CURRENT PERSPECTIVES IN MEDICAL CAUSATION
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I. INTRODUCTION

An essential element of plaintiff's case is causation. There must be some reasonable connection between the defendant's act or omission and the harm suffered by the plaintiff. As simple as that sounds "[t]here is perhaps nothing in the entire field of law which has called forth more disagreement, or upon which the opinions are in such a welter of confusion."[i] Analysis of the casual relationship between defendant's conduct and plaintiff's harm involves two different elements: cause-in-fact and proximate or legal cause.[ii] Most of us recall the headache - inducing experience of trying to separate these concepts while learning first year torts.

This paper and presentation address medical cause-in-fact issues. Medical causation is a critical issue in any tort case, and it is becoming more expensive and time consuming. Hopefully, these thoughts about substantive law, procedure, scientific evidence and presentation to the trier of fact will help you in handling medical causation issues in your tort cases.

II. VALUABLE PLAINTIFF CAUSATION TOOLS

The most contested issue in a tort case frequently involves causation. Did defendant's action, product, process or chemical "cause" or "contribute" to the plaintiff's injury? Defense tactics used to dispute a plaintiff's medical causation case are predictable and consistent. Typically they involve blaming a plaintiff's injury on a lifestyle choice, such as smoking, drinking or eating spicy foods; claiming plaintiff's predisposition to injury comes from pre-existing, developmental, psychological, or genetic factors; or pointing a finger at another entity or event which could have caused injury.

Another technique frequently used by defendants is to define the medical specialty pertinent to a plaintiff's case as rarefied--only their hired gun experts possess such unique expertise. Sometimes defendants insist that only a certain methodology can be used to properly analyze a victim's medical history. This methodology is supposedly used by a defendant's expert but not the plaintiff's. And defendants often claim normal clinical methodologies are insufficient to prove medical causation in a court of law. These defense tactics can be squarely refuted by plaintiff.

A. Take the Victim as You Find Him

A plaintiff's psychological tendencies, previous trauma and genetic predisposition have long been discovery areas where defendants sought information about confounders to mitigate or redirect their liability for hurting the plaintiff. In

personal injury law, it is well settled that in an action for damages, the tortfeasor "takes his victim as he finds him." [iii]

The common law rule, found in Restatement (Second) of Torts, §461, reads: "The negligent actor is subject to liability for harm to another although a physical condition of the other which is neither known nor should be known to the actor makes the injury greater than that which the actor as a reasonable man should have foreseen as a probable result of his conduct." Thus, the tortfeasor is responsible in damages for the consequences of his tort although the damages so caused are greater because of a prior condition of the victim which is aggravated by the tort.

An injured plaintiff with a pre-existing condition can get a jury instruction for his injuries such as BAJI 14.65.

> A person who has a condition or disability at the time of an injury is not entitled to recover damages therefor. However, a plaintiff is entitled to recover damages for any aggravation of a preexisting condition or disability, caused by the injury.
>
> This is true even if a condition or disability made plaintiff more susceptible to the possibility of ill effects than a normally healthy person would have been, and even if a normally healthy person probably would not have suffered any substantial injury.
>
> Where a preexisting condition or disability is so aggravated, the award of damages is limited to the additional injury caused by the aggravation.

B. Substantial Factor

There must be some connection between the act or omission of the defendant and the damage suffered by plaintiff for a tort to be actionable. The vast majority of typical torts allows this cause-in-fact query to be satisfied by the "but-for" rule which has been stated as follows: The defendant's conduct is a cause of the event if the event would not have occurred but for that conduct; conversely, the defendant's conduct is not a cause of the event if the event would have occurred without it.[iv]

There is a class of tort cases-for example, those involving toxic insults or multiple actors- where the but-for rule fails. If two causes contribute to bring about an event, and either one of them, operating alone, would have been sufficient to cause the same result, some test other than but-for is required. Over time common law courts developed an alternative causation rule which has become known as the "substantial factor" test or formula. Thus, the defendant's conduct is a cause of the event if it was a material element and a substantial factor in bringing it about. There has been considerable discussion among commentators as to whether "substantial factor" is a phrase sufficiently helpful to furnish an adequate guide for the jury, and whether it is possible or desirable to reduce it to any lower terms.[v]

Negligence is a cause in fact of the harm to another if it was more likely than not a substantial factor in bringing about the harm. And a long-recognized principle of law is there can be more than one cause in fact making both wrongdoers liable. Causation is not defeated by the possibility that the injury would have happened without the defendant's involvement. The substantial factor test is contained in the Restatement Second of Torts, §431. A noted commentator has written about substantial factor that "the phrase is sufficiently intelligible to any layman to furnish an adequate guide to the jury."[vi] A jury instruction on the issue of substantial factor may read as follows.

> The law defines cause in its own particular way. A cause of [injury] [damage] [loss] [or] [harm] is something that is a substantial factor in bringing about an [injury] [damage] [loss] [or] [harm].[vii]

C. Burden of Proof

The defense will almost always employ experts who testify the applicable science does not support the plaintiff's medical causation. The initial method for dealing with such testimony is getting the defense expert to agree that the burden of proof in the case is "more likely than not", not "scientific certainty." Any trial court analysis of your expert's theory (which is what you're now asking the defense expert to evaluate) must give due consideration to the simple fact that the standard of proof in a civil trial is still, and always has been, more likely than not. The defense expert may not only resist, but be unwilling to consider the civil justice system's standard of proof. As Professor Sheila Jasanoff, Chair of Cornell University's Department of Science and Technology Studies (who was cited by the court in *Daubert),* has written, "It is often said that standards of proof are fundamentally different in science and the law. Thus, proof for scientists generally amounts to something like a 95 percent certainty that a presumed cause-effect correlation is not due to mere chance. Proof in civil litigation, by contrast, requires only a showing that the harm alleged was more probably than not caused by the defendant's conduct. Overly stringent restrictions on admissibility could imperceptibly ratchet up the standard of proof in civil litigation. It should be noted that the *Daubert* majority viewed the older 'general acceptance' test from *Frey* as too restrictive."[viii]

In *Lasha v. Olin Corp.,*[ix] the Louisiana Supreme Court reversed the lower courts who had erred in requiring the plaintiff to prove "to a reasonable medical certainty" his exposure to chlorine gas caused his injuries. A plaintiff's burden of proof is by a preponderance of the evidence or more likely than not, not by some artificially created greater standard. The court explained the lower courts' error as follows:

> When the term "reasonable medical certainty" is used to describe the measure of persuasion in a tort case, it produces harmful error in two respects. First, it places upon the plaintiff a higher degree of proof than is required in the ordinary civil case. To require plaintiff to prove defendant's negligence, for example, to "a reasonable certainty" is to require him to prove it to such degree as to leave no reasonable doubt, which is equivalent to saying that he must prove it beyond a reasonable doubt. Second, because the word "medical" is susceptible of being

> construed as referring only to expert medical testimony, the use of the phrase "reasonable medical certainty" tends to preclude the trier of the facts from considering evidence other than that of expert medical witnesses. While expert medical evidence is sometimes essential, it is self-evident that, as a general rule, whether the defendant's fault was a cause in fact of a plaintiff's personal injury or damage may be proved by other direct or circumstantial evidence. (citations omitted)[x]

In many states, medical opinion testimony concerning the cause of an injury "must be couched in terms of reasonable medical certainty or probability" and such testimony is not inadmissible simply "because it fails to account for some particular condition or fact which the adversary considers relevant."[xi] It's important to recognize that the concept of reasonable degree of medical certainty or probability is a legal, not medical one. While an expert's use of these words in laying the foundation to his or her opinion is well-advised, decisions do not typically require that medical experts must use one or both of these precise phrases for stating an opinion.

