evidence which they hope to offer at trial.

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[797] *Id.* at 142-43.
[798] *Id.* at 143.
[799] EEPG 71.

§ 25

§ 26

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

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[800] *Id.*

First, establish that "scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue." *Id.* Under *Daubert v. Merrell Dow Pharmaceuticals*,[801] the court must (1) make a determination that the expert will testify about "scientific" knowledge. In medical testimony, this is not a problem. Then the judge (2) must determine whether the testimony will assist the court to decide the issue. Again, this is not a problem, and generally, when medical testimony is sought, these steps are accepted as a form of judicial notice.

The witness herself must qualify as an expert witness. The witness recites her background, skills, and expertise. If the witness is a licensed health care practitioner, there is no problem here either since, unless there is some considerable background issue, courts typically permit a wide rage of persons with a wide range of background, skills, and expertise to qualify as an expert witness.[802] Fed.R.Evid. 702 is permissive and generally speaking, the courts are reluctant to exclude an expert on the ground that he or she is unqualified.

The expert witness must have a basis for the opinion and that is covered in Fed.R.Evid. 703:

> Rule 703. Bases of Opinion Testimony by Experts
>
> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in

[801] 509 U.S. 579 (1993).

[802] See also, *White v. State Farm Mutual Automobile Insurance Company*, 680 So. 2d 1 (La.App. 1996), the case of Dr. McDaniel, represents a case where the expert's "track record" was so bad that the court might not admit him as an expert. More properly, though, the court should admit the expert, allow the jury to weigh his weight and credibility, and to then decide the case.

> forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

What facts or data would an expert witness rely upon which is "of a reasonable type relied upon by experts in the particular field?" Health care professional review medical records. Also, if the expert witness examined the patient, then this would form an additional basis for his opinion.

Finally, the expert witness may state opinions under Fed.R.Evid. 704:

> Rule 704. Opinion on Ultimate Issue
>
> (a) Except as provided in subdivision (b), testimony in the form of an opinion or inference otherwise admissible is not objectionable because it embraces an ultimate issue to be decided by the trier of fact.
>
> (b) No expert witness testifying with respect to the mental state or condition of a defendant in a criminal case may state an opinion or inference as to whether the defendant did or did not have the mental state or condition constituting an element of the crime charged or of a defense thereto. Such ultimate issues are matters for the trier of fact alone.

Finally, the opinions need not be supported, but generally, at some time, the court or opposing counsel will require the expert witness to state his basis for his opinions under the authority of Fed.R.Evid. 705:

> Rule 705. Disclosure of Facts or Data Underlying Expert Opinion
>
> The expert may testify in terms of opinion or inference and give reasons therefor without first testifying to the underlying facts or data, unless the court requires otherwise. The expert may in any event be required to disclose the underlying facts or data on cross-examination.

Follow the rules and it is easy to qualify the expert witness. Be sure that the attorney knows and uses the "magic words" from the state or federal statutes since, if a witness does not precisely according to the statutes, one may struggle against repeated objections intended to frustrate, embarrass, and vex the attorney offering the witness.

§ 27 Medical Witness Examination—In General

The medical witness should not be interrogated in the same fashion as the lay witness. A number of reasons compel a different approach. The medical witness is a professional man and in most instances the witness will be a practicing doctor. She will be busy, anxious to get about his business and consequently desirous that the interrogation be well organized, brief, and to the point. Her scientific training demands the same, leaving no time for speculations, conjectures or guesses. She will appreciate questioning that is direct and well defined, that isn't diverted to the capillaries but goes straight to the jugular.… and so will the jury. In general, never keep a doctor on the stand on direct examination in trial in an automobile negligence case for more than an hour. The jury will go to sleep.

Aside from the doctor's press of time and her scientific training, there is yet another reason which dictates the nature of medical evidence. The subject matter is relatively complicated and the jargon, for the jury, comparatively confusing. Despite all efforts at explanation and simplification there will be some aspects of the medical testimony that the jury will not comprehend. The attorney's presentation of this medical testimony must therefore, be direct, simple and well organized. Never permit a witness to use medical gibberish. Define all terms, illustrate when possible and keep it simple!

> **Practice Tip:** Never "joust" with an expert witness. Jurors dislike this abrasive confrontation where the lawyer attempts to pit his wits against the expert witness' command of the field. Further, there is great danger, since the expert witness is an "expert" and the lawyer … unless similarly trained, is not "expert" in the field. A calm, methodic approach is safer in the court room than the off-the-cuff confrontations which predictably anger the jury and which may cast the attorney, in the juror's collective eyes, as a loser.

§ 28 Medical Witness Examination—Direct Examination

The direct examination of a medical witness will follow a general pattern, whether a witness for plaintiff or defendant: qualification, current medical practice, how the doctor met the patient; length and substance of treatment; recitation of the pertinent medical issues which brought the patient to the doctor, introduction of the medical records as evidence, then testimony about the medical care and treatment; opinion testimony about disability and ultimately the prognosis. Finally, it is important for the attorney to admit the doctor's billings into evidence.

When the witness is not a treating physician, or in the case of a treating physician who is going to offer expert witness testimony, it is imperative to admit the witness as an expert witness under Fed.R.Evid. 702 or the state equivalent statute:

Q: Your honor, Dr. West is going to offer expert testimony and at this time the Plaintiff [of Defendant] would ask this court to admit the doctor as an expert witness in the field of orthopedic surgery (for instance).
Judge: (To opposing counsel) Any objections?
A: No, your honor. (Or, if there is a challenge, opposing counsel has the right to engage in a *voire dire* but only on the issue of whether this witness shall be admitted as an expert witness — not on the substance of his intended testimony.)
Judge: The court admits Dr. West as an expert witness in the field of orthopedic surgery.[803]

Unless the witness is admitted as an expert witness, depending upon the witness and her qualifications, objections may be raised later in the trial about the scope of testimony the court will allow. One cure for this "lapse" would be to admit the witness at

[803] If the court does not admit the witness as an expert witness at all or if not in a particular field, be sure to get a ruling on the record. Then object to the ruling; make an offer of proof; ask for reconsideration after the offer of proof. If the ruling is still adverse, move on, but at least the issue is appropriately preserved for appeal.

the time opposing counsel objects but then there is always the risk that the judge may not admit the witness as an expert witness and the opinion may not gain admission.[804]

As some of the cases below will amply illustrate, never conclude that a witness admitted as an expert witness in one area will be admitted in other areas. **There is no such category in the law of evidence as a generic expert witness!**

Do not bore the jury with a detailed recitation of every fact in the medical records and, in general, literally create a poster-sized presentation which "cuts to the chase." Use MicroSoft's Powerpoint as a presentation aid since juries find this like watching television and their retention rate is worth the effort and costs. Objective examination findings are very important and these should be presented with attention to accuracy and detail. Again, a simple poster rendition of the objective findings is the "best evidence" and these may be supplemented, of course, with x-ray evidence and photographs.

