Admissibility of Expert Testimony in Federal Courts

It is no exaggeration to say that during the last thirteen years the rules governing how scientific and technical evidence is admitted in federal courts have undergone a revolution. It started with the Supreme Court’s 1993 decision in *Daubert v. Merrell Dow*, which focused on the criteria for admitting scientific evidence. It then progressed through that Court’s 1999 decision in the *Kumho Tire* case, which expanded the *Daubert* analysis to technical and specialized subjects that do not fall within the category of “science.” The final step in the evolutionary process occurred in December of 2000, when Federal Rule of Evidence 702 was amended to incorporate the changes initiated by *Daubert* and *Kumho Tire*.

As a result of this revolution, federal trial judges are now required to perform as so-called “gatekeepers” to determine as a threshold matter whether expert testimony will be allowed to be heard by the jury in civil and criminal trials. Few people familiar with the judicial system are surprised by the frequency with which trial judges must exercise this role. Expert witnesses testify in most cases, civil and criminal. What sometimes is surprising, though, is the variety of expert testimony that federal judges must contend with. The table of contents for the Federal Judicial Center’s Manual for Scientific Evidence identifies the following subjects: statistics and multiple regression evidence; survey research; estimation of economic losses; epidemiology; toxicology; medical testimony; DNA evidence; and engineering practice and methods.

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1 Paul W. Grimm, Chief Magistrate Judge, United States District Court, District of Maryland


4 *Daubert*, 509 U.S. at 592-93.


Associate Justice Stephen Breyer, author of the Supreme Court’s majority opinion in the Joiner decision, which discussed admissibility of scientific evidence, has offered the following observations on the role of science in court cases:

In this age of science, science should expect to find a warm welcome, perhaps a permanent home, in our courtrooms. The reason is a simple one. The legal disputes before us increasingly involve the principles and tools of science. Proper resolution of those disputes matters not just to the litigants, but also to the general public—those who live in our technologically complex society and whom the law must serve. Our decisions should reflect a proper scientific and technical understanding so that the law can respond to the needs of the public.8

And, while there is abundant literature regarding the Daubert/Kumho Tire analysis that must be applied by courts in admitting scientific and technical evidence, there is not much written from the perspective of the trial judge who must apply it. In Daubert, Justice Blackmun, writing for the majority, expressed the Court’s confidence in the ability of federal trial judges to function as gatekeepers of admissibility of scientific and technical evidence to insure that only qualified experts are permitted to testify on these subjects, based on sufficient facts or data, and reliable methodology that properly has been applied to the facts of the particular case. He said:

Faced with a proffer of expert scientific testimony, then, 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. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and whether that reasoning or methodology properly can be applied to the facts in issue. We are confident that federal judges possess the capacity to undertake this review.9

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9 Daubert, 509 U.S. at 591 (emphasis added) (internal citations omitted).
Chief Justice Rehnquist, in his opinion concurring in part and also dissenting in part from the majority opinion, was no less confident in the ability of the federal trial judiciary, but was less certain that the Court’s ruling would provide them with the means to do the job assigned. He observed:

The Court speaks of its confidence that the federal judges can make a ‘preliminary’ assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue. The Court then states that a ‘key question’ to be answered in deciding whether something is ‘scientific knowledge’ ‘will be whether it can be (and has been) tested.’ Following this sentence are three quotations from treatises, which not only speak of empirical testing, but one of which states that the ‘criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.’ I defer to no one in my confidence in federal judges; but I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its ‘falsifiability,’ and I suspect some of them will be, too. I do not doubt that Rule 702 confides to the judge the gatekeeping responsibility in deciding questions of the admissibility of proffered expert testimony. But I do not think it imposes on them either the obligation or the authority to become amateur scientists in order to perform that role.\textsuperscript{10}

Indeed, Justice Breyer has noted that federal judges typically are generalists, not specialists, and few have training or experience in science and technology.\textsuperscript{11} A cursory look at the types of civil cases filed in federal court confirms the breadth of subjects with which federal judges must contend: social security cases, prisoner petitions, forfeitures and tax suits, real property cases, labor cases, contracts cases, tort cases, copyright, patent and trademark suits, civil rights cases and antitrust suits.\textsuperscript{12}

\begin{footnotesize}
\begin{enumerate}
\item Daubert, 509 U.S. at 600. \\
\item “[M]ost judges lack the scientific training that might facilitate the evaluation of scientific claims or the evaluation of expert witnesses who make such claims. Judges typically are generalists, dealing with cases that can vary widely in subject matter.” Stephen Breyer, \textit{Introduction} to \textit{Reference Manual on Scientific Evidence} 1, 4 (2\textsuperscript{nd} ed. 2000). \\
\end{enumerate}
\end{footnotesize}
It is the purpose of this chapter to offer guidance to lawyers and expert witnesses on how better to understand the process by which expert testimony is admitted into evidence in federal courts. If you will, it outlines for non-judges the methodology and principles that the judges must use to determine whether to permit experts to testify. It is hoped that a better appreciation of this process and what it requires will result in more focused submissions to the court and, correspondingly, better rulings from judges. The chapter will begin with an overview of the types of cases that most frequently involve expert testimony. Next, it will discuss the framework in which expert evidence is presented – the adversary system. Then, it will address the evidentiary and procedural rules that govern admissibility of expert evidence in trials, followed by a discussion regarding each of the factors that trial judges must evaluate in deciding whether or not to admit expert testimony. It concludes with some observations from the perspective of a trial judge about how experts and lawyers can be more effective in presenting expert testimony to the court and challenging expert testimony of adverse parties. With this in mind, the starting place is to appreciate the frequency with which experts testify in court and the types of experts most often called to testify.

A recent study by the Federal Judicial Center, the organization responsible for sponsoring research to improve judicial administration, succinctly described the type of cases that most often involve expert witnesses:

The most frequent types of trials involving experts – 45% of those case types reported – were tort cases, primarily involving personal injury or medical malpractice. Tort cases were followed in frequency by civil rights cases (23%); contract cases (11%); intellectual property cases, primarily patent cases (10%); labor cases (2%); prisoner cases (2%); and other civil cases (8%).

The study further concluded:

Compared to all civil trials, experts were overrepresented in tort cases (which constituted only 26% of all civil trials) and intellectual property cases (3% of all civil trials). Experts

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13 Molly Treadway Johnson et al., Expert Testimony in Federal Civil Trials: A Preliminary Analysis, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 1, 1 (2nd ed. 2000).
were under-represented in civil rights cases (31% of all civil trials), contract cases (14% of all civil trials), labor cases (4% of all civil trials), and prisoner cases, nearly all of them civil rights actions (14% of all civil trials). In cases classified as ‘other’ civil trials, experts were represented in equal proportion to the general case type.\textsuperscript{14}

It is also helpful to see what type of experts most frequently testify, which is reflected in the following chart:

<table>
<thead>
<tr>
<th>Type of Expert</th>
<th>% of Total Expert Testimony</th>
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<tbody>
<tr>
<td>Medical/Mental Health</td>
<td>43.2%</td>
</tr>
<tr>
<td>Engineering/Safety</td>
<td>24.1%</td>
</tr>
<tr>
<td>Business/Law/Financial</td>
<td>22.1%</td>
</tr>
<tr>
<td>Scientific Specialities</td>
<td>7.3%</td>
</tr>
<tr>
<td>Other</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Within the category of medical/mental health experts, “the specific types [of experts] most frequently represented were treating physicians, surgeons, and psychiatrists (each 3.8% of the total experts). Mental health experts, particularly clinical psychologists, but also including social workers and counselors, accounted for almost 4% of the experts presented.”\textsuperscript{15} The studies confirm the anecdotal information provided by lawyers and judges – mental health experts are among the most frequent experts appearing in civil cases tried before juries. And, while no published studies have been found regarding the types of experts that testify in criminal cases, it is not uncommon for mental health professionals to testify in those cases as well at both the guilt/innocence stages and the sentencing stage. Therefore, while the observations in this chapter are applicable for all types of experts, they are specifically offered with the hope of better familiarizing psychologists and mental health practitioners with a fuller understanding of what is

\textsuperscript{14} Id. at 2.

\textsuperscript{15} Id.
involved in determining whether they will be permitted to testify in civil and criminal cases. An appreciation of the adversary system is a good starting place for this process.