A typical instruction on burden of proof is:

> Plaintiff is seeking damages based upon [a] claim[s] of _____. Plaintiff has the burden of proving by a preponderance of the evidence all of the facts necessary to establish:
>
> The essential elements of [each separate] [the] claim. The essential elements of [the] [each separate] claim [is] [are] set forth elsewhere in these instructions. In addition to these essential elements, plaintiff has the burden of proving by a preponderance of the evidence all of the facts necessary to establish the nature and extent of the [damages] [injuries] claimed to have been suffered, the elements of plaintiff's damage and the amount thereof.
>
> _____.
>
> The defendant has the burden of proving by a preponderance of the evidence all of the facts necessary to establish:
>
> _____.
>
> "Preponderance of the evidence" means evidence that has more convincing force than that opposed to it. If the evidence is so evenly balanced that you are unable to say that the evidence on either side of an issue preponderates, your finding on that issue must be against the party who had the burden of proving it.
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> You should consider all of the evidence bearing upon every issue regardless of who produced it.[xii]

III. DAUBERT

A. A Short History of Expert Testimony in Federal Courts

For seventy years the case of *Frye v. United States*[xiii] controlled the admissibility of expert scientific evidence in federal courts. Courts applying *Frye* typically limited its application to so-called "black box" testimony, i.e. machines, devices, or techniques that authoritatively and automatically decide outcome-determinative "truths,"[xiv] since such testimony has the aura of infallibility and thus the potential to overawe the jury.[xv]

The *Frye* court affirmed the trial court's refusal to allow a scientist's testimony about a criminal defendant's test results from a predecessor of a polygraph machine stating that before admitting expert scientific testimony "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." For the most part, U.S. courts only applied the *Frye* test in criminal cases.[xvi] And *Frye* did not stand as a roadblock to the admissibility of scientific expert testimony, being cited less than one hundred times in federal and state cases until 1975.[xvii] But as the litigation use of diverse kinds of expert testimony dramatically increased, business and industry groups clamored for additional screening of expert scientific testimony.

In the 1993 case of *Daubert v. Merrell Dow Pharmaceuticals, Inc.,*[xviii] the United States Supreme Court considered whether *Frye* survived the 1975 adoption of Federal Rule of Evidence 702. The rule, since changed, provided:

> 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.

The court held that Rule 702 superceded *Frye's* "rigid" requirement that testimony based on a scientific methodology or technique was admissible only if it had achieved "general acceptance" in the relevant field. The *Daubert* decision recognized Rule 702's "liberal thrust" and its "general approach of relaxing the traditional barriers to opinion testimony." The decision directs trial courts to assess whether proffered testimony or evidence admitted at trial is not only relevant but reliable.[xix]

According to *Daubert*, trial courts should 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."[xx] The court referenced five factors that should guide the trial court's decision. It emphasized none of the factors was indispensable and the overall inquiry is a flexible one. The "nondefinitive checklist" directs trial courts to evaluate:

> (1) whether the expert's technique or theory can be or has been tested- that is, 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 subject 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.

Over the next seven years, the U. S. Supreme Court addressed the admissibility of expert testimony three more times. In *General Electric Co. v. Joiner*[xxi] the court held that appellate courts must apply the highly deferential "abuse of discretion" standard to trial court rulings admitting or excluding scientific evidence. The *Joiner* court also allows federal trial court's to examine the relationship between an expert's methodologies and conclusions, stating that they "are not entirely distinct from one another." The court concluded that a trial court must not "admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert."[xxii]

The supreme court concluded in *Kumho Tire Co. v. Carmichael*[xxiii] that Rule 702 mandates all types of expert evidence are subject to the "gatekeeping" requirements of *Daubert*. *Kumho* contains language helpful to plaintiffs in that it reemphasized the five *Daubert* factors could not always be used to evaluate the reliability and admissibility of all types of expertise. Trial courts should have broad discretion to devise alternative tests for "determining whether particular expert testimony is reliable."[xxiv] It is not necessary that all, or even one, of the *Daubert* factors be satisfied for the testimony to be admissible. Expert testimony from historically reliable disciplines which conforms to the standards associated with those disciplines shall be freely admitted. Conclusions consistent with commonly used methodologies will be admissible when drawn "from a set of observations based on extensive and specialized experience."[xxv] And most significantly, trial court's may use discretion "to avoid unnecessary 'reliability' proceedings in ordinary cases when the reliability of the expert's methods is properly taken for granted."[xxvi] The court emphasized that the best gauge for assessing whether expert testimony is reliable is whether the expert employs in the courtroom the "same level of intellectual rigor that characterizes the practice of an expert in the relevant field."[xxvii]

In *Weisgram v. Marley Co.*,[xxviii] the court ruled that an appellate court reversing a trial court's decision to admit an expert's testimony need not remand the case to allow that party a second chance to cure what the appellate court regarded as unreliable evidence. Thus, the party affected by the exclusion of the evidence may not be permitted to reexamine the disqualified expert so as to provide a satisfactory explanation of his methodologies' reasonings and conclusions. Further, the party harmed by the appellate decision to exclude testimony may not be permitted to find other experts who can validate or cure the excluded expert's work.

Rule 702 was amended in 2000 in response to *Daubert* and *Kumho.*[xxix] Rule 702 now 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, *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.*

The italicized language "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."[xxx] The committee notes on amended Rule 702 make plain that the rejection of expert testimony is the exception rather than the rule. *Daubert* did not work a "seachange over federal evidence law," and "the trial court's role as gatekeeper is not intended to serve as a replacement for the adversary system."[xxxi]

B. Protecting Your Expert's Opinion

Retaining the Expert

Anticipate and evaluate *Daubert* issues from the first time a case is screened for acceptance. You must use care in choosing the right experts and inoculating them to a *Daubert* attack.

When considering an expert for retention in a case, no matter what the referral source, you should conduct a Westlaw or similar legal database search on all reasonable iterations of the expert's name. This provides some insight into the expert's familiarity with the legal system; it may also reveal the expert's involvement with a *Daubert* motion or hearing. While an expert's ability to present testimony in an effective fashion and her credentials are obviously important factors to consider, those abilities are not enough to justify selection. An expert must be able to explain, support, and defend her methods and conclusions at deposition, hearing, and trial and work with you on how to accomplish that.

You must ask the expert about her prior experience with *Daubert* issues. If multiple courts have rejected the expert's previous testimony, that does not mean she should never again be hired. It does mean you can expect defendants to attack the expert's opinion in the present case, so be prepared to explain why this case testimony is distinguishable from those past cases.

Educating the Expert

After retention of the expert, you should lay the groundwork to protect the expert's opinions to be expressed in the case. This is true for all experts except those using a standardized methodology routinely accepted by the courts; for example, an economics professor calculating wage loss. Some commentators suggest sending an

expert package including disclosure rules, evidence rules, the *Daubert/Kumho* decisions, other cases involving experts in the witness's field, examples of a good expert report in other cases, and the like. However, some courts may view such an expert package as an attempt to control the expert's opinion, precisely the opposite impression you want to make. The best practice may be for you to timely inform the expert in writing of disclosure requirements, deadlines, report and deposition requirements, and take the time to educate her by explaining *Daubert* considerations in the jurisdiction where suit will be tried.