Chronologically, the doctor will then conduct an examination and record his findings. During the course of this portion of the testimony the medical witness will undoubtedly use medical terms. Engage in an integrative dialogue with "your" witness which will demonstrate the doctor's humanness. In general, for a juror to vote in favor of what the expert witness is telling, the juror must identify that this doctor would be someone she would listen to in a professional sense.

"Please tell the jury what *osteochonritis dessicans* means, doctor." Wrap the technical term in your request so that these terms of art become "wallpaper" to the jury.[805]

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[804] Virtually every state has a requirement that all witnesses to be designated as expert witness must be disclosed prior to trial. These issues may be, and should be, decided in pre-trial motions in limine.

[805] For the attorney who plans to use medical terms, there is no substitute for practice. One technique, though, to emphasize a term or to highlight technical material, is to cautiously pronounce the terms: "A *comminuted* fracture? One where the bone edges actually come through the skin?" Sometimes it is helpful

"Am I correct, doctor, that a split thickness skin graft, abbreviated in your records as STSG is used when the skin destruction, in this case a burn, is so deep that the skin would not grow back by itself?" In this techniques, the attorney uses language the jury understands and combines that with the term's meaning yet simultaneously creates an image of the degree of the trauma.

Clarify points which are important yet which remain ambiguous by succinctly creating a parallel question which engages the expert in dialogue. For instance, "Now, even though the bone at the base of the thumb, you called this the navicular?[806] … Even though this bone was not fractured, there is a distinct probability that within a year the bone will undergo avascular necrosis … that the bone will die because its blood supply has been destroyed by this severe sprain?"[807]

Most judges will permit a degree of give and take between the attorney and the witness but the opposing counsel may object since the attorney is, indeed, asking leading questions. The proffering attorney should simply ask, "Your honor, in the interest of medical and legal clarity, may I lead my witness in this fashion?" Most judges will permit this.

The lawyer has the option of interrupting the testimony so that the witness defines each term as it arises and as witness recites every esoteric word but it is preferable to wait until the doctor's recitation is complete and then seek definitions for the words used. It is imperative to preserve a coherent written record in the event of appeal. When the

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to have the witness write these terms on a chalkboard. Avoid Hollywood glitz, though, since one desired effect is to create an "homespun" version of these complex medical terms.

[806] (Give him time to answer "yes" for the court reporter and for the record.… and to maximize the effect.

[807] Watch the jurors' faces for grimaces which indicate confusion and have the witness explain terms which jurors do not appear to understand.

proffering lawyer chops up the testimony with clarifications, the transcript may literally become incomprehensible.

Another technique is handy. Have the witness create a glossary of terms for the jury and introduce the glossary as part of the expert witness' testimony. If the doctor prepared the glossary, he will be esteemed and appreciated at least by the jury, the judge, and the stenographer.

Frequently the doctor will identify the clinical test through its medical term "The patient had a positive Babinski". If the test is sufficiently significant to mention, it is significant to describe. "The sole of the patient's foot was stroked by the end of a pencil, and the big toe bent up and the other toes fanned outward. Normally this stimulation causes the toes to flex or bend downward. When we get this abnormal response, as we did in this case, it is an indication of some disturbance in the brain or spinal cord. This test is a standard neurological test which we refer to as Babinski's reflex."

It is crucial for an expert witness to explain this "jargon" in both theory and concrete terms. Remember, show the jury what all of this means. For a juror to hear that "the patient was normal to pinprick" will have greater meaning when the doctor takes out a safety pin and demonstrates how he determined that there was an "hypesthesia over the C_7 - T_2 dermatome."[808] When the doctors "tells" by showing, the jurors will remember the infirmity. "Normal to pinprick," without some detailed explanation would be meaningless to lay jurors.

"Following arthrodesis, this patient is left with the ability to flex or extend the foot," the doctor testified and the jurors are unimpressed. The attorney follows with:

Q: Mr. Jones is unable move the ankle?
A: So this arthrodesis was a procedure to fuse the ankle?
A: Yes.
Q: And as a result, Mr. Jones would not be able to jump? (run, climb stairs, stand on his toes"
A: Yes
Q: So if he really enjoyed shooting baskets with his son, this motion, the ankle lift-off necessary to that activity, that would not be possible?
A: That's correct.

It is powerful testimony where the attorney has the physician "wrap" structure and function" with activities of daily living. The jurors will comprehend at the conclusion of this line of testimony what an ankle arthrodesis means to Mr. Jones, to his life style, to his family in a human way which will affect them personally. Which juror would want to be deprived of the common pleasure of "shooting hoops" with one's son? When the jury sees and feels what this arthrodesis has done to this man, they will create a reasonable award.

For every diagnosis, be sure to present its functional component as the arthrodesis example showed. A clinical diagnosis remains "clinical" until the jury is able to feel, touch, hear, smell, and see what it means to the person.

§ 29 Course of Treatment

If there is any technique a jury will find merciful, it is for the plaintiff to follow the rule, "No whiners." It is imperative to show disability but resist the temptation to overdo. Neither the patient nor the physician should overstate any aspect of the accident history, the injury, or the current condition: no adjectives. On the other hand, it is

[808] After the testimony, the lawyer should then clarify, "So that means that over this side of the arm, the patient has a loss of sensation?"

important to illustrate disability with concrete examples such as the inability to "shoot hoops."[809]

For a woman who enjoyed baking, if the accident injured her navicular bone and she is unable to use a rolling pin to roll out cookie dough for her family, this example crystallizes the injury, the disability, and the impact on the patient's life and on her family.