**The Adversary System of Dispute Resolution within the Judicial System**

Judges are not in the business of deciding what is scientific or technical “truth” in some abstract sense. They preside over a process designed to determine situational truth in the narrow context of resolving disputes between individual, organizational or governmental parties who usually have something important at stake, and whose interests are adverse.\(^\text{16}\) Thus, there is a fundamental difference between “scientific proof” and “legal proof.” As Justice Breyer has observed, “The search is not a search for scientific precision. We cannot hope to investigate all the subtleties that characterize good scientific work. A judge is not a scientist, and a courtroom is not a scientific laboratory. . . . The law must seek decisions that fall within the boundaries of scientifically sound knowledge.”\(^\text{17}\) Similarly, in *United States v. Horn*, a criminal case involving a challenge to the admissibility of field sobriety tests in drunk driving cases, the judge commented, “[j]udges do not determine the reliability of scientific or technical issues in the abstract but rather in the context of deciding a specific dispute.”\(^\text{18}\)

While most people have a basic familiarity with how the adversary system works in court cases, few really consider just how little information the trial judge has throughout the case about the facts underlying the dispute that brought the case to court. In criminal cases, the documents that charge the defendant often are boilerplate recitations of statutory or common law offenses,

\(^{16}\) For judges ruling on admissibility of scientific or technical evidence the “primary objective is usually process-related: seeing that a decision is reached fairly and in a timely way. And the decision in a court of law typically (though not always) focuses on a particular event and specific individualized evidence.” Stephen Breyer, *Introduction* to *REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* 1, 4 (2\(^{\text{nd}}\) ed. 2000).

\(^{17}\) *Id.*

with little supporting factual detail. In civil cases, where the judge is more likely to be aware of the facts, he still operates largely in the dark for most of the case. Federal Rule of Civil Procedure 8 requires only that plaintiffs filing lawsuits provide bare-bones “notice” pleadings that identify the claims asserted against the defendants, and proscribes the inclusion of “evidentiary” facts – the who, what, where, why and how of the underlying dispute. Preliminary challenges to the lawsuit on jurisdictional grounds, or on the sufficiency of the pleadings, can provide some insight to the facts, but these challenges are usually quite specific, and challenges to the sufficiency of the complaint usually are based on a reading of the four corners of that document without reference to extrinsic facts.

The discovery process provides the parties and their lawyers with five methods of learning the underlying facts, but the discovery requests and the responses to them – the documents produced, the sworn written answers to interrogatories or transcripts of oral depositions – are not filed with the court. It is not unusual for the discovery process to generate disputes that the parties cannot resolve, which are then submitted to the court for a ruling. In the course of this procedure, the trial judge gets factual information; however, this too reveals fragments of facts, and not a unified whole. Indeed, the goal of the discovery rules is to encourage the parties to conduct discovery without involving the court, and the rules require them to certify that they have tried to do so but failed before they can even seek help from the court.20

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19 They are: interrogatories (written questions that must be answered in writing, under oath); requests for production of documents and things, or requests to inspect places or things, depositions (oral questioning of parties and witnesses, under oath, with the testimony transcribed by a court reporter); requests for mental or physical examination; and requests to admit the truth of certain facts and or the genuineness of certain documents.

20 FED. R. CIV. P. 37(a)(2)(A) requires that a certificate of good faith attempts to resolve a discovery dispute without involving the court must accompany a motion to compel discovery may be filed in a civil case in federal court.
In the typical civil case filed in federal court, it is not until summary judgment practice, when one or both parties try to bring the suit to an end without a trial, that the court tends to get its first coherent look at the “evidence” that the parties have produced, but this procedure too is narrowly focused. Summary judgment motions test whether there is any genuine dispute regarding “material facts” – those that prove or disprove essential elements of the claims and defenses that have been raised – and if not, whether one party or the other is entitled to “win” the case without a trial, based on the controlling law.

As for the pretrial disclosure of proposed expert testimony in civil cases, the same is true. Rule 26(a)(2)(B) requires the parties to exchange very comprehensive disclosures regarding the expert testimony they intend to offer at trial, yet, as with other discovery responses, they are not filed with the court. Similarly, interrogatory answers identifying information about the proposed expert testimony, and transcripts of depositions taken of the experts, are not filed with the court unless attached as exhibits to motions to compel discovery or to prevent the expert from testifying at all.

In addition, the role of the expert witness, discussed in more detail below, is itself shaped by the demands of the adversary system, rather than some objective search for the truth. The parties have a lot at stake, and want to win. The lawyers are ethically charged with representing their clients' interests zealously. In such a system, it is naive to expect that experts will be hired to provide testimony that is not supportive of the case of the party that hired them. This means that the trial judge may be presented with two diametrically opposite points of view by similarly qualified experts, each of whom has been well paid to advance the position of the party that

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21 Fed. R. Civ. P. 26(a)(2)(B) requires disclosure of the following information regarding experts retained to offer testimony in civil cases in federal court: “a complete statement of all opinions to be expressed and the basis and reasons therefor; the data or other information considered by the witness in forming the opinions; any exhibits to be used as a summary of or support for the opinions; the qualifications of the witness, including a list of all publications authored by the witness within the preceding ten years; the compensation to be paid for the study and testimony; and a listing of any other cases in which the witness has testified as an expert at trial or by deposition within the preceding four years.”
retained her. How the trial judge manages the decision is what *Daubert, Kumho Tire*, and Rule 702 control.

The final point to keep in mind about the adversary process is that cases must be resolved under substantial time pressure, in a court system that has an ever-increasing case load. This means that all the participants – the parties, the lawyers and the experts as well as the judge always seemed to be rushed.

The next step in better understanding how trial judges deal with issues associated with admissibility of expert witness evidence is to appreciate the unique nature of expert testimony.

**The Nature of Expert Evidence**

Stripped to its essentials, expert evidence most often amounts to *opinion* testimony. In this regard, experts are afforded more latitude than any other witness in the trial of a case, and are permitted to testify to matters that non-experts may not.

The following chart identifies the rules that most influence the admissibility of expert testimony in civil or criminal cases. They will be discussed throughout the remainder of the chapter.

<table>
<thead>
<tr>
<th>Rule of Evidence</th>
<th>Summary</th>
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<tr>
<td>104(a)</td>
<td>This rule requires the trial judge to determine as a preliminary matter before the jury hears the evidence whether experts are qualified and whether their testimony will be admitted.</td>
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<tr>
<td>401</td>
<td>This rule defines what evidence is relevant in a case. It defines evidence as relevant if it has any tendency to make a fact that is material to the outcome of the case either more probable or less probable than it would have been without the evidence.</td>
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<tr>
<td>402</td>
<td>This rule prohibits the admission of evidence that is not relevant.</td>
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<td>Rule</td>
<td>Description</td>
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<td>403</td>
<td>This rule allows the trial judge to exclude evidence that is relevant, if its probative value (its value in proving issues that determine the outcome of the case) is substantially outweighed by certain adverse consequences such as unfair prejudice, delay of the trial, confusion of the jury, or if the evidence is unnecessarily cumulative. It requires the judge to balance the positive qualities of the evidence against the inimical consequences of admitting it.</td>
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<td>702</td>
<td>This rule provides that scientific, technical or specialized evidence (i.e. “Expert testimony”) may be admitted if: (a) the expert is qualified; (b) the expert’s testimony will help the jury decide issues in the case or understand the evidence; and (c) the expert’s testimony is based on sufficient facts or data; is the product of reliable methods and principles, and if the expert reliably has applied the methods and principles to the facts of the case in trial.</td>
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<tr>
<td>703</td>
<td>This rule identifies the types of factual information that an expert witness may rely on to support an opinion. Included are facts perceived by the expert through her own study or research, facts provided to her by others (including the lawyer), or facts learned of by the expert from other witnesses during the trial. The rule allows the expert to base her opinion on information that is reliable to practitioners in his field, even if it is not admissible into evidence. (For example, a neuropsychologist may rely on a report by the patient’s psychiatrist that might be inadmissible hearsay in forming opinions about the condition of a patient.) If the expert bases her opinion in whole or part on reliable but inadmissible facts, the trial judge must decide whether the jury is informed of these particular facts for the purpose of evaluating the weight to be given to the expert’s testimony.</td>
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<tr>
<td>704</td>
<td>This rule allows the expert to express opinions about “ultimate facts” – those that determine which party will win or lose the case. Thus, an expert could express the opinion that a plaintiff’s emotional injuries were caused by the harassing conduct of the defendant in an employment discrimination case.</td>
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<tr>
<td>705</td>
<td>This rule allows an expert to testify to the jury about her opinions without first stating all the facts that underlie them, unless the trial judge requires them to be disclosed. Note, however, that under Rule 104(a), the party offering the expert’s testimony must already have demonstrated to the trial judge that the expert’s opinion was based on sufficient facts; otherwise, the expert would not be qualified to testify before the jury.</td>
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<tr>
<td>706</td>
<td>This rule allows the trial judge to retain an expert witness to act as a court expert, to help the judge deal with conflicts in expert evidence between the parties’ experts.</td>
</tr>
<tr>
<td>1101(d)(1)</td>
<td>This rule allows the trial judge to disregard all rules of evidence except those dealing with privilege when deciding, outside the presence of the jury, whether to admit expert testimony.</td>
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</table>
By definition, expert witnesses are only allowed to testify about subjects that are scientific, technical, or that involved specialized knowledge that is beyond the ability of the jury to understand on its own. In the language of Rule 702, expert testimony is allowed for subjects that the jury would need “help” understanding. Further, under Rule 704, the expert is allowed to give his or her opinion on the very core issues that the jury must decide in the case, the so called “ultimate issues” in the case. This means, for example, that in a products liability case where the “ultimate issue” is whether a piece of machinery was defectively designed or manufactured, the plaintiff’s expert would be allowed to express the opinion that the machine was, in fact, defective. In addition, under Rule 703, expert witnesses are excused from the requirement that they have personal knowledge of the facts that underlie opinions, and – so long as they are reliable – those facts need not even be admissible into evidence. Thus, to continue with the products liability example, the plaintiff’s expert engineer would be permitted to base his opinion that the product is defective on tests performed by a metallurgist that would be inadmissible hearsay, if such tests typically are relied on by design engineers. Further, under Rule 705, experts are excused from having to set out all the facts that they rely on to form their opinions, and are permitted to give their “bottom line” opinions without first explaining the support for it, unless the court orders them to.