Scheduling Orders and Expert Disclosures

Pre-trial scheduling orders[xxxii] or case management orders[xxxiii] ought to give special consideration to *Daubert* issues. In fact, the federal rules specifically authorize the trial court in setting schedules for pre-trial proceedings to consider "limitations or restrictions on the use of testimony under Rule 702."[xxxiv] You should request the court require in the scheduling order that any evidentiary material on which a movant intends to rely in support of any *Daubert* motion be served with the motion and not held for reply. Also, ask the court to require that a movant designate by specific citation of the source each portion of any expert testimony which a movant means to challenge, listing all factual and legal grounds on which the challenge rests.[xxxv] If the case warrants, ask the court to schedule *Daubert* motions before the discovery cut-off, so if a deficiency can be cured there is enough time to do it.

Federal courts typically require a plaintiff to disclose experts and provide their reports a month or so before defendant, a pre-*Daubert* custom presumably based on the plaintiff bearing the burden of proof at trial. Although often requiring the plaintiff to disclose the identity of experts earlier than defendant, state courts frequently allow a contemporaneous exchange of expert reports. In this regard state court practice discourages defendant experts from cheating off plaintiff experts' work or writing a report that simply reacts to plaintiff experts' opinions and requires defendant experts to form their own opinions based on the facts of the case. Independently derived expert opinions allow the court to more properly perform its mandated gatekeeping function pursuant to *Daubert*. Thus, you should always seek contemporaneous exchange of expert reports in the scheduling order whenever possible.

Reports

Pursuant to Rule 26 of the Federal Rules of Civil Procedure, expert witnesses in federal court must provide a written report as part of discovery. Such a report is due in some state courts only upon contradictory motion of any party or on the court's motion.[xxxvi] Regardless of the forum in which it is produced, the expert should take extreme care in writing his expert report.

The written report should be detailed and discuss the expert's understanding of the facts, methods, and conclusions necessary to explain his opinion. You should spend the money required for the expert's best effort in preparing the report. Citations of authoritative sources, peer-review publications, and standard texts which support and explain methodologies and conclusions consistent with those of

the expert should be referenced in the report. If the expert is applying a specific technique or methodology to his analysis it should be mentioned. It is particularly helpful for the expert to explain how the methodology he employs in his analysis applies to the facts of the case to reach his conclusion.

In federal court, expert reports must be accompanied by the expert's qualifications or a current resumé, a list of all publications authored by the witness in the last ten years, a testimony log for deposition or trial from the last four years, any exhibits to be used as a summary of or support for the opinions, and the compensation to be paid for the study and testimony.[xxxvii]

The report must contain the data or other information considered by the witness in forming the opinions, a complete statement of all opinions to be expressed and the basis and reasons for the opinions, and the witness must sign it.[xxxviii]

Depositions

If care has been taken in preparing the expert's report, defending the deposition will be much easier. Assuming the expert possesses proper qualifications for his opinion and his testimony applies to the case facts, defense of the deposition should be built around the expert report. This is the payoff for the hard work done to produce it.

You should encourage the expert to refer to his report at his deposition. If defense counsel rephrases, partially cites, or takes a portion of the expert's report out of context, the opportunity for inconsistency and misunderstanding increases. Accordingly, to the extent defense counsel's questions are answered in the report, the expert witness should say so and refer to that portion of his report which is responsive.

If the plaintiff's expert witness has not fully explained his sources, methodologies, techniques, analyses, or conclusions in his report, you should request he do so at his deposition during your direct examination. Otherwise, supplementation of the opinion by affidavit or live testimony may be necessary if a *Daubert* hearing is held. At a minimum, you should make sure the report, deposition or both contain a statement of the expert's methodology and his application of that methodology to the facts of the case. This will provide the foundation for protecting the opinion if a court reviews it for evidentiary sufficiency.

C. *Daubert* And Motion Practice

Triggering a Hearing

A *Daubert* challenge is a given in complex litigation and is becoming all too common in even simple cases. Many defendants choose to abuse *Daubert* in motion practice because even if the challenge is unsuccessful, it will be time-consuming and costly.

The trial judge decides whether to admit or exclude expert testimony.[xxxix] But

there is little guidance as to when an evidentiary hearing is required or what procedures a court should employ in deciding whether to admit expert testimony. *Kumho* states "[t]he trial court must have the same kind of latitude in deciding how to test an expert's reliability, and to decide whether or when special briefing or other proceedings are needed to investigate reliability, as it enjoys when it decides whether or not that expert's relevant testimony is reliable."[xl] And *Kumho* advises that the trial judge has discretion to avoid "unnecessary 'reliability' proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted."[xli] But the threshold showing required for a *Daubert* hearing is unclear and varies depending upon the court and jurisdiction.

It is plain that trial courts are more likely to conduct a *Daubert* hearing on "less usual or complex cases,"[xlii] once the opposition has called the expert's proferred testimony "sufficiently into question."[xliii] In civil cases, a court might refuse "to undertake any reliability-relevancy determination until the movant has made a prima facie showing of specific deficiencies in the opponent's proposed testimony.[xliv] The Fifth Circuit has concluded that the issue was raised "by providing conflicting medical literature and expert testimony."[xlv] Other federal circuit courts of appeal have specifically found that district courts are not required to hold a pretrial evidentiary reliability hearing in carrying out their trial court gatekeeping function.[xlvi] In Louisiana, appellate courts will support a trial court's denial of a motion in limine to conduct a *Daubert* hearing as being within the trial court's discretion.[xlvii] But the Louisiana Supreme Court has granted writs to overturn the trial court's refusal to conduct an evidentiary hearing to determine whether proposed expert testimony is scientifically reliable.[xlviii]

In federal court, threshold factors for the hearing could presumably include defects in the expert testimony's (1) factual basis; (2) data; (3) principles; (4) methods; or (5) their application, although Louisiana state courts may properly limit an attack to methods only. Whatever the approach there appears to be a two step trial court inquiry that first requires an initial showing of unreliability and then an ultimate determination of reliability involving application of *Daubert* factors or any factors the trial court deems appropriate.[xlix]

There is no specific rule as to when a *Daubert* hearing should occur. In federal court, a *Daubert* hearing is typically filed as a motion to strike; in state court, such a hearing is usually triggered by a rule to show cause as to why a motion in limine should not be granted. In whichever court you are filing, your motion should 1) clearly identify the specific portions of the testimony to which objections pertain; (2) state the grounds for objection in detail with supporting analysis; and (3) attach evidentiary material relied upon in support of the motion.

At The Hearing

If a *Daubert* hearing takes place, the court "is not bound by the rules of evidence except those with respect to privileges."[l] In other words, expert testimony may be challenged by inadmissible evidence. "When expert testimony is challenged under *Daubert*, the burden of proof rests with the party seeking to present the

testimony."[li] The proponent of expert testimony "need not prove to the judge that the expert's testimony is correct, but she must prove by a preponderance of the evidence that the testimony is reliable."[lii] For the trial court to overreach in the gatekeeping function and determine whether the opinion evidence is correct or worthy of credence is to usurp the jury's right to decide the facts of the case. All the trial judge is asked to decide in a *Daubert* hearing is whether the proffered evidence is based on "good grounds" tied to a sufficient methodology.[liii] A trial court "must take care not to transform a *Daubert* hearing into a trial on the merits."[liv]

When you are faced with a *Daubert* hearing your challenged expert should get involved right away - she is the best source for defending her methodology. If the case warrants, your challenged expert can suggest another expert - perhaps a colleague or co-author - to provide a supporting affidavit after review of your challenged expert's report or deposition for methodology and reasoning. You should typically resist a moving party's request for a live hearing since it 1) provides another cross-examination opportunity of plaintiff's expert; 2) increases your burden and expense; and 3) consumes court resources listening to defense lawyers manufacture attacks on plaintiff's expert which could otherwise be used to try the case. If the court allows a live hearing, make sure your opponent identifies which experts will be called to challenge your expert's methodology. And ask to go first since you have the burden of proof. Whether the hearing is live or on paper, you should prepare an exhibit list which involves authoritative texts, peer review articles, learned books, and similar material so as to provide the court with independent methodological support for your expert's opinion.