§ 30 Amount of Medical Expense

Medical expenses may be introduced through the patient but it also useful for the doctor to present the treatment bills so the jury can tie the doctor and the costs directly to the patient. Most jurisdictions provide that medical expenses are legitimate items of damages if the medical attention has been reasonably necessary and the charges themselves have been reasonable. In most instances the necessity of treatment can be inferred from the nature of the injury. The reasonableness of the bill might also be inferred if it has been paid. If unpaid, testimony may be needed to justify the amount of the bill. The validity or enforceability of the billing must never be contingent upon the outcome: the bill is valid.

A long course of treatment with one physician will always raise a question in the jurors' minds. Is the doctor "milking" the patient? In this case, it is important for the witness to explain why it was necessary for the prolonged treatment and for the provider to unequivocally state that her charges were "usual, customary, and reasonable" in the profession. This is especially true with chiropractic treatment or with massage therapists.

§ 31 Prognosis

[809] "Earthy" examples impress jurors since they are able to sympathize with the problem.

If the previous testimony was the "windup," the testimony with respect to prognosis is the "pitch." Fed.R.Evid. 703 permits the expert witness to gaze into the medical crystal ball and express opinions on what the future will bring. The facts have been laid through the testimony concerning the history, the clinical tests, the findings. Now, basing the opinion on concrete medical facts, the expert is free to relate the consequences. These will fall into well defined categories:

> 1. Future pain and disability. Will the plaintiff continue to have trouble? Will he improve physically? And more importantly, will he be able to return to his work, resume his normal activities, be restored to society?
>
> 2. Permanency. Has maximum improvement already occurred? If there will be future improvement, will a residuum of pain and disability remain? What will be the effects of these permanent conditions?
>
> 3. Future medical treatment and expenses. Will additional medical attention be necessary? How much of an economic burden will this entail? What will be a reasonable charge for these expenses if it is reasonably certain the plaintiff will incur.
>
> 4. Reduction of life expectancy. Have the injuries lessened the life expectancy of the plaintiff? Will he prove vulnerable to other diseases or conditions which will reduce his length of life?
>
> These are the matters which conclude the plaintiff's medical presentation.

The same is true of the defendant's doctor. The battle will no doubt be joined on these grounds and if so, the defendant will want to emphasize the more optimistic prognosis of his medical expert by reserving the prognosis until the last.[810]

[810] In a recent case, the defense filed a *Daubert* motion to exclude the patient's own treating physician who expressed an opinion on longevity. The defense argued that his opinions were mere conjecture and that there is no way to express an opinion on longevity since there was no way to test the hypothesis, that there was no particular error rate, and that there was no way to test whether the opinion could be subjected to falsifiability. In general, courts do permit treating physicians to express longevity opinions where the physician has some rational basis for his conclusion. See Appendix A.

Although the medical testimony has been categorized into distinct areas, the actual testimony will be developed in a logical flowing manner that moves easily from one area of interrogation into another. During the direct examination, it is helpful to have the doctor relate cause and effect as the testimony proceeds so that by the time the attorney is ready to "show" damages, the jury will be well acquainted with the medical terms, implications of each injury, and will easily follow the damage presentation.

Illogical supposition unfounded upon a medical basis will be ample reason for the court to curtail or to fully exclude testimony. Make sure any prognosis testimony is well reasoned and based upon a reasonable degree of medical certainty.

§ 32 Medical Witness Examination—Cross-Examination

Impeachment of a treating medical witness, or other medical expert witness, proceeds as cross-examination where the attorney is permitted to use leading questions. The attorney seeks to uncover bias, interest, prejudice, inconsistency,[811] omissions, and inconsistent statements of the witness on other occasions. Every attorney has her own style and there is no "right" or "wrong" method. One method this author prefers is to determine the most vulnerable point and to surround the cross-examination around that point, always aiming the arrows at the target case vulnerabilities.

For instance, suppose that the plaintiff's main medical witness is the treating physician who saw the patient on two occasions, each for ten minutes. He has testified that the patient now has a chronic low back syndrome and that this condition is fixed and permanent, that the patient will suffer for an indefinite time but,. At the patient's age of

[811] With another witness, physical evidence, or with common sense.

51, the patient claims, supported by physician testimony, that "it is unlikely that the pain will ever fully be gone or that the injury will ever heal."

One crucial approach to such a witness is to decide whether it is worth cross-examining at all. A jury may perceive this illogical position as "whining." For the sake of this monograph, however, assume that the attorney has decided to "attack." Here are some questions which illustrate the approach:[812]

Q: In two visits, ten minutes each, you concluded that this patient is totally disabled?
Q: You took no x-rays, performed no MRI, your neurologic examination consisted of 21 words … and that was how you reached this conclusion? And you are certain of your conclusions?
Q: Let me clarify something here Doctor,[813] you would like this jury to believe that Mr. Jones will suffer forever from this rear-end collision which didn't even deform his bumper?[814]
Q: (Raising a stack of depositions) In these cases you have testified for the plaintiff? And, (having nothing in the other hand) … in these cases you have testified for the defense?[815]
Q: When Doctor X testified (defense medical examination) he showed the jury the MRI scans which do not show any pathology. Yet you, with your background, training, and expertise, and extensive experience, you detect a chronic back strain … which can't be seen?[816]
Q: Isn't it true that in Gleem v. Colgate you testified, and correct me if I am wrong when I read this, "If you can't see it on MRI, it doesn't exist." So now, in this case, you can't see it on MRI, so there's no injury?[817]
Q: I know docs make a certain amount of money for doing examinations, can it true that last year you earned (paging through a sheaf of pages) $220,000 on examinations such as the one you did in this case?[818]
Q: So for $220,000 you would help these patients?[819]
Q: Dr. M is a neurosurgeon who examined Mr. Jones and found only poorly conditioned muscles. Yet it is your testimony that he is permanently disabled from this accident which occurred at 5 miles per hour? Don't you think a few sit-ups

[812] Cross-examination has been called the opportunity for the "attorney to testify" since the attorney limits the responses to "yes" or "no."
[813] The attorney must never behave in a disrespectful or disdainful manner.
[814] Impeach with common sense.
[815] Bias and prejudice.
[816] Inconsistency with medical testing.
[817] Inconsistent statement.
[818] Prejudice.
[819] Bias and prejudice.

would cure this condition?[820]

In automobile litigation, one may also cross-examine against "professional degrees:" osteopath v. allopath v. chiropractor. Careful, though, since some jurors may "love" their alternative medicine healers and the surgically rational approach may offend more than strengthen an argument where jurors have this bias.