These rules are played out within the adversary process, where parties with a lot at stake and the resources to advance their side of the dispute look for the most prominent and credible expert that they can afford; indeed, they would be foolish to do otherwise. In turn, this has led to the development of many expert witnesses whose livelihoods depend, in whole or significant

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22 “Unlike ordinary witnesses, see Rule 701, an expert is permitted wide latitude to offer opinions, including those that are not based on firsthand knowledge or observation . . . . Presumably, this relaxation of firsthand knowledge—a rule which represents ‘a most pervasive manifestation’ or the common law insistence upon ‘the most reliable sources of information. . .’ is premised on an assumption that the expert’s opinion will have a reliable basis in the knowledge and experience of his discipline.” Daubert, 509 U.S. at 592 (internal citations omitted).
part, on their success on behalf of the litigant that hires them. In such a system, there is a very real tendency to regard experts as advocates, rather than objective, neutral commentators. Indeed, in surveys of trial judges performed by the Federal Judicial Center regarding problems perceived by them with expert testimony, “[t]he most frequent problem cited by judges . . . was experts who ‘abandon objectivity and become advocates for the side that hired them.’”

This does not mean that the adversary system promotes wholesale false or fabricated expert testimony, as the majority of expert witnesses do base their opinions on sufficient facts and employ reliable methodology. It does mean, however, that it is impossible to remove all bias from the presentation of expert testimony, and that there is a perception among many judges, whether justified or not, that experts often advocate more than they elucidate. When considered in tandem with the extraordinary latitude given to expert witnesses, who do not even get to testify unless the subject matter is beyond the reach of the jury in the first place, it is easy to see how the jury can be “blinded by science” and “hit by technology.”

The only thing standing between the expert and the jury is the trial judge, who must decide, outside of their presence, the preliminary question of whether the expert will be allowed to testify. The methodology used by the trial judge when doing so will now be discussed.

**Foundation for Admitting Expert Testimony**

The admissibility of expert evidence largely is governed by two rules, as fleshed out by the previously referenced Supreme Court decisions in *Daubert* and *Kumho Tire*. Rule 104(a)

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states that preliminary questions concerning the qualification of a person to be a witness, the
existence of a privilege, or the admissibility of evidence shall be determined by the court, and
that in doing so the judge is not bound by the rules of evidence, except for privilege. This rule is
the one that makes the judge the “gatekeeper,” and it has the following important features: (1)
the trial court will decide, outside the presence of the jury, whether the expert has sufficient
education, experience, knowledge or skill in the area about which he or she intends to testify; (2)
the judge will decide, using Rule 702 and the Daubert decision, whether the opinions of the
expert may be heard by the jury; (3) the facts that the judge looks at in making these
determinations may be considered without regard to their technical admissibility under the rules
of evidence.25

Rule 702, as amended in 2000, furnishes the substantive criteria the judge must employ
when making a ruling about the admissibility of expert testimony under Rule 104(a). Because it
is so important, it is worth quoting in its entirety:

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 on 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.

25 Fed. R. Evid. 104(a). See also Fed. R. Evid. 1101(d)(1) (stating that with the exception of the
rules of evidence relating to privilege, the rules of evidence do not apply to questions of fact that
relate to preliminary determinations by the court of whether the expert will be permitted to
testify). The rules of evidence regarding privilege, however, do apply. These rules are nothing
short of gifts to the lawyers, but surprisingly, not often taken advantage of by them. Because the
rules of evidence do not apply to the inquiry into the admissibility of expert opinions, the
lawyers are freed from the requirement of using non leading questions when examining
witnesses; they may provide affidavits or other forms of inadmissible, but reliable, information
to the judge regarding the factors that the judge evaluates. The relaxation of the rules of
evidence when determining preliminary admissibility of evidence is intended to shorten and
streamline the process. Despite this, most lawyers seem unaware of this and plod through the
process the same way that they would if they were presenting evidence to the jury, where the
rules of evidence do apply.
What lawyers and experts should understand is that Rule 702, as interpreted by the courts, identifies the methodology that the trial judge must use in resolving challenges to admissibility of expert testimony. The recent amendments to Rule 702 were intended to bring it in line with the *Daubert* and *Kumho Tire* opinions. They require the trial judge to evaluate whether the opinions the expert will express: (1) are based on sufficient facts or data; (2) were reached by the use of reliable methods and principles; and (3) are the product of a reliable application of this methodology to the facts of the particular case. This all sounds well and good, but as previously noted, the trial judge usually is entirely dependent on the parties to furnish the information necessary to make these rulings. This means that if they want to be successful, lawyers and their experts need to be well-versed in what they should provide to the trial judge in order to enable him or her to do their job.

Of the three additional determinations recently added to Rule 702, the final two – gauging the reliability of the methods and principles used by the expert, and whether they reliably were applied to the facts of the particular case – are the most challenging to the trial judge. As for the former, the approach set forth in the *Daubert* decision is the most useful. The four *Daubert* factors are: (1) whether the methodology used by the expert can be tested; (2) whether there is a known error rate associated with the methodology used; (3) whether the methodology has been subject to peer review by others on the expert's field; and (4) whether the

26 Fed. R. Evid. 702 advisory committee’s note. “Rule 702 has been amended in response to *Daubert v. Merrell Dow Pharmaceuticals, Inc.* . . . and to the many cases applying *Daubert, including Kumho Tire Co. v. Carmichael . . .*.”Id.

27 Fed. R. Evid. 706 does allow the trial judge to hire his own experts to assist in this process, but in practice this is not done routinely because it increases the cost to the parties and prolongs the time devoted to deciding whether the parties’ experts will be allowed to testify.