A paper-only hearing is usually advisable when the *Daubert* hearing involves complex scientific matters. Remember the court is not supposed to decide the merits of the matter, only that the expert's methodology and its relevance to the case is acceptable. Courts usually benefit from being able to review specialized scientific material in written form at their leisure since credibility of the witness is not at issue.

Offensive Use of Daubert

Getting the defense expert to validate plaintiff expert's methodology, or exposing flaws in the defense expert's analysis, is attainable and worth the effort. For example, if the defense doctor refuses to analyze the medical causation issue through the legally correct "more likely than not" burden of proof, reverse his overly rigorous scientific requirements against him. The defense doctor may state the cause of your client's condition is most consistent with some predisposing genetic or unknowable factor - its anything but the actions of the defendant. Have the defense doctor explain his analysis. Then make the defense doctor critique plaintiff doctor's causation theory in great detail, which may include his imposition of additional methodologies he considers necessary to comprise "good science". Then have the defense doctor apply that same analysis to his alternative causation theory. Almost always, the defense doctor's alternative causation theory will be unable to meet his unnecessarily stringent requirements for proof imposed on plaintiff doctor's opinion.

Another way to illustrate the same point is to have a defendant scientific

expert explain his theory on a material issue and how he arrived at it. Then ask him to assume his opinion is wrong. Ask what process would the expert go through to analyze and assess the opinion to find the error? Usually the expert will not respond the same way to this question as to the initial explanation of how he arrived at his theory.

The court can readily infer the defense expert is not applying the same intellectual rigor to his alternative causation theory (or other theory) as he claims is required by "good science;" or, he is not as analytically critical of his own opinion as he is of plaintiff's expert. And if the defense expert is unable to meet his methodological requirements for alleged "good science" you may choose to exclude his alternative theory pursuant to a *Daubert* motion.

The decision to use *Daubert* offensively will depend, in large part, upon whether the defendant abuses *Daubert* in its motion practice and files ill-founded motions. This is not to suggest you file a *Daubert* motion to exclude a defense expert in retaliation for the defense provoking a *Daubert* hearing. But you may choose to file a *Daubert* motion seeking to exclude a defense expert to point out to the court flaws in the defense expert's methodology, or for additional reasons consistent with amended Rule 702 if you are in federal court. Also, assuming it's the case, filing a *Daubert* motion provides the opportunity for you to contrast the defense expert's flawed reasoning with the superior analysis of plaintiff's expert, thereby protecting the plaintiff expert's opinion.

IV. ESTABLISHING THE FOUNDATION FOR A MEDICAL OPINION

A. Use the Reference Manual on Scientific Evidence

A helpful source of information for understanding scientific concepts, including medicine, is the *Reference Manual on Scientific Evidence,* now in its second edition.[lv] The manual is published by the Federal Judicial Center as part of its mission to develop and conduct education programs for judicial branch employees. According to the preface, the manual "furthers the goal of assisting federal judges in recognizing the characteristics and reasoning of 'science' as it is relevant in litigation."

About 100,000 copies of the reference manual have been distributed since its initial publication. Its use is widespread in educational programs for federal and state judges, attorneys, and law students. According to the *Reference Manual's* preface, the reference guides "are not intended to instruct judges concerning what evidence should be admissible or to establish minimum standards for acceptable scientific testimony." But some courts ignore that directive and quote the reference guide as an authority for admissibility of scientific evidence. Regardless, counsel handling toxic tort cases should become familiar with, and regularly use, the *Reference Manual.*

B. Expert Qualifications of a Physician

Both lay testimony and physician testimony can be used to prove a plaintiff's

damages.[lvi] Expert testimony is required when the conclusion regarding medical causation is not one within common knowledge.[lvii] This expert testimony is usually provided by a physician. To render an opinion a doctor, of course, must be qualified.

In the United States, a physician is someone who has met the rigorous requirements of a four year program and graduated from a credentialed medical or osteopathic school.[lviii] The expected next stage of medical training is a formal medical residency program. For example, the American Board of Internal Medicine (established in 1936) is one of twenty-four primary medical specialty boards recognized by the American Board of Medical Specialties (ABMS), which is the pre-eminent professional organization in the United States responsible for setting standards for certifying all physicians. The credential of ABMS board certification is a marker of substantial proficiency within a particular area of medicine.[lix]

C. Special Physician Qualifications Relevant to Toxic Torts

There is relatively little structured (organized) study of public health, occupational medicine, and toxicology in a traditional US medical school curriculum; an MPH degree offers enhanced training in epidemiology, toxicology, and other related aspects of public health.[lx] The American Board of Preventive Medicine (the board for occupational medicine was established in 1948) is also one of the twenty-four primary medical specialty boards recognized by the American Board of Medical Specialties (ABMS).[lxi] A significant issue in most toxic tort cases is the proper diagnosis of a spectrum of medical conditions in an adult, and whether they are causally related to chronic or acute exposure to toxic chemicals.

Appropriate research experience and training in analysis of epidemiological methods and study results can also be a relevant criterion.[lxii] Hospital appointments are a further positive indicator of a doctor's qualifications and experience in clinical medicine.[lxiii]

D. Information Relied on to Reach a Diagnosis

In submitting an opinion, the doctor should review readily available information. Of course, this changes from patient to patient. The patient history is one of the primary and most useful tools in the practice of clinical medicine, and should be obtained directly by the examining physician. A thorough patient history includes not only the present illness and past medical history, but aspects of medical, occupational, personal, and family background relevant to the present problems.[lxiv] If possible, a doctor should personally examine the client and take a thorough history during a clinical visit. A written medical report may contain separate sections on occupational (work) history, present illness (medical history), social history, family history, and past medical history, and a review of systems.

Although there is no established standard patient history questionnaire form, there is agreement that a useful adult patient history should include the following six categories of information 1) patient identification; 2) chief complaint and history of present illness; 3) medical history of injuries, past medical diagnoses, and surgical

procedures; 4) lifestyle characteristics including smoking, drug and alcohol use, and environmental exposures; 5) family history; and 6) occupational history.[lxv] However, gathering a thorough history is improved by use of a formal written questionnaire to ensure that relevant topics are not slighted or missed entirely. A registered nurse may interview the client face-to-face and complete a very detailed personal and medical history questionnaire in advance of the client's examination by the doctor.

Although time consuming and cumbersome, an examination of patient records from treating physicians, clinics, and hospitals can sometimes be crucial for accurate diagnosis.[lxvi] The doctor may review pages of personal medical records of the client, including those from multiple treating physicians, medical and surgical hospitalizations, laboratory tests, radiology studies, and neuropsychological testing results before arriving at his medical opinion. The client's individual employment and medical surveillance examinations from the employer may be available. The doctor's review of a complete set of personal and occupational patient medical records before he arrives at his medical opinion in the case is desirable, if the case permits.

The physical examination is a routine procedure for evaluating a patient and determining a proper diagnosis. The physical examination has standard components which include determination of vital signs, a description of the patient's general appearance, and examination of specific regions and organ systems of interest.[lxvii] The doctor's performance of the physical examination should comport with the recommendations of the FJC Reference Guide on Medical Testimony for medical experts. This may include specific findings for the Head and Neck (HEENT), Chest, Heart, Abdomen, Extremities, and Neurological Examination, as well as the other recommended components.