To cross-examine against professional degree training means to point out the limits of the opinion expressed as a function of gaps in "medical knowledge." A chiropractor would not have the background, skill, or expertise to understand what an orthopedic surgeon may understand. This approach goes to the weight the jury will accord to the opinion evidence. Against medical specialties, too, this might be effective: neurosurgery v. family practice v. orthopedic surgery v. physical medicine and rehabilitation.

To some degree, cross-examination against professional degrees is done by implication, by what is not said, rather than by seeking to elicit direct testimony. For instance, suppose a chiropractor has testified that the client / patient will require a long course of continuing treatment; a defense neurosurgeon testified that "a tincture of time will cure." Both professionals are vulnerable:

Chiropractor v. neurosurgeon:

Q: Dr. Chiropractor, have you ever seen a laminectomy performed?

A: No

Q: What is spondylolisthesis?

[820] Inconsistency with another witness.

A: ...(fumbles with definition)

Q: But it is you're opinion that more of your manipulations will make this patient better?

The jury is left here with the implication that the chiropractor's opinion is not as authoritative as the neurosurgeon who knows the "fancy word."

Neurosurgeon v. Chiropractor:

Q: Dr. Neurosurgeon, you operate for a living?

A: Well, yes...

Q: But it is rare for you to actually provide "hands on therapy" where you actually feel the patient in a therapeutic session? To provide relief with physical manipulation?

A: No … neurosurgeons don't do that.

Here, the jury "sees" that the neurosurgeon is a mechanic; the chiropractor is an "healer." How cozy is the testimony!

In another aspect, concede the obvious; accept the fact that a jury will winnow and weigh the testimony, seeing a charade for what it is. Never "debate" with an expert witness. Finally, here, avoid nit-picking every detail to death. Jurors find that tedious and offensive.

§ 34 Conclusion:

Planning is everything in litigation and, as in all other areas of evidence, in scientific evidence, create a plan; stick to the plan. All the bravado, strategy and advocacy in the court room is worthless unless the expert is admitted as an expert in the requisite field and the evidence is itself admissible.

If real estate boils down to "location, location, location," scientific evidence in automobile litigation boils down to "foundation, foundation, foundation." The proponent must build the case on scientific substance. The substance may be reasonably debatable, and the law is liberal on the admission of scientific testimony, but lacking foundation, in terms of *Frye*, *Daubert*, and *Kumho Tire*, a trial court will exclude the testimony and this will be upheld on appeal.

The common thread to distinguish science from not-science are the four *Daubert* factors. Always spend considerable time in qualifying the expert in the precise field in which the expert will testify. Never confuse a witnesses' credentials with the admissibility of the opinion; they are unrelated unless the two areas intersect. Be sure to have the court rule on the admission of the expert witness as an expert witness and to admit the expert's opinion in the appropriate field. Be certain that the expert witness bases the testimony upon the case facts, that re-enactments or demonstrations are substantially similar to the facts in the case. Speculative opinions or those born of conjecture are irrelevant and inadmissible. While an illustrative demonstration which a witness uses to "educate" the jury so that the jurors will be better able to understand the complex scientific information is nearly always admissible, a re-enactment or reconstruction of the accident must be substantially similar to the accident's circumstances.

The "education" example is not itself "evidence" of one fact or another. On the other hand, the reconstruction attempt constitutes evidence. Beware when an expert witness attempts to bootstrap an "educational" example into a "reconstruction" example...a trick often tried and sometimes successful. To omit these basics is to assure

evidentiary flaws; flaws which could have been prevented, flaws which, in many cases, are often impossible to remedy in appeal.

When confronted with the admission of scientific evidence, if the evidence itself is more like astronomy than astrology, the evidence itself will probably be admitted into evidence. The next step is to cross-examine the argument's substance. In the advocacy, whether for the plaintiff or the defense, always reach for the stars.

§35 SCIENTIFIC EVIDENCE IN MEDICAL NEGLIGENCE LITIGATION:

Introduction:

The first part of this monograph discussed the fundamentals of *Frye*, *Daubert*, and *Kumho Tire* in the context of Fed.R.Evid. 702.[821] The court's analysis in medical negligence litigation is identical to that in automobile litigation and only a few points warrant emphasis here.[822] A decision whether to admit or to exclude an expert witness's testimony lies within the court's discretion, therefore, on appeal the standard of review is "abuse of discretion." As any trial lawyer knows, these discretionary decisions are next to impossible to overturn on appeal. Besides that, no lawyer wants an appeal. What all trial plaintiff trial lawyers want is resounding victory at the trial level … or better yet, a safe, negotiated, acceptable settlement, without the risks at trial.

This section concerns how trial courts deal with scientific testimony in medical negligence and in related medical litigation. In the past few years, following *Daubert*, opposing admission of scientific industry has risen to become a major cottage industry since derailing a case, prior to trial, especially where successful, often delivers a death blow. What must a busy lawyer know to bring or to defend such a motion in the context of medical litigation? Keep reading!

To begin, consider this example problem from a case currently under litigation. The plaintiff has been catastrophically injured when the surgeon did not appropriately respond to a code. The surgeon delayed in placing an endotrachael tube and, argues the plaintiff's attorney, that delay caused the brain damage. The defense deposed the

[821] *See*, ELLIOTT B. OPPENHEIM, THE MEDICAL RECORD AS EVIDENCE §§ 1-5(a); 1-10; 1-25(a) (Lexis 1998).

plaintiff's damages expert witness, the patient's current treating physician. That doctor expressed an opinion on the patient's longevity. The defense has moved that this witness' testimony should be struck on the basis that he is not qualified to render an opinion on his own patient's longevity. How long this patient will live is conjecture, argued the defense. Of course, it is conjecture, said the plaintiff, all such projections are conjecture … but conjecture in this area is routine for the treating physician and based upon the treating physician's credentials. Who wins this motion?