28 To be completely accurate, the *Daubert* decision also included a fifth factor: the existence and maintenance of standards and controls that control the technique’s operation, *Daubert*, 509 U.S. at 594. However, this concept really fits best within the concept testability—as the standard technique implies that the metrology of the test has been tested and an approved technique achieved. It is hard to imagine that an “approved” technique for an untested procedure would exist. Accordingly, it will be discussed in connection with the testability factor.
methodology used has been generally accepted by other experts in the particular field under
review.\textsuperscript{29} It seems clear that in announcing the \textit{Daubert} opinion, the Court was sensitive to how
the scientific community itself evaluates the reliability of methodology used in scientific
research.\textsuperscript{30} And, in \textit{Kumho Tire}, it recognized that while the \textit{Daubert} factors certainly were
relevant to evaluation of non-scientific, but nonetheless technical or specialized subjects, they
might not all be useful.\textsuperscript{31} Although some critics of the \textit{Daubert} and \textit{Kumho Tire} decisions argue
that the methodology identified does not deliver what it promises, a prominent scientist has
described it as a “pretty good performance.”\textsuperscript{32} What remains challenging to the trial judge,

\textsuperscript{29}The Daubert factors are not an exhaustive list, they are illustrative. \textit{Daubert}, 509 U.S. at 593; \textit{Kumho Tire Company, Ltd. v. Carmichael}, 526 U.S. 137, 151 (1999). Others have also been
identified, though less frequently used. The commentary to the recent change to Rule 702
identified a number of factors that a trial judge could consider in performing his gatekeeping
function, in addition to the Daubert factors: whether the experts propose to testify from matters
flowing “naturally and directly” from research performed outside the context of litigation;
whether the expert unjustifiably extrapolated from a legitimate premise to one that cannot fairly
be derived from it; whether the expert has considered and accounted for alternative explanations
that are inconsistent with her own; whether the expert has used the same degree of care in her
methodology as she would use in her professional work unrelated to litigation; and whether the
expert’s field itself is lacking in reliability. \textit{Fed. R. Evid.} 702 advisory committee’s note. 192
F.R.D. 419. Also, recent research performed by the Federal Judicial Center suggests that trial
judges have developed their own set of criteria for evaluating admissibility of expert testimony
that are distinct from the Daubert factors: whether the expert has abandoned objectivity and
become an advocate for one of the parties; whether the expert’s opinion conflicts with those of
other experts in the field in a way that defies reasoned assessment; whether the expert seems less
competent than opposing experts; whether the expert’s testimony is comprehensible to the fact
finder; whether the expert’s testimony is helpful in deciding the issues of the case being tried;
and whether the expert was poorly prepared to testify. Carol Krafka C et al., \textit{Judge and Attorney
Experiences, Practices and Concerns regarding Expert Testimony in Federal Civil Trials, in
REFERENCE MANUAL ON SCIENTIFIC EVIDENCE} 1, 21 (2\textsuperscript{nd} ed. 2000), \textit{excerpted from
PSYCHOLOGY, 8 PUBLIC POLICY AND LAW} No. 3, 309, 309-22 (2002).

\textsuperscript{30} \textit{Daubert}, 509 U.S. at 590, 593, n. 9.

\textsuperscript{31} \textit{Kumho Tire}, 526 U.S. at 151-52. Imagine examining a brick layer testifying in a construction
case about the specialized requirements for building a workmanlike brick wall and asking
whether the methods handed down by masons for hundreds of years have been “peer reviewed,”
and you get the idea.

\textsuperscript{32} David Goodstein, \textit{How Science Works, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE} 1,
82 (2\textsuperscript{nd} ed. 2000).
however, is just how to employ the *Daubert* factors in a substantive, rather than ritualistic, fashion, given the constraints on how they receive the information they need to do the analysis. It further is a struggle at times to apply the *Daubert* factors in an individual case because the view of how science works that underlies the *Daubert* test may be a somewhat romanticized view, given recent debate about just how reliable scientific inquiries are.\(^{33}\) What next will be discussed is a step-by-step consideration, from the perspective of a trial judge, of each of the steps taken to determine admissibility of expert evidence, and suggestions to lawyers and expert witnesses on how they may be more effective in assisting the judge in doing so.

### “Relevance, Reliability, Helpfulness, and Fit”

If there is a mantra that trial judges repeat when deciding admissibility of expert evidence it is that the evidence must be “relevant” to the issues in the case, “reliable” as outlined in *Daubert/Kumho Tire* and Rule 702, “helpful” to the jury, and “fit” the issues of the particular case.\(^{34}\) While separate concepts, they overlap substantially. They are summarized in the following chart:

<table>
<thead>
<tr>
<th>Relevance</th>
<th>Derived from Rule 401, this factor requires the court to insure that the expert’s testimony will help prove or disprove an important fact or issue in the case.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Refers to “evidentiary reliability,” not “scientific reliability.” Evidentiary reliability means trustworthiness, and is analogous to scientific validity.</td>
</tr>
<tr>
<td>Helpfulness</td>
<td>Whether the expert testimony will help the jury to understand the evidence and or decide issues of fact relating to the claims the parties have raised.</td>
</tr>
</tbody>
</table>


\(^{34}\) *Daubert*, 509 U.S. at 589-91.
Whether the expert testimony relates to the facts and issues of the particular case at hand so that it will assist the jury in doing its job.

Relevance is defined by Rule 401, which says that evidence is “relevant” if it tends to make a fact that is of consequence to the litigation either more or less probable than it otherwise would have been. Several observations may be made from this definition.

First, facts are not relevant if they do not prove or disprove something that matters in the case. It is the function of the pleadings in a civil case to identify what matters. Complaints identify individual “causes of action” asserted by a plaintiff against a defendant. Each cause of action is nothing more than a legal recipe consisting of a list of essential “ingredients” (referred to as “elements”). Thus, to illustrate, in the garden variety negligence cause of action, the elements are: (a) the defendant owed to the plaintiff a duty of care recognized by the law; (b) the defendant breached this duty; (c) this breach both factually and legally caused the plaintiff to (d) sustain quantifiable damages. If the lawyer cannot explain to the judge why proposed expert testimony will help to establish one or more of the above elements, then it will not be relevant, and it will be excluded. If the plaintiff has sued the defendant doctor for medical malpractice, the plaintiff must prove that the defendant failed to meet the standard of care for similar doctors under similar circumstances. Because the standard of care governing doctors is not something that the ordinary jury would know, an expert witness will “help” the jury with this inquiry, and thus the testimony will be relevant.

Defendants also file pleadings called answers, in which they are allowed to assert legal roadblocks to the plaintiff’s cause of action which are known as “affirmative defenses,” because the defendant has the burden of proving them. So, for example, in a medical malpractice case, if the plaintiff alleged that the defendant doctor breached the standard of care by performing a risky surgery that did not relieve the plaintiff’s symptoms, the defendant doctor could assert in her answer to the complaint the affirmative defense of “assumption of risk” – and use a defense doctor to testify from a review of the records that the defendant doctor carefully explained to the plaintiff the risks of the surgery during the informed consent procedure, and yet the plaintiff,
knowing the risks, elected to proceed anyway. The point of all this is that the first requirement for a lawyer or an expert to demonstrate relevance is the ability to explain to the trial judge why the proposed expert testimony will prove or disprove one or more elements of a claim or defense identified in the pleadings. In doing so they should be able to quickly, and with a minimum of puffing, identify the complaint or answer by paper number and the specific element or elements that the testimony will address. It further may be noted that the threshold requirement of relevance is not a stringent one because Rule 401 only requires that the offered evidence have “some” tendency to prove a material fact in the case, not that it prove that fact by some quantum of proof\(^\text{35}\) such as “more likely than not” or “beyond a reasonable doubt.”

Second, the concept of “relevance” as applied to expert testimony has an additional, more subtle, aspect to it. It merges with the “reliability” and “helpfulness” requirements at some point in the court’s analysis. For example, if an expert witness is not qualified in the area he or she proposes to testify about, his or her opinion will not be helpful to the jury, and hence not relevant. Similarly, even if imminently qualified, if the expert’s proposed testimony is not based on sufficient facts or is the product of unreliable methodology, it will amount to nothing more than speculation or conjecture, which, similarly, is not helpful to the jury.\(^\text{36}\) Thus, the concept of relevance encompasses those of helpfulness and reliability.

Third, because the concept of relevance is potentially so broad under Rule 401, and because the evidence only needs to have “any tendency” to prove a substantial fact in the case, trial judges readily take advantage of another rule, Rule 403.\(^\text{37}\) Rule 403 allows the trial judge to


\(^{36}\) Id. at 470. “If the proffered expert testimony is speculation, or conjecture, it is not relevant. This is because it has no tendency to make a significant fact more or less probable than otherwise, as guesswork is the antithesis of probability.” Id.

\(^{37}\) Fed. R. Evid. 403 Exclusion of Relevant Evidence on Grounds of Prejudice, Confusion or Waste of Time: Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.
exclude evidence that meets the threshold requirement of relevance if admitting the evidence would have certain inimical effects, such as confusing the jury, allowing cumulative evidence, unnecessarily delaying the case or if the prejudicial effect of the evidence would be unfairly prejudicial when measured against its relevance, or “probative value.” This means that in addition to being able to explain why the proposed expert evidence is “relevant,” the sponsoring lawyer or expert should be prepared to explain to the judge why the proposed expert testimony is not overly cumulative, prejudicial, or confusing. It seems self-evident that if the lawyer and expert cannot explain the proposed expert testimony in a way that does not confuse the trial judge, they have little chance of convincing him that it will not similarly confuse the jury.