In addition to the specific content of the physical examination, there are accepted methods of performing the physical examination properly as well. A reliable causation determination of the client's medical condition is usually aided by a competent general physical examination. Further, it is the consensus of responsible medical authorities that a patient must be disrobed in order for any physician to perform a thorough physical examination.[lxviii] The doctor should perform a competent general physical examination using acceptable methods, and a proper recording of his medical findings.

In modern medical practice, appropriate diagnostic tests are helpful to confirming most diagnoses. These may include laboratory tests, pathology tests, and clinical tests. All such tests have strengths and limitations for their use in reaching a diagnosis or making a causal inference. The physician's decision to order a specific test from among those available should take into account expense, risk, accuracy, and predictive value, if known, as well as the patient's individual circumstances, and institutional capabilities.[lxix] Based on the doctor's personal history taking and physical examination of the client, his review of previous medical records, and his knowledge of adverse health effects reported in the professional medical literature, he may recommend that certain additional pertinent diagnostic studies be performed by the client's local treating physicians. These additional studies can be representative of those relevant and appropriate studies that can be ordered based on a careful consideration of factors including cost, institutional capabilities, diagnostic

sensitivity, and the patient's exposure and risk circumstances, and are not to be an exhaustive and uncritical catalogue of all those which are possibly relevant.

In a case where the medical work-up indicates a potential occupational or environmental disease, special attention must to be paid to documenting the patient's potential chemical exposures. For example, in a toxic tort case, the physician will almost never have direct quantitative exposure levels. However, exposures can be properly inferred by an experienced physician from other types of information, such as workplace layout, work process descriptions, exposure duration, correlates such as acute irritative symptoms, and nearby work activities, among others.[lxx] Each of these alternate information sources should be available and reviewed by the doctor in formulating his opinion. The doctor in a toxic tort case may review a detailed industrial hygiene report from a certified industrial hygienist. The doctor may obtain chemical process or exposure information directly relevant to these issues during his face to face patient interview with the client. From that interview, he can describe in his written report pertinent exposure information such as the plant layout and work processes, work shifts, job activities, personal protective equipment (or lack thereof), specific chemical identification, and recurrent acute irritative symptoms and the circumstances of their appearance.

Other useful records sources for exposure information in toxic cases include industrial hygiene records, private consultant reports, and government reports.[lxxi] Examples of each of these types of records if available can be reviewed by the doctor in determining his medical causation opinion. The responsibility and duty to conduct adequate industrial hygiene monitoring rests solely with the employer (assuming it's a work-related exposure) under federal law; the workers bear no burden in this regard. The lack of useful quantitative data is strictly and directly the employer's fault.

In the virtual absence of any useful industrial hygiene quantitative exposure information, there is still a wealth of useful exposure data in this case from multiple sources, amounting to much relevant confirming information. The doctor can potentially review a large amount of relevant exposure information which allows him to make a careful medical causation determination. This can include, when available, specific workplace chemical identification, detailed work process descriptions, quantitative environmental release data from government reports, expert reports from company private consultants, medical surveillance program summaries, and individual irritative symptom correlates, and expert industrial hygiene reports.

In summary, the medical causation doctor may have credible information from a number of sources in each category of information; direct patient history, detailed questionnaire data, an extensive collection of personal and occupational medical records, multiple detailed sources of external exposure information, a properly conducted physical examination, and appropriate medical diagnostic studies, that a physician may consider in reaching a final medical causation opinion as recommended by the FJC Reference Guide on Medical Testimony under Part III.

E. Placing the Clinical Treating Physician in Context

It's apparent that a qualified clinical treating physician's credentials, qualifications, and methodology must be evaluated in terms of the physician's acknowledged expertise. There are three relevant chapters in the Reference Manual on Scientific Evidence with respect to different kinds of experts who may hold a medical or medical field-related degree. They are the Reference Guide on Medical Testimony, the Reference Guide on Epidemiology, and the Reference Guide on Toxicology. There is no mention in the current Reference Manual that any one of these three chapters holds sway over another, nor that one specific methodology is superior to another in determining medical causation. There are three separate chapters to recognize three sometimes similar, but distinct, disciplines and methods for doctors with differing qualifications, training, and clinical experience to use in arriving at valid determinations of medical causation.

Defendants sometime labor under the impression that the only valid method is that outlined in the Reference Guide on Toxicology. That is not so. The primary methodology for physicians is that outlined in the Reference Guide on Medical Testimony. A clinical doctor should be judged only upon his performance within the appropriate clinical boundaries of the relevant Reference Guide on Medical Testimony. To expect him to meet the requirements specified for a physician epidemiologist or physician toxicologist in addition to those of a clinical physician specialist in his specialty, is akin to saying that an architect must also be a iron worker and a commercial banker in order for him to be allowed to design an office building.

V. THE METHODOLOGY OF DIFFERENTIAL DIAGNOSIS

The Federal Judicial Center's Reference Guide on Medical Testimony explains the process of differential diagnosis:[lxxii]

> In the process of performing a differential diagnosis, the physician determines which of two or more diseases with similar clinical findings is the one that the patient is suffering from. The physician does this by developing a list of all the possible diseases that could produce the observed signs and symptoms, and then comparing the expected clinical findings for each with those exhibited by the patient. (citations omitted)

For the most part, courts are reaching a consensus that the basic methodology used by physicians to diagnose disease is sufficient for courtroom purposes.

A. Differential Diagnosis in Most United States Courts of Appeal

The vast majority of federal appellate courts have held that a medical opinion on causation founded on differential diagnosis satisfies Rule 702 of the Federal Rules of Evidence. For example, the Second Circuit in *McCullock v. H B. Fuller Co.*[lxxiii] accepted as reliable a doctor's opinion that glue fumes caused the plaintiff's respiratory symptoms and throat polyps, although the doctor could not specify any medical literature stating that glue fumes cause throat polyps. According to the court, the doctor's opinion was reliable.

> Dr. Fagelson based his opinion on a range of factors, including his care and treatment of McCullock; her medical history (as she related it to him and as derived from a review of her medical and surgical reports); pathological studies; review of Fuller's MSDS; his training and experience; use of a scientific analysis known as differential etiology (which requires listing possible causes, then eliminating all causes but one); and reference to various scientific and medical treatises. **Disputes as to the strength of his credentials, faults in his use of differential etiology as a methodology, or lack of textual authority for his opinion, go to the weight, not the admissibility, of his testimony.**[lxxiv] (emphasis added)

In *Zuchowicz v. United States,*[lxxv] the Second Circuit reaffirmed a clinical medical expert opinion in pulmonary medicine as sufficiently reliable for a causation opinion. The court approved the causation opinion of a pulmonary medical doctor who testified that overdose of the endometriosis drug Danocrine caused plaintiff's primary pulmonary hypertension. The doctor's conclusion was based on the temporal relationship between the overdose and the start of the disease and the differential etiology method of excluding other possible causes. The Third Circuit has also held that a clinical physician's methodology of differential diagnosis was sufficiently reliable to support the admissibility of that expert's opinion that polychlorinated biphenyls caused specific plaintiffs' illnesses.[lxxvi]

The Fourth Circuit affirmed a district court's admission of doctors' testimony that a plaintiff's severe liver damage was caused by mixing extra-strength Tylenol and alcohol.