Review:

The general *Daubert* rules presented in Part I, held that (1) if the scientific evidence will assist the trier of fact; then (2) the judge should admit the evidence and allow the jury to weigh the credibility of the evidence. *Daubert*'s two prongs are: (1) Is the reasoning and methodology underlying the theory or techniques reliable? Is the evidence scientific?; (2) is the proposed evidence relevant to the case facts? The court operates, in this sense, as a gatekeeper … and that is the court's function. The court excludes evidence which is unscientific, incapable of authentication, or testimony where the witness really, though knowledgeable in some fields, is not sufficiently knowledgeable and authoritative in the field in question. The *Kumho Tire* decision applied the *Daubert* standard to all expert testimony.

Some cases exemplify the current status of the exclusion of testimony in medical negligence and in medically related litigation.

***Daubert* in Summary Judgment:**

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[822] A monograph limited to medical negligence litigation cases would not adequately cover the topic and the audience would be limited, as well.

In *Cortes-Irizarry v. Corporación Insular de Seguros*[823] the plaintiff brought a medical negligence claim in which she alleged that the obstetrician negligently post-dated her pregnancy. This negligence caused the child's brain damage. The trial court granted summary judgment against the plaintiff but the appellate court reversed on several grounds including the legal conclusion that the appellate court would not engage in a *Daubert* analysis since the initial trial court was not asked to do so.

This case represents an important point for both plaintiff and defendant. **A party must ask the trial court to engage in a *Daubert* analysis, otherwise the court has no obligation to consider these factors.** Further, *Daubert* may be applied in a summary judgment proceeding.

The plaintiff's experts, an obstetrician and a neurologist, gave opinions that the post-dating was negligent and that the post-dating caused the brain injury. The defense expert concluded that the obstetrician figured the date precisely, that the tests suggested by the plaintiff's experts were superfluous, and that "intrauterine cytomegalovirus (CMV) infection, a rare condition which occurs in 0.2 to 2.2 percent of all live births" caused the injury.[824]

The defendant argued that the trial court had the power to exclude the plaintiff's expert evidence under *Daubert*.[825] Without that evidence, the plaintiff had no case.

[823] 111 F.3d 184 (1st Cir. 1997). This opinion is a literary masterpiece written by The Honorable Circuit Judge Selya. De novo review is appropriate for review of summary judgments since the issue is an interpretation of law and fact.
[824] *Id.* at 186.
[825] *Id.* at 187-88.

Plaintiff argued that *Daubert* may not be applied at this stage of litigation but this court concluded that "the truth lies somewhere in between."[826]

The plaintiff "posits that *Daubert* is strictly a time-of-trial phenomenon."[827] The appellate court concluded here that *Daubert* may play a role in the summary judgment phase of civil litigation since, if expert testimony fails to "cross Daubert 's threshold for admissibility, a district court may exclude that evidence from consideration when passing upon a motion for summary judgment.[828]

The court continued its analysis noting that although *Daubert* can be used in summary judgment motions, "it should be used profligately."[829] The trial setting "normally will provide the best operating environment for the triage which *Daubert* demands."[830] *Voir dire* is an extremely helpful device in evaluating proffered expert testimony,[831] and this device is not readily available in the course of summary judgment proceedings.

Moreover, given the complex factual inquiry required by *Daubert*, courts will be hard-pressed in all but the most clear-cut cases to gauge the reliability of expert proof on a truncated record.[832] Courts should not exclude debatable scientific evidence in summary

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[826] *Id.* at 188.
[827] *Id.* Internal quotations omitted.
[828] *Id.* (citing Cavallo v. Star Enter., 100 F.3d 1150, 1159 (4th Cir.1996), petition for cert. filed, 65 U.S.L.W. 2399 (U.S. Mar. 19, 1997) (No. 96- 1493); Peitzmeier v. Hennessy Indus., Inc., 97 F.3d 293, 297-99 (8th Cir.1996), petition for cert. filed, 65 U.S.L.W. 3539 (U.S. Jan. 29, 1997) (No. 96-1212); Claar v. Burlington N.R.R., 29 F.3d 499, 502-05 (9th Cir.1994); Porter v. Whitehall Lab., Inc., 9 F.3d 607, 612, 616-17 (7th Cir.1993).
[829] *Id.*
[830] *Id.*
[831] *Id.* (citing Sepulveda, 15 F.3d at 1184 n. 15).
[832] *Id.*

judgment "without affording the proponent of the evidence adequate opportunity to defend its admissibility."[833]

The court concluded that although *Daubert* may be used at the summary judgment phase of litigation, the defendants here never asked the court to engage in the *Daubert* analysis and the court made no effort to do so on its own.[834] The defense asked the trial court to exclude the expert witness testimony on two inappropriate bases: (1) that the defendant's evidence is more persuasive than the plaintiff's evidence; (2) that the plaintiff's evidence, if admitted, would server only to confuse the jury.[835]

This case is emblematic for a problem frequently seen in the landscape of the admissibility of scientific evidence: judicial ineptitude. Many well-respected judges cringe when they see these motions. In this case the trial court did not understand how to handle scientific evidence nor how to analyze expert witness evidence testimony. Unfortunately this ineptitude is frequent among the trial court judiciary. Many lawyers enter the profession since they found "science" difficult to understand and one might wryly conclude, although there probably is more than a grain of truth to this, that judges enter the judiciary because they did not find the practice of law fulfilling, for one reason or another. Therefore trial lawyers, who may also suffer from being "scientifically challenged," are confronted with judges who do not understand *Frye*, *Daubert*, and *Kumho Tire* and the long lines of their progeny which flesh out all of the variations on the various themes.

Is it Science?:

[833] *Id.*
[834] *Id.* at 188-89.
[835] *Id.* at 189 n.5.

In *Bushore v. Dow Corning-Wright Co.*,[836] the court was presented a common evidentiary question. Is the proffered evidence "science?" How does a court determine whether evidence is scientific in the medical setting? Some of medicine is science; some of it is art. Should courts exclude the art and admit only the science even where the art plays an important role in the care and treatment of the patient?