The concept of “helpfulness” already has been discussed. It flows from the requirement of Rule 702 that expert testimony be helpful to the jury, as well as the requirements of Rule 401 that the evidence be relevant, and Rule 403, not confusing or unfairly prejudicial. Similarly, the requirement of “reliability” has been discussed above, and will be in more detail below, as it fits into the Daubert/Kumho Tire/Rule 702 analysis.

The concept of “fit” should also be kept in mind. By “fit,” the Supreme Court in Daubert was referring to the requirement that the proposed expert testimony had to provide help in resolving the specific issues presented in the pending case. Thus, proffered expert testimony from a preeminent expert that is the result of a robust factual basis and reliable methodology will not be relevant, or helpful, or fit if it does not prove some issue that must be resolved in the case.

Finally, the Court discussed the concept of reliability, and noted that within the field of scientific inquiry, the concepts of “reliability” and “validity” are discrete. It stated that scientific reliability addresses whether the methodology or principle produces consistent results when applied. In contrast, the Court observed that scientific validity focuses on whether a principle

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38 Daubert, 509 U.S. at 591.

39 Id. at 590, n. 9.
supports what it purports to show.\textsuperscript{40} When it used the word “reliability,” however, the Supreme Court was referring to “evidentiary reliability,” which it equated with the concept of the “trustworthiness” of the expert testimony, which it viewed as analogous to the concept of scientific validity. This can be confusing to an expert preparing to testify in a case because the concepts of reliability and validity do not have identical meanings in science and law.\textsuperscript{41}

With the notions of “relevance, reliability, helpfulness and fit” in mind, we will now turn our attention to a more thorough consideration of the “reliability” requirement and the Daubert/Kumho Tire/Rule 702 factors.

\textbf{The Daubert/Kumho Tire/Rule 702 Factors}

The centerpiece of the \textit{Daubert/Kumho Tire} cases was the emphasis placed in the need to evaluate the methodology used by the expert and the identification of four non-exclusive factors to assist in doing so: testability, error rate, peer review, and general acceptance within the relevant scientific or technical discipline.\textsuperscript{42} Rule 702 supplements these factors. Properly used, they give the trial judge the tools to perform the gatekeeper role in a fair and efficient manner. As all too often used, they are “buzzwords” thrown about carelessly by both judges and lawyers to justify the result desired, but without careful substantive analysis.\textsuperscript{43} Each of these concepts

\textsuperscript{40} \textit{Id.}

\textsuperscript{41} “Someone once said that the United States and England are two nations separated by a common language. Something similar can be said of science and the law. There are many words that are commonly used in both disciplines, but with different meanings.” David Goodstein, \textit{How Science Works, in Reference Manual on Scientific Evidence} 1, 80 (2\textsuperscript{nd} ed. 2000). In \textit{Daubert}, the Supreme court stated “[i]n a case involving scientific evidence, evidentiary reliability will be based on scientific validity.” \textit{Daubert}, 509 U.S. at 590, n. 9.


\textsuperscript{43} Sophia I. Gatowski et al. \textit{Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-Daubert World}, 25 \textit{Law and Human Behavior} 5, 433, 433 (2001) (A survey result of judges regarding their “gatekeeping” role as defined in Daubert demonstrated that many judges lacked sufficient scientific literacy required by Daubert, and particularly
will now be examined in more detail, and suggestions offered for how they may be better used by all participants in the judicial process when evaluating expert evidence.

**Testability**

The testability factor is an important one to determine whether the methodology used by the expert is reliable. The most useful definition of reliability is that it helps the judge determine whether the results of the methodology used by the expert are relevant and helpful because they may be verified by repeating them, or unhelpful, irrelevant and inadmissible because they are chance occurrences.44 The most important thing for a lawyer or expert to explain to the trial court is just what methodology the expert witness used in arriving at his opinions. Did the expert do a particular test, that is well documented by specific standards that are accepted in the relevant scientific community (such as diagnostic tests to determine whether the plaintiff has a particular mental illness), or did the expert simply make observations and draw conclusions from

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44 Daubert, 509 U.S. at 593.
them based on her experience and skill, such as in the *Kumho Tire* case. Whatever the expert did to reach her opinion, this must be clearly explained to the court. It is surprising how much trouble experts and lawyers have in answering this simple inquiry from the court: “Please tell me the exact methodology you used to reach your opinions.” What the judge has been instructed to look for is simple: “The objective of [the *Daubert* gatekeeping requirements] . . . 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.”

To do this the judge needs the following information:

1. Exactly what did the expert do to review the facts of the case and reach his/her opinions?

2. If a test or tests were used, which ones were used? Where were they derived from?

This inquiry can be enormously important. Some tests are standardized, published by learned societies, detailed in what they require, and well documented to be used “in the field,” not just in the courtroom. If this is the case, this is a comfort to the trial judge, as the methodology used can be compared to the standard, and if it was followed the odds are good that it will be admitted. Sometimes this inquiry reveals that the expert used a “modified” version of a standardized test. This is always a red flag to the court. For example, in *Samuel v. Ford*, the plaintiff’s expert used a modified version of an accident avoidance test developed by Consumer Reports. Both the underlying test and its modified versions had been extensively studied and commented on in publications from organizations that had no particular bias, including the National Highway Transportation Safety Administration (NHTSA). Their exposure of the flaws in the design of the test, and its subsequent modification, were the principal reason why the test results were not admitted.

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45 *Kumho*, 526 U.S. at 151.

46 *Id.* at 152.

admitted into evidence. Similarly, in United States v. Horn, the entire case turned on the admissibility of standardized field sobriety tests developed for NHTSA by psychologists to provide a uniform method for law enforcement officers to decide whether to issue DWI charges. The defendant’s motion to suppress the results of the tests led to a three-day hearing during which the court heard testimony from psychologists and an optometrist, and reviewed both the NHTSA test data and peer review literature critical of the tests. This intense inquiry explored the very underpinnings of the tests, and disclosed serious limitations in their use as a standardized test, as well as risk factors associated with their implementation as intended under real-life conditions in the field.

The point to take away from all this is that when a particular test is used by an expert witness to support an opinion intended to be expressed at trial, the sponsoring lawyer/expert must be prepared to demonstrate to the judge the test used, its origin, use in the field, and back this up with publications or other extrinsic support. If a modified version of a standardized test was used it will be critical to explain just why this was done, and whether the modification invalidated the test. If an expert chose not to use a standardized test, but instead employed some other methodology, this must be explained to the satisfaction of the court. Similarly, if a lawyer is challenging the methodology used by an opponent’s expert, he will need to be able to show the court the same level of analysis to support the challenge. What happens too frequently, and is of no help at all, is that the court is given a conclusory statement from an expert that the test is or is not standardized, or routinely used, yet all the information needed to support this conclusion is missing. To be sure, this step is difficult for the lawyer, as it is for the court, because the lawyer must have sufficient understanding of the science and technology to unpack it for the judge. But there is no substitute for being able to do so, and anything less evidences lack of preparation.

3. If a particular test was used, be prepared to demonstrate how it relates to the real world outside the courtroom. Do doctors, engineers, psychologists, and economists use the test

in their non-litigation work? If they do, then the likelihood of admissibility is great if the test was performed correctly. If they do not, then this speaks volumes—what help is it to a jury to decide a dispute about a “real-life” occurrence by employing a test that is not itself used in “real life?” The answer to this question likely will determine admissibility.

4. It will not have escaped the attention of the reader that to follow all the above guidance will take time, effort and probably money. To borrow, irreverently, from popular slang, “get over it.” The time is long past to bemoan the burdens imposed by Daubert. It has been around for thirteen years and is going to be around for the foreseeable future. Given what is involved to either withstand or successfully prosecute a Daubert challenge to expert testimony, the lawyer or expert must accept two things. First, you must plan carefully to insure that you have enough time within the scheduling order issued by the court to develop your positions to support your expert positions and oppose your opponent’s. Second, you must make sure that the court has as much advance notice as possible that there will be a substantive challenge to the expert evidence so that the court can schedule proceedings under Rule 104(a) sufficiently far in advance of trial. The absolutely worst thing that can be done is to wait until trial itself, or just before, to spring a full-blown Daubert challenge. Doing so is certain to antagonize the court. It is essential that lawyers carefully examine their expert evidence, their opponent’s expert evidence and the trial schedule to make sure that a reasonable amount of time is built in to accommodate this vital part of the case.