> Benedi's treating physicians based their conclusions on the microscopic appearance of his liver, the Tylenol found in his blood upon his admission to the hospital, the history of several days of Tylenol use after regular alcohol consumption, the liver enzyme blood level, and the lack of evidence of a viral or any other cause of the liver failure. Benedi's other experts relied upon a similar methodology: history, examination, lab and pathology data, and study of the peer-reviewed literature. We conclude that the district court did not abuse its discretion when it determined that the methodology employed by Benedi's experts is reliable under *Daubert.* **We will not declare such methodologies invalid and unreliable in light of the medical community's daily use of the same methodologies in diagnosing patients.**[lxxvii] (emphasis added)

Another Fourth Circuit court stated in *Westbury v. Gislavi Gummi AB,*[lxxviii] "differential diagnosis, or differential etiology, is a standard scientific technique of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated."[lxxix] A reliable differential diagnosis typically, though not invariably, is performed after physical examinations, the taking of medical histories, and the review of clinical tests, including laboratory tests, and generally is accomplished by determining the possible causes for the patient's symptoms and then eliminating each of these potential causes until reaching one that cannot be

ruled out or determining which of those that cannot be excluded is the most likely.[lxxx, lxxxi]

B. Evolution of *Daubert* in the U. S. Fifth Circuit Court of Appeal

In *Curtis v. M & S Petroleum, Inc.*,[lxxxii] the U. S. Fifth Circuit vacated a district court's dismissal of numerous refinery workers' suits and remanded them for trial, finding an abuse of the trial court's discretion in excluding plaintiffs' expert industrial hygienist on the issue of medical causation. The case is significant in that the same court only nine months earlier found no abuse of a trial court's discretion in excluding the opinion of a highly qualified pulmonary physician on the causal relationship between a plaintiff's exposure to industrial chemicals and his pulmonary illness.[lxxxiii] Analysis of the cases is therefore helpful in evaluating when a federal trial court's exclusion of an expert's medical opinion may abuse its considerable discretion.[lxxxiv]

The plaintiffs in *Curtis* were refinery workers and their wives who alleged they were exposed to excessive amounts of heavy aromatic distillate ("HAD"), a dangerous component more than 25 percent of which is benzene. A defendant, M & S Petroleum, Inc. ("M&S"), planned to process the HAD, a DuPont product, at a leased refinery which was not designed to handle highly toxic chemicals such as benzene. Immediately after M&S began processing HAD at the refinery serious problems erupted; workers became soaked in HAD daily while fixing clogged equipment and were continuously exposed to HAD fumes that possessed a very strong distinctive odor. These exposures contemporaneously caused the refinery workers to experience headaches, nausea, dizziness, diarrhea, and a lack of energy.

After conducting a hearing *in limine* shortly before trial, the district court excluded the proffered testimony of Dr. Frank Stevens, plaintiffs' expert industrial hygienist, on the issue of medical causation. The expert's opinion was that the plaintiffs' exposure to benzene caused their symptoms and that this exposure subjected them to known long-term health problems. Although the trial court found that plaintiffs' industrial hygienist had adequate support for his general causation opinion that exposure to benzene at levels of 200-300 ppm would cause the injuries suffered by plaintiffs, it excluded his testimony as unreliable since plaintiffs had not demonstrated the amount of benzene to which they were exposed. But the appellate court found ample evidence supporting the expert's finding that the refinery workers were exposed to benzene at levels several hundred times the permissible OSHA standard of 1 ppm. This was important since if his causation opinion was not based on sufficient information of the level of benzene to which plaintiffs were exposed, his methodology would not be reliable, rendering his causation opinion inadmissible.[lxxxv] However, the law does not require plaintiffs to show the precise level of benzene to which they were exposed.[lxxxvi]

The industrial hygienist's medical opinion was reliable since the facts adequately supported the expert's findings of the level of benzene to which the refinery workers were exposed. The court found sufficient support for Dr. Stevens's causation opinion for multiple reasons:

First, Dr. Stevens found the symptoms experienced by the refinery

> workers to be extremely important. He testified that the cluster of symptoms that the refinery workers began experiencing shortly after HAD was introduced into the refinery - headache, nausea, disorientation, and fatigue - are well-known symptoms of overexposure to benzene. He concluded that these symptoms were all indications of exposure to benzene at levels of at least 200-300 ppm.
>
> Dr. Stevens also relied upon the results of the Draeger tube tests performed by the refinery workers. The particular Draeger tubes used were designed to measure a maximum of 10 ppm based on twenty pumps. Because these tubes were only pumped twice before becoming saturated, measuring the maximum of 10 ppm, Dr. Stevens calculated that the refinery workers were exposed to at least 100 ppm. Additionally, Dr. Stevens relied upon the work practices at the refinery. The refinery workers were required to clean the strainers and the oily water separator, and gauge the tanks on a daily basis. All of these functions made exposure to high levels of benzene likely. Dr. Stevens was particularly impressed with the testimony of the refinery workers that they often became soaked in HAD when required to perform this work.
>
> Finally, Dr. Stevens relied on the design of the refinery. Dr. Stevens testified during the *in limine* hearing and stated in his report that the refinery was not designed to process highly toxic chemicals such as benzene. Dr. Stevens testified that refineries that process benzene and other toxic chemicals are completely enclosed to eliminate the possibility that these toxic chemicals can escape into the environment.[lxxxvii]

Since the court viewed his causation opinion as based on scientific knowledge that would assist the trier of fact pursuant to Fed. R. Evid. 702, it should have been admitted by the trial court.

Nine months previously, in *Moore v. Ashland Chemical, Inc.*,[lxxxviii] the Fifth Circuit held that the district court did not abuse its discretion in excluding the opinion of a physician that the plaintiff's exposure to toluene and other chemicals caused his reactive airways dysfunction syndrome ("RADS"). Interestingly, a concurring opinion pointed out that it would not have been an abuse of the district court's discretion had it admitted the proffered testimony.[lxxxix] Mr. Moore became exposed to toluene and other chemicals manufactured by Dow Corning, Corp. ("Dow") while cleaning up the spilled material in an enclosed 28-foot trailer for about an hour. He immediately sought emergency room treatment after the onset of respiratory distress which occurred less than an hour after his exposure. The Fifth Circuit found the exclusion of the plaintiff's highly qualified expert pulmonologist, Dr. Jenkins, acceptable since he did not know what tests Dow had conducted in generating the MSDS and "perhaps more importantly, Dr. Jenkins had no information on the level of exposure necessary for a person to sustain the injuries about which the MSDS warned. The MSDS made it clear that the effects of exposure to Toluene depended on the concentration and length of exposure."[xc] The court in *Curtis* explained its exclusion of Dr. Jenkins in *Moore.*

> In *Moore*, this Court discussed the admissibility of the proffered testimony of the plaintiff's expert on causation. After finding that the expert offered no scientific support for his general theory that exposure to Toluene solution at any level could cause Reactive Airways Dysfunction Syndrome, the Court stated:
>
> Given the paucity of facts Dr. Jenkins had available about the level of Moore's exposure to the Toluene solution, his causation opinion would have been suspect even if he had scientific support for the position that the Toluene solution could cause RADS in a worker exposed to some minor level of the solution. Under *Daubert*, 'any step that renders the analysis unreliable . . . **renders the expert's testimony inadmissible. This is true whether the step completely changes a reliable methodology or merely misapplies that methodology**. *In re Paoli R.R. Yard PCB Litigation,* 35 F.3d 717, (3d Cir. 1994) (emphasis in original).[xci]

Since the "analytical gap" between Dr. Jenkins' causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide, it was within the trial court's discretion to exclude his opinion.