This is a superbly well-written and terse opinion which exemplifies the sort of "scientific evidence" one will experience cloaked in the credentials of an otherwise superbly credentialled witness but where the evidence itself "is not science." Following an evidentiary hearing, here, the appellate court correctly excluded causation testimony that breast implants caused fibromyalgia.[837]

The plaintiff's expert witness had "impressive credentials" in Rheumatology but what he lacked was any scientific support for his opinions. His opinions did not meet the *Daubert* test for opinion testimony.[838] At issue was whether silicone breast implants caused fibromyalgia.[839]

The plaintiff's expert based his conclusions on his (1) clinical experiences; and (2) case studies. The case studies consisted of a retrospective chart review of patients who underwent removal of the breast implants, explantation, and who then "improved." He published this study under Frank B. Vasey, *et al.*, *Clinical Findings in Symptomatic*

[836] 1999 U.S. Dist. LEXIS 20697 (M.D.Fla. 1999).
[837] *Id.* at *2.
[838] *Id.* at *3.
[839] *Id.* at *3 n.3. Fibromyalgia is a disorder characterized by muscle pain, stiffness and easy fatigability. The cause is unknown and an estimated three million are affected in the United States. See Allison v. McGhan Medical Corp., 184 F.3d 1300, 1305 n. 6 (11th Cir. 1999) (citing The On-line Medical Dictionary (1997-98), http://www.fibromyalgia.com>)."

Women With Silicone Breast Implants, 24(1) SEMINARS IN ARTHRITIS AND RHEUMATISM 22 (August 1994).[840]

Further, this doctor "followed" patients after that study, perhaps as many as 1000 patients, all of whom confirmed "fibromyalgia-like symptoms" which symptoms gradually disappeared over time after explantation.[841] The court noted that expert testimony is proper when

> (1) the expert is qualified to testify competently regarding the matters he intends to address; (2) the methodology by which the expert reaches his conclusion is sufficiently reliable as determined by the sort of inquiry mandated in *Daubert*; and (3) the testimony assists the trier of fact, through the application of scientific, technical, or specialized expertise, to understand the evidence or to determine a fact in issue.[842]

Under Fed.R.Evid. 702 and *Daubert*, the court continued its analysis.[843] In particular, it examined the gatekeeping role of the trial court.[844] The *Daubert* court listed four noninclusive factors which courts should consider in determining reliability under Rule 702. Under a preponderance of the evidence, the proponent must show that the evidence is reliable.

To make this determination the court must analyze the "big-four," noninclusive *Daubert* factors:

> (a) whether the theory or technique can be tested; (b) whether it has been subjected to peer review and publication; (c) whether the technique has a high known or potential rate of error; and (d) whether the theory has attained general acceptance in the scientific community.[845]

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[840] *Id.* at *3-*4.
[841] *Id.* at *4.
[842] *Id.* at *4-*5. (citing Allison v. McGhan Medical Corp., 184 F.3d1300, 1309 (11th Cir. 1999) (citing City of Tuscaloosa v. Harcros Chem., Inc., 158 F.3d 548, 562 (11th Cir. 1998) (affirming the district court's *Daubert* rulings excluding Allison's causation experts).
[843] *Id.* at *5
[844] (Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 597 (1993)).
[845] 1999 U.S. Dist. LEXIS 20697, *5 (citing Daubert, 509 U.S. at 593-94; see also Allison, 184 F.3d at 1312).

Further, "[t]he primary focus must be solely on principles and methodology, not on the conclusions that they generate."[846] The, the proponent of the testimony does not have to prove that the testimony is scientifically correct — but that it is reliable.[847]

Daubert's relevance prong requires the court to ensure that the evidence is relevant — "logically advances a material aspect of the proposing party's case."[848] The evidence then must have a valid scientific connection to the disputed facts in the case.[849] This nexus "has been denominated "fit."[850] In this "fit" analysis, the Court first took up the expert's qualifications[851] and concluded that his credentials were "impressive." He was well qualified to give an opinion on fibromyalgia.[852] Where the plaintiff's argument became flimsy was in the determination of the *reliability* of the scientific evidence itself:[853] whether the theory or technique can be and has been tested.[854]

Here, the expert "relied upon clinical impressions[855] … [without] … defined clinical criteria or objective medical tests to confirm silicone-related disorder."[856] The expert testified that plastic surgeons had replicated the study and confirmed the results.[857] In this instance, though, the court noted that the study (1) had no controls; (2) a defense toxicologist testified that these impressions are clinical observations and not something

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[846] *Id.* (citing Daubert, 509 U.S. at 595).
[847] *Id.*
[848] *Id.* at *6 See Allison, 184 F.3d at 1312 (citing Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F.3d 1311, 1315 (9th Cir. 1995) (on remand)).
[849] *Id.* at *6. (citing Allison, 184 F.3d at 1312 (citing Daubert, 509 U.S. at 591)).
[850] *Id.* at *6-*7 (*Daubert*, 509 U.S. at 591 n.4.).
[851] *Id.* at *7 (citing Allison, 184 F.3d 1300, 1309).
[852] *Id.*
[853] *Id.* at *8.
[854] (Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 593; see also Bradley v. Brown, 42 F.3d 434, 438 (7th Cir. 1994) ("The first and most significant Daubert factor is whether the scientific theory has been subjected to the scientific method."). *Id.* at *8-*9.
[855] These clinical impressions are empirical evidence. For instance, the expert may testify, "It is my clinical impression that patient's with XYZ often have associated with that condition HIJ." When asked to support this "clinical impression" with authoritative writings including journal articles, one may soon discover that this "clinical impression" is not scientifically valid — conjecture, pure and simple. "Clinical impressions" are inadmissible under *Daubert*.
[856] *Id.* at *9.
[857] *Id.*