If the schedule is too tight, the lawyers should ask for a scheduling conference with the court to request modification of the schedule to accommodate proper analysis of the expert evidence. In doing so, the lawyers should be prepared to demonstrate to the court what inquiry will be required and how much time reasonably is needed. The time needed also must include sufficient time for the court itself to digest the information, which, from experience, can take hours, if not days. The need to give the court adequate time to rule on a challenge to the admissibility of expert evidence presents a tactical dilemma to many lawyers, who fear that filing early will “tip their hands,” and somehow give their opponent time to try to cure the defect.
Although understandable, this concern may be dealt with effectively by asking the court at the start of the case to impose a discovery cut-off deadline, and a deadline for filing challenges to expert testimony that is after the discovery cutoff.

In this regard, the federal rules of civil procedure provide helpful tools to assist the diligent lawyer in this task. Rule 26(a)(2)(B) requires early disclosure of all opinions from experts retained to testify at trial. Rule 26(e) requires timely supplementation of these disclosures after they are made, if the expert changes her mind or adds to her previously disclosed opinion. Rule 37(c) provides a sanction that precludes introduction at trial of any expert opinion testimony that was not timely disclosed under Rule 26(a)(2)(B) or supplemented under Rule 26(e), unless the failure to disclose was harmless to the party against whom the expert will be testifying, or the failure to disclose or supplement was substantially justified. The key to avoid tipping your hand by filing an early challenge to an opponent’s expert is to address the timing of such challenges at the very beginning of the case. If the trial judge includes a deadline for filing challenges to experts that is after the discovery deadline, this usually will prevent the lawyer whose expert is challenged from getting a second chance to get it right from the court absent some truly exceptional reason. If forced to chose between filing a Daubert challenge too late to enable the trial judge properly to understand and rule on it, or filing it early enough to facilitate proper review, it is more prudent to file early.

**Error Rate**

The second Daubert factor requires the trial judge to evaluate the error rate associated with the test. For example, if the test has a high error rate, the court will have to reconcile whether or not to admit evidence of its use in a particular case. The court will want to know how it can determine whether these results were erroneous, and hence of no help to the jury, or correct. The expert must do the job of explaining to the court the significance of the error rate. No test is error free. Scientists have recognized acceptable error rates associated with studies, and with the disclosure of what those rates are, accept the results as reliable. The expert must be
able to explain to the court: (1) what the error rates were; (2) what the accepted norm is within
the scientific or technical community for the test used; (3) whether there are measures that can be
taken in performing the test to reduce the error rate materially, and, if so, whether they were
taken in the case at hand; and, most importantly, (4) an explanation of just how the error rate in
the test may have affected the results in the case being decided. In other words, what is the
“real-life” significance of the error rate?

For example, in *United States v. Horn*, the evidentiary issue was the admissibility of
three standardized field sobriety tests used by police officers to issue DWI citations. The
NHTSA literature regarding the test included description of the error rates of the individual tests
as well as the tests used in combination. For some of the tests the error rate was nearly 25
percent, meaning that there was a one in four chance that the test results would lead to the
citation and charging of a person that had not been driving under the influence of alcohol. The
defendant was able to offer testimony and publications from psychologists to show that the tests,
as well as the results from the “validation studies” performed to “test” the tests themselves, fell
substantially below the accepted norm for such tests. This played an important role in the court
ruling that the field sobriety tests were not admissible for the purpose of proving that a defendant
had a particular blood-alcohol level. Instead, the court ruled that the tests were admissible for a
more restricted purpose—as procedures that enabled the police officer to observe the defendant
perform standard exercises which, when observed by the officer, would permit an assessment of
the driver’s balance, coordination, ability to concentrate and follow instructions, and reaction
time. Thus, the test was admitted as circumstantial evidence, and not direct evidence, of driver
intoxication.

This raises an important point often overlooked by lawyers, and unappreciated by
experts. Lawyers and laypersons alike tend to view admissibility of evidence as an “all or

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49 *Id.*

50 *Id.*
nothing” process. This is an inflexible mindset that regards evidence as one-dimensional, and is not at all how the rules of evidence operate. Evidence is not “admissible” or “inadmissible” as if it occupies some physical property that cannot be altered. Rather, evidence is admissible or inadmissible depending on what it is offered to prove. Rule 105 states that evidence may be admissible for some but not other purposes, or against some, but not all parties in the litigation. Complementing this rule is Rule 104(e). It reminds lawyers that admissibility is only a threshold matter – it determines only whether the jury gets to consider the evidence. This is not to be confused with credibility or weight, which affect whether the evidence is believed or accepted by the jury. Thus, evidence of a test that has a higher than desired error rate may not be admissible as the only evidence that something happened in a case, but it may be admitted in addition to other evidence if the court can be convinced that the more limited use is relevant and helpful, in which case the court may admit it along with giving a “limiting instruction” to the jury that identifies the limited purpose of the test.\(^{51}\) Thus, for example, in the Horn case, the trial judge did not allow the police officer to testify that a “test” had been performed and that the defendant had “failed” it, and therefore the defendant had a blood alcohol level of at least 0.08, because of reliability concerns about the test, including its high error rate. However, the officer was allowed to testify that when making DWI arrests, certain standard procedures were followed that enabled him to observe the defendant, and that based on this observation, it was the officer’s opinion that the defendant was driving under the influence of alcohol (the ultimate issue in the case).

The point to take is that error rate, like other evidence, is not “all or nothing” and lawyers and experts should keep this in mind. The bottom line is that from the judge’s perspective, error rate is important to the extent that it impacts his assessment of whether the test is reliable, and its results helpful to the jury. Like the other Daubert factors, error rate analysis may not be

\(^{51}\) Critics of the judicial process view the “limiting instruction” as a fiction, and argue that there is little evidence to suggest that juries follow the judge’s instruction. Whether this is so is beyond the scope of this discussion. It is sufficient to say that the rules of evidence clearly recognize limited admissibility and judges routinely give limiting instructions.
dispositive, and must be considered in the whole with all the other evidence affecting admissibility. It is up to the expert and the lawyer to clearly put it in proper perspective.

**Peer Review**

The role of peer review in the *Daubert* analysis is that it helps the trial court assess whether the test used by the expert in fact met the same level of rigor expected of non-litigation inquiries within the scientific or technical field. The thought is that if the testing or methodology is flawed, the shortcomings will be exposed by neutral, unbiased and learned analysis in scientific and technical journals or literature. As imagined by the Supreme Court, this notion is appealing. However, it may be founded on a romanticized and less than entirely accurate view of the real state of peer review in today’s competitive world of science. There are those who have commented on the limitations of peer review.\(^{52}\) One particularly candid assessment of the peer review process, published in the New England Journal of Medicine several years before the Daubert decision observed:

>[P]eer 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. Its functions are more modest but nonetheless valuable . . . . [G]ood peer reviewed scientific journals should provide their readers with reports of the best available research, free of obvious major flaws. Still, although peer review can screen out work that is clearly invalid and greatly improve the chances that published work is valid, it cannot guarantee scientific validity . . . . If peer review cannot guarantee the validity of research, still less can it be relied on to detect fraud.\(^{53}\)

\(^{52}\) David Goodstein, *How Science Works, in Reference Manual on Scientific Evidence* 1, 75 (2\(^{nd}\) ed. 2000) (The author, a physicist, notes that peer review works well to “separate valid science from nonsense but less well as a means of choosing between competing valid ideas”, and works poorly “in catching cheating and fraud”).

If the best that can be expected of good peer reviewed journals is that they will detect “obvious major flaws” and “clearly invalid” research, it is clear that the mere fact that a scientific methodology or procedure has made it through the peer review process is not the end of the inquiry. It is the experience of this author that most trial judges do not adequately appreciate the limitations of what peer review adds to the process of ruling on challenges to expert testimony, despite the fact that the Supreme Court’s discussion of peer review in Daubert seemed to recognize its limits.\(^54\) Regardless of its shortcomings, however, peer review literature is useful to the court in performing its Daubert analysis, if properly presented by the lawyer and expert. If not, then it is useless.