At first blush, it's perplexing that the Fifth Circuit would require an industrial hygienist's causation opinion to be admitted in *Curtis,* yet allow the exclusion of a highly qualified pulmonologist's opinion as to the cause of a lung problem in *Moore.* A careful reading of both opinions leads one to the conclusion that the appellate court feels comfortable requiring admissibility when there is ample factual information about the exposure to a widely studied chemical, like benzene, as in *Curtis.* In *Curtis,* perhaps serendipitously, the safety manager, himself a later plaintiff, took Draeger tube readings for benzene when he became sick and personally convinced that his and other workers' symptoms were caused by chemical exposure. The employer, M & S, should have been regularly monitoring for benzene exposure pursuant to its agreement with Dupont and for compliance with OSHA standards. Since the employer did not perform monitoring, but an employee on his own did, there was additional information upon which the industrial hygienist could reliably estimate the benzene level. While the court did not specifically say so, the other factors relied upon by Dr. Stevens - well known symptoms of overexposure to benzene, work practices at the refinery, and design of the refinery - probably were sufficiently reliable on their own to require admittance of his opinion.

Judge Eugene Davis, author of *Moore* and *Curtis,* again ventured into the arena of medical causation in *Pipitone v. Biomatrix Inc.*[xcii] Thomas Pipitone had severe osteoarthritis in his knees. Because of pre-existing medical conditions, he chose to have his knees injected with a synovial fluid product, Syvnisc, manufactured by defendant, Biomatrix. Soon after injection, Pipitone suffered significant knee pain and a fever. A few days later, tests confirmed he had a salmonella infection, which is highly unusual in joints.

After Pipitone and his wife filed suit, Biomatrix moved to exclude the testimony of the plaintiffs' experts pursuant to *Daubert*. The district court granted

Biomatrix's motion for summary judgment after finding the testimony of plaintiffs' experts unreliable. The Fifth Circuit reversed.

The appeals court found the testimony of the orthopedist who injected the joint properly excluded. The orthopedist deferred to the other treating physician, Dr. Coco, an infectious disease expert. Also, the orthopedist was equivocal as to how the infection occurred. The court noted that a perfectly equivocal opinion is not a relevant one. Since the orthopedist testified it was as likely as not (not more likely than not) that the Synvisc syringe contained the salmonella bacteria that infected Pipitone's knee, the district court did not abuse its discretion in excluding his testimony.

But the appellate court disagreed with the trial court's exclusion of Dr. Coco, the infectious disease expert. The district court based its decision to exclude Dr. Coco's testimony on three factors. First, the district court pointed out Dr. Coco performed no epidemiological studies. Next, the district court noted that Dr. Coco's hypothesis that Synvisc caused the joint infection was undermined by his literature search, which revealed no reports of salmonella infection from contaminated injectable knee products. Last, the district court found Dr. Coco had failed to eliminate "many viable alternative sources" for the salmonella infection.

The Fifth Circuit analyzed Dr. Coco's reasoning that led to his conclusion that the Synvisc injection caused infection. While it was true Dr. Coco did not perform an epidemiological study, no such study was necessary or appropriate in a case involving one infected person. And Dr. Coco's literature search showing no other reports of infection from knee injections did not contradict his opinion. Failure to uncover other reports actually supported his conclusion by eliminating the possibility that "unsterile injection technique or some other cause unrelated to Synvisc" had caused the infection. As the Supreme Court pointed out in *Kumho Tire Co. Ltd. v. Carmichael*,[xciii] "[i]t might not be surprising in a particular case, for example, that a claim made by a scientific witness has never been the subject of peer review, for the particular application at issue may never previously have interested any scientist." No one should reasonably expect a published report on a phenomenon that had not occurred before.

Having analyzed Dr. Coco's opinion through *Daubert's* "testing" and "peer review" factors, the court noted that the "error rate" factor "is not particularly relevant, where, as here, the expert derives his testimony mainly from firsthand observations and professional experience in translating these observations into medical diagnoses." The court observed "this circuit has upheld the admission of expert testimony where it was based on the expert's specialized knowledge, training, experience, and first-hand observation while supported by solid evidence in the scientific community."[xciv] As to the *Daubert* factor of "general acceptance," the court noted "Dr. Coco based his opinion on how Pipitone contracted salmonella in large part on accepted medical knowledge of the ways in which salmonella functions as an organism and how it infects humans."

The appellate court disagreed with the district court's finding that Dr. Coco had identified "many viable alternative sources" of the salmonella infection in Pipitone's knee. Instead, Dr. Coco eliminated almost all alternative sources of the

infection through analysis and investigation. The disputed factual record allowed a fact-finder to choose the Pipitone's contentions over those of defendant. Thus, the district court's grant of summary judgment was reversed.

i Prosser and Keeton, *Torts*, 5th ed. (St.Paul, Minn.: West Publishing Co., 1984), 263.

ii See Maraist and Galligan, *Louisiana Tort Law*, (Charlottesville: Michie, 1996), Chapter 4.

iii *United States v. Feola*, 420 U.S. 671, 685 (1975) . . . *Stoleson v. United States*, 708 F.2d 1217, 1221 (7th Cir. 1983) (explaining eggshell skull rule); *Pierce v. Southern Pac. Transp. Co.*, 823 F.2d 1366, 1372 n. 2 (9th Cir. 1987) ("[w]hen an emotional injury causes physical manifestations of distress we can see no principled reason why the eggshell plaintiff rule should not apply.")

iv Smith, *Legal Cause in Actions of Tort*, 1911, 25 Harv.L.Rev. 103, 106, 109, McLaughlin, *Proximate Cause*, 1925, 39 Harv.L.Rev. 149, 155.

v For example, see the comment to BAJI 3.76. In *Mitchell v. Gonzales* (1991) 54 Cal.3d 1041, 1 Cal.Rptr.2d 913, 819 P.2d 872, the court did not attempt to define "substantial." However, in *People v. Caldwell* (1984) 36 Cal.3d 210, 220, 203 Cal.Rptr. 433, 439, 681 P.2d 274, the court in referencing the term "substantial factor" quoted from a well known text, "No cause will receive judicial recognition if the part it played was so infinitesimal or so theoretical that it cannot be regarded as a substantial factor in bringing about the particular result."

vi Prosser, Proximate Cause in California, 1950, 38 Cal. L.Rev. 369, 379.

vii BAJI 3.76.

viii Sheila Jasanoff, *Judging Science: Issues, Assumptions, Models*, 1997 Forum For State Court Judges 9 (The Roscoe Pound Foundation) July 19, 1997.