which can be tested and are not subject to replication.[858] The expert, himself, (3) admitted that there is no test which can distinguish "silicone related disease" from natural fibromyalgia."[859] The court concluded that "at best" this expert's opinion were hypotheses, that they eluded confirmatory testing; his opinion remained untested.[860]
Has the theory or technique been subjected to peer review and publication? The expert had published these "outcome" studies in peer-reviewed medical journals,[861] in the forms of abstracts and letters to the editor but to date, he had not published an epidemiological study in a peer-reviewed medical journal.[862] While publication is not a *sine qua non* for admissibility in court, but only a component of "good science," publication "increases the likelihood that substantive flaws in methodology will be detected."[863] In essence, publication in peer-reviewed "mainstream" journals does the court's analysis for the court! Nevertheless, "the fact of publication in a peer reviewed journal is a relevant, though not dispositive, consideration in assessing the scientific validity of a particular methodology."[864]
Next, the court turned to the "known or potential rate of error and the existence and maintenance of standards controlling the technique's operation."[865] In this instance, the plaintiff conceded that "outcome methodology" is subject to error due to small sample sizes and a selection bias.[866] Further, these "outcome" studies acknowledge a lack of internal controls and an higher rate of error than other forms of epidemiological studies.[867] This method, argued the plaintiff, produces "useful and otherwise unavailable scientific knowledge."[868]
The defendant argued that the expert's techniques used only theories, hypotheses, and observations.[869] The expert's techniques, even if valid, had an inherently high error rate.[870] There is a placebo effect inherent in the methodology since patients would expect improvement following explantation. Further, the doctor would only verify his own theory because *he makes* the determination whether the patient is "better."[871] There is no clinical definition for the illness; no objective findings. This methodology is questionable, concluded the court.[872]
Widespread acceptance in the general scientific community can be a factor in ruling whether particular evidence is admissible since a known technique which has attracted only minimal support may be viewed with skepticism.[873] Here, with respect to

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[858] *Id.*
[859] *Id.* at *9.
[860] *Id.* at *10.
[861] *Id.* at *10-*11.
[862] *Id.* at *11.
[863] *Id.* at *11.
[864] *Id.*
[865] *Id.* at *11-*12. (citing Daubert, 509 U.S. at 594).
[866] *Id.* at *12.
[867] *Id.*
[868] *Id.*
[869] *Id.*
[870] *Id.*
[871] *Id.* at *13.
[872] *Id.*
[873] *Id.* at *14.

fibromyalgia, numerous organizations have expressed skepticism and have concluded that there is "insufficient evidence" to support an association between silicone breast implants and connective tissue disease."[874] The defense cited three epidemiology studies conducted on breast implants and fibromyalgia — none supported the plaintiff's opinion evidence.[875] The court, following this analysis, concluded that the plaintiff's causation opinion was not generally accepted in the scientific community.[876]

Relevance = "Fit"

Does the proposed expert testimony advance a material aspect of the proposing party's case?[877] The plaintiff's position is that the expert witness's testimony "fits perfectly" since he will testify that the defendant's implants caused the fibromyalgia.[878] This testimony, then will assist the trier of fact ultimately to decide the facts in dispute.[879] The defendant avers that this testimony is not relevant under Florida law "which requires plaintiff to prove by a preponderance of the evidence, with reasonable medical probability, that defendant's alleged negligence was the proximate cause of the plaintiff's injury.[880]

The defendant argued then, that the expert witness based his expert opinion on a "temporal sequence of explanation followed by improvement" which is inconsistent with the *Allison* decision.[881]

In this instance, the appellate court reasoned that appropriate fit would be produced by an epidemiological study … which this expert is unable to produce.[882] The "outcome study" lacks any testing to distinguish silicone related disease from natural fibromyalgia. There is no "fit,"[883] and the court concluded that the witness' testimony should be excluded since the testimony met neither the reliability nor the relevance prong of the *Daubert* analysis.[884] Further, since the witness' testimony did not pass *Daubert* muster, this court

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[874] *Id.* at *14-15.

[875] *Id.* at *15. See generally Betty A. Diamond et al., Silicone Breast Implants in Relation to Connective Tissue Diseases and Immunologic Dysfunction, A Report by a National Science Panel to the Honorable Sam C. Pointer Jr., Coordinating Judge for the Federal Breast Implant Multi-District Litigation, at IV-3 (November 17, 1997). *Id.* at *16.

[876] *Id.* at *17.

[877] *Id.* (See Allison, 184 F.3d at 1312 (citing Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F.3d 1311, 1315 (9th Cir. 1995) (on remand)).

[878] *Id.*

[879] *Id.* at *18.

[880] See Christopher v. Cutter Laboratories, 53 F.3d 1184, 1191 (11th Cir. 1995). *Id.* at *18. In re Breast Implant Lit., 11 F. Supp. 2d 1217, 1226 (D. Colo. 1997) for the proposition that "plaintiff must present expert testimony showing that her exposure to breast implants more than doubled the risk of her alleged injuries in order to meet the "more likely than not" burden." *Id.*

[881] 184 F.3d at 1321. (stating that the mere coincidence of temporality of the dropping antinuclear antibodies and the plaintiff's subjective reports of decreased fatigue after explantation were questionable bases for the proposed expert to reverse his prior opinion that he did not believe the plaintiff's implants were a source of her medical problems, which was grounded on two clinical visits with the plaintiff). *Id.* at *18-19.

[882] *Id.* at *19.

[883] *Id.*

[884] *Id.* at *21.

never reached the Florida proof issue.[885]

Inferential Causation is Not Scientific:

In *Black v. Food Lion, Inc.*,[886] another fibromyalgia case, unraveled in Texas. A woman slipped and fell in a food store and, following a bench trial in which the plaintiff was awarded nearly $300,000, the appeal centered upon the causation of fibromyalgia, "an elusive but debilitating condition." Did the plaintiff produce reliable expert evidence that the accident caused the fibromyalgia. The appellate court concluded that she did not succeed and it based its analysis on *Kumho Tire Co., Ltd. v. Carmichael*.[887]

The plaintiff's burden was to prove "to a reasonable degree of medical certainty, based on a reasonable medical probability and scientifically reliable evidence" that the fall caused the fibromyalgia.[888] The court balanced its opinion on *Merrell Dow Pharms., Inc. v. Havner*[889] holding that "possibility, speculation, and surmise" are insufficient to support expert testimony regarding causation.[890]

The Court concluded that "[d]espite the elusiveness which forecloses an absolute determination of causality, the specialists in the field recognize an accepted protocol in rendering an opinion in terms of reasonable medical probability."[891] The witness ruled other possibilities for the fibromyalgia and then concluded that it was the accident which caused the fibromyalgia.[892]

The Texas court noted that *Kumho Tire* "refine[d] in a common-sense way, but does not undermine, the use of the specific *Daubert* factors as a reference point for gauging the reliability of potential expert testimony."[893] Justice Breyer, in *Kumho Tire*, analyzed the issue this way: whether a trial judge determining the "admissibility of an engineering expert's testimony" may consider several more specific factors that Daubert said might "bear on" a judge's gate-keeping determination.[894]

The Texas court reasoned here that the permissive "may" in *Kumho Tire* "should not be misunderstood to grant open season on the admission of expert testimony by permitting courts discretionarily to disavow the Daubert factors."[895] A *Daubert* analysis is always fact specific and the *Daubert* factors may not all apply even to the admissibility of pure scientific testimony.