Peer review as envisioned by the Supreme Court in Daubert contemplates a process by which learned scientific or technical journals receive articles from experts who seek their publication. In theory, the article explains the subject studied by the authors, and identifies in a detail sufficient to enable its evaluation by others in the field of the methodology used, describes the data collected and its analysis, and posits the conclusions of the authors. Once received, the notion goes, the journal editors submit the article to preeminent members of the same field, who are unbiased and carefully examine the article to assess any shortcomings. If shortcomings are found, the article is rejected or returned to the authors for revision. If published, the mere fact of publication is considered a “test” of sorts of the scientific validity of the methodology used and conclusions expressed, although it is clear that making it through the peer review process is no guarantee of scientific validity. Assuming for the moment that this is an accurate enough vision of what peer review is, then, in theory, it provides some comfort level to the judge that an expert

\(^{54}\) Daubert, 509 U.S. at 593-94. The court stated “publication (which is but one element of peer review) is not a sine qua non of admissibility, it does not necessarily correlate with reliability,” but added that “submission to the scrutiny of the scientific community is a component of ‘good science,’ in part because it increases the likelihood that substantive flaws in methodology will be detected.” The Court concluded “the fact of publication (or lack thereof) in a peer reviewed journal thus will be a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.”
that employed methodology “accepted” by peer review employed methodology that is legally reliable.

From the perspective of a trial judge who has had to wade through piles of peer review literature in a case, however, the information is of minimum value if not properly presented by the lawyer and expert. The following should be kept in mind. First, not all that is published is peer review. Much is published by societies or organizations that have an interest in the use of a particular methodology, and the publication of a laudatory article by such an organization does not go a long way in convincing the court that the methodology is reliable. For example, in the Horn case, some of the literature provided to the court was published by law enforcement groups, such as prosecuting attorneys’ organizations. In contrast, the defendant provided the court with articles published by clinical psychologists in more objective journals that clearly identified significant flaws in the methodology in the field sobriety tests, and challenged their scientific validity. The trial court found these articles particularly helpful in ruling that the sobriety tests were not admissible to prove the blood alcohol level of a driver in a DWI case.55

Thus, unless it can be demonstrated that the journal that published the article does not have a stake in the outcome of the issue to be decided in the case, the publications will be of limited, if any, value to the court. The first step in the proper use of peer review material is to clearly identify the journal, any group or organization that it is affiliated with, its purpose, and the process by which articles are received, evaluated and selected for publication. From experience, this is very rarely done.

Second, and critically, is the need to assist the court in understanding what is said in the peer review literature. The worst thing that can be done is to simply offer into evidence a stack of technical articles and, without more, expect the court to (a) read them; (b) understand them, or (c) use them in any meaningful way. By definition, peer review material is targeted at members 


56 Id.
of the scientific and technical field – not judges. The articles may themselves refer to other articles unfamiliar to the court, describe statistical analysis that is clear to the expert community, but unknown to the court. Further, it may be impossible to draw from a single article any generalizations about a particular methodology or results; it may require analysis of a series of studies done over time that explore many facets of the study. The trial judge will require a guide or translator to assist him in drawing meaning from the articles. The following suggestions are offered:

1. The proponent of the evidence should be prepared to offer an expert who can explain, either in an affidavit, or preferably in testimony, to the judge the nature of the peer review literature, the character of the journals whose articles are offered, and the significance of the articles.

2. Where multiple articles are offered, summaries that synthesize the studies and explain how they interrelate and their collective meaning are helpful. The goal is to help the judge understand the importance of the literature as a whole.

3. It is not enough to just give the court a description of the “state of the science” to date. It must then be tied back to the judge’s job as gatekeeper. In short, just how does the peer review literature support or undermine the admissibility of the opinions to be offered by the experts at trial? Abstract discussions are unhelpful. They must be focused.

4. You must plan to give the court enough time to meaningfully evaluate the literature as well as the information regarding its importance to the case. Dumping a pile of technical articles, even if accompanied by an affidavit from an expert that evaluates them as discussed above, on the court without giving it enough time to read the information before a hearing or trial is of no use. If it appears that the admissibility of expert evidence will involve an evaluation of extensive peer review information, the lawyers should alert the court about this as soon as possible, and a conference should be held to determine the most effective schedule and procedures to use to enable the court to evaluate it. For example, if the defendant challenges the plaintiff’s evidence, the judge may want the defendant’s expert to present a written summary of
the challenge, including a discussion of the peer review literature. The court may want to receive from the plaintiff or the government a similar submission from their expert. After reading the submission, the court may want to schedule a conference or hearing at a future date, identifying what questions it wants addressed in greater detail. The rule of thumb is that there is no one way to approach the process. Each case needs to be evaluated on its own to determine the best way to do so. And, as noted above, because the court has so little information as compared to the parties, it is the responsibility of the parties themselves to evaluate these issues as early as possible, and then inform the court so that it may determine how best to proceed.

**General Acceptance**

The final *Daubert* factor is most familiar to experts and lawyers, and requires the least discussion. It allows the court to consider whether the methodology used by the expert is generally accepted within the relevant scientific or technical community – the old *Frye*\(^57\) test that had been in universal use since the 1920's when evaluating the admissibility of novel scientific theories. The Court in *Daubert* noted the continuing usefulness of the general acceptance as a benchmark for reliable methodology.\(^58\) But, the drawback of the *Frye* test, and the reason why it was supplanted by Rule 702, was that it required exclusion of new techniques that had not yet achieved general acceptance, but which might in fact be more reliable. Other drawbacks include the fact that it may take years, even decades, for a theory, method or principle to achieve general acceptance, and the fact that the way general acceptance typically is proved is by calling an expert hired by one of the parties to say, in essence, “trust me, judge – this is what I do, and this method is the one that is generally accepted by practitioners in my field.” There is a Latin phrase in law to describe such a phenomenon – *ipse dixit* – or “because I said so.” This type of argument is entirely dependent on the credibility of the person offering the testimony. Of far


\(^58\) *Daubert*, 509 U.S. at 594.
more use to the judge is to provide details supporting the general acceptance of the methodology or principle, such as text books, peer review literature, affidavits from other experts that have no interest in the outcome of the litigation. With the foregoing comments about the *Daubert* factors in mind, the next area of focus is Rule 702, as changed in December 2000 to more fully implement the *Daubert/Kumho Tire* methodology.

**Evidence Rule 702**

As noted above, following the *Kumho Tire* decision, when the *Daubert* methodology as extended to all expert testimony, the rules of evidence in federal court were amended to take this change into account. Rule 702, which governs the admissibility of expert testimony, was changed to add three additional requirements to those already in existence. In deciding whether to admit expert testimony of any type the court was required to insure that the testimony was based on (a) sufficient facts or data, and (b) that the methods and principles used were reliable, and (c) that the methods and principles reliably had been applied to the facts of the case at issue. The commentary to this rule change makes it clear that while the new requirements were distinct from the *Daubert* factors, they were intended to complement them.\(^{59}\) Each will be briefly examined below.

**Sufficient Factual Basis**

As already noted, expert testimony is at root opinion testimony. But, in our culture, opinions are like feet—everybody has them, and lots of them stink! What makes an opinion worthy of listening to is the basis for it—the facts underlying it and the methodology used to reason to the opinion that is based on the facts. The most compelling explanation for why it is so important to determine the sufficiency of the factual basis for expert testimony came not from

\(^{59}\) Commentary to Fed. R. Evid. 702, 192 F.R.D. 418.
any judge, lawyer or scientist, but rather from America’s legendary social critic—Mark Twain. He said:

Now, if I wanted to be one of those ponderous, scientific people, and ‘let on’ to prove what had occurred in the remote past by what had occurred in a given time in the recent past, or what will occur in the far future by what has occurred in late years, what an opportunity is here! Geology never has such a chance, nor such exact data to argue from! Nor ‘development of species,’ either! Glacial epochs are great things, but they are vague—vague! Please observe:—In the space of one hundred and seventy-six years the Lower Mississippi has shortened itself two hundred and forty-two miles. That is an average of a trifle over one mile and a third per year. Therefore, any calm person who is not blind or idiotic, can see that in the Old Oolitic Silurian Period, just over a million years ago next November, the Lower Mississippi River was upwards of one million three hundred thousand miles long, and stuck out over the Gulf of Mexico like a fishing-rod. And by the same token any person can see that seven hundred and forty-two years from now the Lower Mississippi will be only a mile and three-quarters long, and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual board of aldermen. **There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact.**

The drafters of Rule 702 could not have said it better. The first additional requirement of “new” Rule 702 is for the trial judge to insure that the expert’s testimony does not confound the jury with wholesale returns of conjecture based on a trifling investment of fact. Therefore, what the judge needs to know is a straightforward explanation of what facts the expert considered—data, documents, discovery materials, treatises, studies, calculations, analyses, and the like. The judge is not looking for a regurgitation of the underlying facts or data, merely an inventory of it. After presenting this information the expert should explain why this was sufficient to support the opinions to be expressed. If information was not considered that reasonably should have been, an explanation is needed as to the effect that this has on the opinion expressed. In this regard remember Rule 703— the information that experts rely on to support their opinions need not be independently admissible into evidence, so long as it is reliable and customarily referred to by experts in the field. Similarly, if a lawyer is attacking an opposing expert’s opinion on the

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60 **Mark Twain, Life on the Mississippi** 120 (Justin Kaplan ed., Signet Classics 1967) (1883) (emphasis added).
grounds that it lacks a sufficient factual basis, he needs to particularize just what is lacking in the opinion, and more importantly, why its absence undercuts the opinion to the point that it should not be admitted.