Kumho Tire also stressed that the *Daubert* factors may be relevant to the reliability of experience-based testimony. The overarching goal of Daubert's gate-keeping requirement, however, is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that

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[885] *Id.*
[886] 171 F.3d 308 (5th Cir. 1999).
[887] 526 U.S. 137, 119 S. Ct. 1167 (1999). *Id.* at 309.
[888] *Id.* at 310.
[889] 953 S.W.2d 706, 711-12 (Tex. 1997).
[890] *Id.*
[891] *Id.*
[892] *Id.*
[893] *Id.* at 310-11.
[894] *Id.* at 311 (citing Kumho Tire, 1999 W.L. 152455, at *9 (citing Daubert, 509 U.S. at 592-94.)
[895] *Id.* at 311.

characterizes the practice of an expert in the relevant field.[896]

Reasoning further, then, Justice Breyer wrote "[a]s we pointed out in Joiner, "nothing in either Daubert or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert."[897] Kumho Tire, in this court's view, represents a "starting-point" for the analysis in the usual case.[898] The court's task is to decide whether the *Daubert* factors are even appropriate to apply and then, once it considers the *Daubert* factors and then to analyze other factors which may not appear in *Daubert*.[899] This implies an intellectually aggressive court even in the absence of weak briefs. Note that where medical science does not know the cause or etiology of an entity[900] then the theory which an expert advances remains a theory and the theory is isolated and unsubstantiated.[901] Where experts proceed with an educated guess, even though the experts themselves are pre-eminent in their respective fields, the "educated guess" is not transformed into scientific evidence which becomes admissible. "Mere conjecture does not satisfy the standard for general acceptance, except to demonstrate general acceptance of a proposition."[902] In this case, there was no underlying medical theory which supported the causation: the fall caused the fibromyalgia.

What is a reliable opinion under the standards of *Daubert* and *Kumho Tire*? An expert must follow "in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field."[903] In *Ontiveors*, the plaintiff had a difficult time arguing that the pedicle screws failed where the non-union developed at the site where the Dyna-Lok system remained intact.[904]

What is a judge to do when confronted by evidence originating from an expert witness who is well trained and credible but where the evidence is opposed on a "scientific admissibility" basis? The next case is instructive and the answer is simple: admit the evidence; then let the jury decide.

In *Merilis v. Lapreyrolerie*[905] the court reasoned "(i)n borderline questions, it is more appropriate for a judge to admit the evidence than to exclude it from the factfinder because "vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional, and appropriate means of attacking

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[896] *Id.* at 311. (citing Kumho Tire, 1999 W.L. 152455, at *10).

[897] *Id.* (Kumho Tire, 1999 W.L. 152455, at *14 (citing General Elec. Co. v. Joiner, 522 U.S. 136, 146, 118 S. Ct. 512, 519, 139 L. Ed. 2d 508 (1997)).

[898] *Id.* at 311. (See, e.g., Moore v. Ashland Chemical, 151 F.3d 269, 275 (5th Cir. 1998) (en banc) (noting Daubert's "five-factor, non-exclusive, flexible test" for determining the reliability of expert testimony); Watkins v. Telsmith, Inc., 121 F.3d 984, 988-89, 990-91 (5th Cir. 1997) ("Not every guidepost outlined in Daubert will necessarily apply to expert testimony . . . but the district court's 'preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid . . .' is no less important." (citing Daubert, 509 U.S. at 592-93).

[899] *Id.* at 312.

[900] i.e. -fibromyalgia, reflex sympathetic dystrophy, Bendectin.

[901] *Id.* at 312.

[902] *Id.*

[903] Ontiveors v. Danek Medical, Inc., 1999 U.S. Dist. LEXIS 18873, *4 (D.Utah 1999) (citing Kumho Tire Co. Ltd. v. Carmichael, 526 U.S. 137 (1999)).

[904] *Id.* at *4.

[905] 2000 U.S. Dist. LEXIS 3849, *6 (E.D.La. 2000).

shaky but admissible evidence."[906]
Briefly, this case concerned the issue of an endocervical curettage following an abnormal Pap smear … but the patient was pregnant and the ECC caused a stillborn delivery at twenty weeks gestation.[907] The plaintiff produced an expert witness with forty years of experience, a Board certified obstetrician and gynecologist who taught at Tulane University School of Medicine. The defense challenged this expert's qualifications! The court quickly denied summary judgment in this case and admitted this practitioner as an expert witness on the standard of care in obstetrics and gynecology[908] and on causation.[909]
Conclusion:

Daubert has become the ballpark for modern medical negligence gamesmanship, where one party can involve the opposing party in a costly fray over whether expert testimony is admissible … even when they know that the evidence is admissible. *Daubert* motions are subject to abuse. Nevertheless, Fed.R.Evid. 702 motions may be used to narrow trial issues, to exclude expert witnesses, and to promote settlement negotiations. Scientific evidence is evidence which is reliable, which is subject to legitimate verification. In general, and the answer to the questions posed at the beginning of the article, the trial court should permit the witness to testify and to have the jury weigh the weight and credibility of the witness's credential and the testimony.
Always be wary of testimony from any expert witness where the expert is a "big name" who screams "this is scientific because I say it is science!" Case law does not support admission of that testimony. Be wary of "inexpert experts," those who would testify out of their field of expertise, where they "know of" the standard of care, for instance. Always look for real experts, expert witnesses with "blood on their shoes."
Finally, look for the simple logic with all of these cases. Notice how the court will quickly analyze credentials, then analyze the precise opinion evidence; then proceed to the basis of the opinion. Where an opinion is inferential, based upon outcome studies, or the expert witness' "clinical experience," and balanced upon evidence which is not subject to verification by publication, the lawyer is looking at coal, not a diamond.

[906] (citing Daubert, 509 U.S. at 596).
[907] *Id.* at *2.
[908] *Id.* at *8-*9
[909] *Id.* at *9.