**Reliable Methods and Principles**

The second factor added to Rule 702 when it last was changed was the requirement that the methods and principles used by the expert in reaching the opinions to be expressed must be reliable. As used in Rule 702, “reliability” means evidentiary reliability, as that term was defined in *Daubert*, not scientific reliability. Evidentiary reliability means that the methodology or principle is trustworthy, and equates with scientific validity.61 As the commentary to the rule makes clear, the change was in response to *Daubert* and *Kumho Tire*, but was not intended to “codify” the *Daubert* factors, as they are “neither exclusive nor dispositive.”62 Other “factors” that may complement the *Daubert* factors and assist the court in determining the reliability of the methodology used by the expert are: (1) whether the experts propose to testify from matters that flow “naturally and directly” from research conducted outside the context of the litigation – i.e. “real world research;” (2) whether the expert unjustifiably has extrapolated from an accepted premise to a conclusion that cannot fairly be derived from it; (3) whether the expert adequately has taken into consideration and accounted for or ruled out alternative explanations inconsistent with the opinion expressed; (4) whether the expert is being as careful in the methodology used for testifying as she would be in her professional work unrelated to litigation; and (5) whether the field of expertise the expert claims is recognized for reaching reliable results for the type of opinion that the expert proposes to give at trial – i.e. the discipline itself is not lacking in reliability.63 Thus, the second of the new Rule 702 factor complements, but is not identical with,


62 Committee Note to Fed. R. Evid. 702, 192 F.R.D. 418.

63 *Id*. 419.
the evaluative factors identified in *Daubert* and *Kumho Tire* for measuring reliability of methodology used by experts. Both have the same goal – exposing flaws in the process used to reach the opinion that would render it unhelpful, and therefore inadmissible.

What this means for lawyers and experts is that they must be able to take a self-critical look at the methods and principles underlying the opinions they intend to offer into evidence, and be prepared to explain to the judge why they are reliable. It enhances the credibility of both the lawyer and expert if they are forthcoming with this, rather than forcing the judge to tease it out or, worse, have it exposed by opposing counsel.

If a lawyer intends to challenge the reliability of an opponent’s methodology, she must be prepared to be specific, and particular. Boilerplate, general, conclusory allegations are worthless. As a rule of thumb, a lawyer stands a better chance of convincing a judge to exclude or limit the scope of expert testimony if she presents a clearly focused, narrow challenge that can plainly and persuasively demonstrate the flaws in the challenged expert testimony, as opposed to a scattergun approach that overwhelms the court by jumping from one asserted flaw to another, without clearly identifying the significance of each to the ultimate issue of whether the opinions are legally reliable. If multiple grounds for exclusion of the evidence are offered, the lawyer needs to make sure that the motion is extremely well organized and that each basis for attacking the expert’s testimony is discussed in a way that allows its significance to be appreciated by the court. By this, I mean that the court will ask “so what?” If the error rate was 3% – what does this mean in the big picture of whether the opinions expressed by the expert are legally reliable, scientifically valid, relevant to this case, and helpful to the jury?

Many expert opinions regarding scientific and technical matters may be based on multiple procedures. If a challenged opinion has many parts, the lawyer must either be prepared to break down each opinion (or part thereof), and each method or principle that is challenged, or demonstrate that one particular component of the opinion that is essential to its admissibility is fatally flawed. This includes showing the judge the source of the opinion, such as an expert report, deposition testimony, or disclosure statement, and detailing exactly why it is not
trustworthy. The lawyer should provide the court with these materials, not just paraphrase them. In doing so, the lawyer should take full advantage of the fact that under Rule 104(a) the rules of evidence are not strictly applied. Therefore, the lawyer may use affidavits or other materials that may not be independently admissible, if they will help the court appreciate why the challenged testimony is not reliable. Whatever is provided to the court must be clear enough for the court to both follow it and accept it. Throwing out an incomprehensible scientific opinion why another equally incomprehensible scientific opinion is not reliable does not work well.

**Reliable Application of the Methods and Principles to the Facts of the Case**

The final factor recently added to Rule 702 is that it must be established that the methods and principles used reliably have been applied to the facts of the particular case. This factor dovetails most closely with the Supreme Court’s notion of “fit” as discussed in *Daubert* – “whether expert testimony proffered in the case is sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute. The consideration has been aptly described . . . as one of ‘fit.’” In essence, the notion of “fit” addresses whether procedures that may unquestionably be scientifically valid in one context continue to be so if applied to the context of the case being tried. A determination that the procedures used by an expert don’t fit the facts of the cases at hand does not mean that the procedures themselves are not scientifically valid, rather it means that the results of the procedure may not be generalized to apply to the resolution of the pending case.

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64 See e.g., *Samuel v. Ford Motor Co.*, 96 F. Supp. 2d. 491, 504 (D. Md. 2000) (noting that the court required counsel to submit a “Daubert/Kumho Tire Checklist” that detailed exactly how they should present the information relating to the challenges to the expert testimony).

65 *Daubert*, 509 U.S. at 591 (internal quotations and citations omitted). See also Committee Note to Fed. R. Evid. 702 192 F.R.D. at 420-21.
For example, in a state court case, *J.H.C. v. State*, the appellate court reviewed trial court testimony from a psychologist that a child had been the victim of child abuse. The opinion was based in part on two projective technique tests the psychologist had analyzed, the Rorschach Test and the Thematic Appreciation Test ("TAT"), as well as the Minnesota Multiphasic Personality Inventory for Adolescents, the Wechsler Intelligence Scale, and the Woodcock-Johnson Test of Achievement. The trial court had allowed the expert to express the opinion that the child been the victim of sexual abuse based in part on the results of these tests. The appellate court ruled that the trial court had committed error in allowing the psychologist’s to state this opinion, because there was not a sufficient showing that the tests could reliably and validly identify victims of sexual abuse. There was no need for the appellate court to assess the scientific validity and reliability of the tests if used for some other purpose than to confirm sexual abuse. Essentially, even if the court had assumed that the tests were scientifically reliable and valid for some purpose other than that for which they were used, they would not “fit” the case at hand, and would not have been applied in a legally reliable manner to the facts of the pending case.

As with demonstrating that methodology is not reliable, the same level of detail and clarity must be used to show the court why the methodology used does not fit the facts of the case. Source material, not just conclusory descriptions of it, should be used to “prove” the poor fit. Remember that the judge only has the materials filed with the court, and this does not include all of the discovery produced.

Further, the attorney or expert needs to be able to walk the judge through why exactly it is that the test used does not fit. In doing so remember that both the expert and attorney will

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Faigman, D., et al. *Modern Scientific Evidence, The Law and Science of Expert Testimony*, 2 SOCIAL AND BEHAVIORAL SCIENCE, at 168 (2005). ("The court [in *J.H.C. v. State*] thus effectively held that the several psychological tests that underlay the expert’s opinion did not fit the legal issues to which they were offered. They might or might not have validity for their intended purposes, but there was no suggestion that they could identify victims of sexual abuse. There was thus no need for the court to assess the tests’ reliability or validity.") *Id.*
have far more familiarity with the test and the facts of the case than the court. There sometimes is a tendency for counsel and experts to assume that the court is as familiar with the technical and factual information as they are, or that the court has had as much time as they have to read the materials before the hearing. Such an assumption should be avoided. The better assumption is that the judge is busy and probably has not had time to carefully go through all the filings in the case, and is not an expert in the underlying science or technology. Therefore, approach the hearing as if the judge knows nothing and spell it out for him or her using the clearest, least technical explanation possible. As I tell lawyers and experts, borrowing Denzel Washington’s great line in the trial scene in the movie *Philadelphia*, “talk to me like I’m six years old.” Absolutely avoid loading up the explanation with jargon, and be complete without beating around the bush. If you happen to be before a judge who is familiar with the facts and science, she will tell you so and you can adjust your presentation accordingly. If time and resources permit, practice your presentation before another lawyer who is unfamiliar with the case and the underlying scientific or technical issues to see if there are any problem areas in your presentation.