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625 So. 2d 1002 (La. 1993).

x *Id.* at 1005 (citations omitted).

xi *Creanga v. Jardal*, 185 *N.J.* 345, 360 (2005) (quoting *State v. Freeman*, 223 *N.J. Super* 92, 116 (App.Div. 1988), *certif. denied*, 114 *N.J.* 525 (1989) (citation omitted)).

xii BAJI 2.60.

xiii 293 F.1013, 1014 (D.C. Cir. 1923).

xiv Prof. Michael H. Graham, *Scientific and Technological Evidence*, in Handbook Of Federal Evidence15 (4th ed., 1999 Pocket Part); Paul S. Milich, *Controversial Science in the Courtroom: Daubert and the Law's Hubris*, 43 Emory L.J. 913, 915 (1994).

xv Prof. Michael H. Graham, *The Expert Witness Predicament*, 54 U. Miami L.Rev. 317 (2000).

xvi *Developments In The Law*, 108 Harv.L.Rev. 1423, 1529 n. 160 (1995).

xvii Prof. Michael J. Saks, Merlin and Solomon: *Lessons From The Law's Formative Encounters With Forensic Identification Evidence*, 49 Hastings L.J. 1069, 1076 (1998).

xviii *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-595, 113 S.Ct. 2786, 125 L.Ed.2d 469.

xix *Daubert*, 509 U.S. 579, 593-595.

xx *Daubert*, 509 U.S. 579, 592.

xxi *General Electric Co. v. Joiner*, 522 U.S. 136, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997).

xxii *General Electric*, 118 S.Ct. 512, 517-519.

xxiii *Kumho Tire Company v. Carmichael*, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999).

xxiv *Kumho*, 119 S.Ct. 1167, 1175-1176.

xxv *Kumho*, 119 S. Ct. 1167, 1178.

xxvi *Kumho*, 119 S.Ct. 1167, 1176.

xxvii *Kumho*, 119 S.Ct. 1167, 1176.

xxviii *Weisgram v. Marley Co.*, 528 U.S. 440, 120 S.Ct. 1011, 145 L.Ed.2d 958 (2000).

xxix
Advisory Committee Notes, Fed. R. Evid., Rule 702, as amended.

xxx Advisory Committee Notes, Fed .R. Evid., Rule 702, as amended.
xxxi *United States v. 14.38 Acres of Land Situated in Leflore County, Mississippi,* 80 F.3d 1074, 1078 (5th Cir. 1996).
xxxii Fed. R. Civ. P.16(b).
xxxiii La. C. Civ. P. Art. 1551.
xxxiv Fed. R. Civ. P. 16(c)(4).
xxxv Fed. R. Evid. 103 and La. C. Evid. Art. 103.
xxxvi For example, La.C. Civ. P. Art. 1425 B.
xxxvii Fed. R. Civ. P. 26(a)(2)(B).
xxxviii Fed. R. Civ. P. 26(a)(2)(B).
xxxix Fed. R. Evid.104(a) and La.C. Evid. Art 104(a).
xl *Kumho,* 119 S.Ct. 1167, 1176.
xli *Kumho*, 119 S.Ct. 1167, 1176.
xlii *Kumho,* 119 S.Ct. 1167, 1176.
xliii *Kumho,* 119 S.Ct. 1167, 1174.
xliv Margaret Berger, *Supreme Court's Trilogy on Admissibility of Expert Testimony, Reference Manual on Scientific Evidence* 28-29 (Fed. Judicial Center 2000).
xlv *Tanner v. Westbrook*, 174 F.3d. 542, 546 (5th Cir. 1999).
xlvi *United States v. Alatorre,* 222 F.3d. 1098, 1102 (9th Cir. 2000) (quoting *Daubert*, 509 U.S. @ 592) and *United States v. Nichols,* 169 F.3d. 1255, 1262-1264 (10th Cir. 1999).
xlvii See *Minner v. American Mortgage & Guaranty Company,* 791 A.2d 826, Del. Super. C.A. No. 96C-09-263-WTQ.
xlviii *Benn v. Hilton,* 815 So.2d. 830, 2002-0620 (La. 5/10/02).
xlix Robert J. Goodwin, *The Hidden Significance of Kumho Tire Co. v. Carmichael: A Compass for Problems of Definition and Procedure Created by Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 52 Baylor L. Rev. 603, 626 (Summer 2000).
l Fed. R. Evid.104(a) and La.C. Evid. Art 104(a).
li *Moore v. Ashland Chemical, Inc.*, 151 F.3d 269 (5th Cir. 1998).
lii *Tanner v. Westbrook*, 174 F.3d 542 (5th Cir. 1999).
liii *Globetti v. Sandoz Pharmaceutical Corporation,* 111 F.Supp. 2d, 1174, 1177 (N.D. Ala. 2000).
liv *Pipitone v. Biomatrix, Inc.*, 288 F.3d 239 (5th Cir. 2002).
lv An electronic version of the reference manual can be found at http://air.fjc.gov/public/fjcweb.nsf/pages/16.
lvi For example, *Lasha v. Olin Corp.*, 625 So.2d 1002 (La. 1993).
lvii *Hutchinson v. Shah,* 94-0264, (La.App. 1 Cir. 12/22/94), 648 So.2d 451, *writ denied,* 95-0541, 653 So.2d 570, (La. 4/21/95) and *Schexnayder v. Exxon Pipeline,* 815 So.2d 156, 01-1236 (La.App. 5 Cir. 3/13/02).
lviii Federal Judicial Center (FJC) Reference Guide on Medical Testimony, Part II A, p. 447.
lix FJC Reference Guide on Medical Testimony, Part II A, p. 448.
lx FJC Reference Guide on Medical Testimony, Part II A, p. 447.
lxi There is no ABMS Board of Medical Toxicology; Medical Toxicology is not a recognized primary medical specialty in the United States; and the ABMS Subspecialty Certificate has only been available since 1995.
lxii. FJC Reference Guide on Medical Testimony, Part II C, p. 450.
lxiii FJC Reference Guide on Medical Testimony, Part II A p. 448-449.
lxiv FJC Reference Guide on Medical Testimony, Part III A, p. 452-453.
lxv FJC Reference Guide on Medical Testimony, Part III A, p. 453.
lxvi FJC Reference Guide on Medical Testimony, Part III B, p. 455.
lxvii FJC Reference Guide on Medical Testimony, Part III C, p. 455-456.

lxviii See standard medical textbooks by DeJong, Harrison, or Bates.

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FJC Reference Guide on Medical Testimony, Part III D, p. 457-461.

lxx FJC Reference Guide on Medical Testimony, Part III A2, p. 454-455.

lxxi FJC Reference Guide on Medical Testimony, Part III A2, p. 455.

lxxii FJC Reference Guide on Medical Testimony, Part IV, p. 463.

lxxiii61 F.3d 1038 (2nd Cir. 1995).

lxxiv61 F.3d 1044 (2nd Cir. 1995).

lxxv140 F.3d 381 (2nd Cir. 1998).

lxxvi*In Re Paoli R.R. Yard PCB Litigation,* 35 F.3d 717 (3rd Cir. 1994).

lxxvii*Benedi v. McNeil-P.P.C., Inc.,* 94-2596, 66 F.3d 1378, (4th Cir. 1995).

lxxviii 178 F.3d 257, 51 Fed. R. Evid. Serv. 682 (4th Cir. 1999).

lxxix *Id.*, 178 F.3d at 262. See also *Baker v. Dalkon Shield Claimants Trust,* 156 F.3d 248, 252-253, 50 fed. R. Evid. Serv. 115 (1st Cir. 1998).

lxxx *Kannankeril v. Terminix Intern., Inc.,* 128 F.3d 802, 807, 47 Fed. R. Evid. Serv. 1376 (3d Cir. 1997), *as amended,* (Dec. 12, 1997) (explaining that "differential diagnosis is defined for physicians as 'the determination of which of two or more diseases with similar symptoms is the one from which the patient is suffering, by a systematic comparison and contrasting the clinical findings'" (quoting Stedman's Medical Dictionary 428 (25th ed. 1990)). See also *McCullock v. H. B. Fuller Co.,* 61 F.3d 1038, 1044, 42 Fed. R. Evid. Serv. 1047 (2d Cir. 1995) (describing differential etiology as an analysis " which requires listing possible causes, then eliminating all causes but one"); *Glaser v. Thompson Medical Co., Inc.,* 32 F.3d 969, 978, 40 Fed. R. Evid. Serv. 47, 1994 FED App. 0287P (6th Cir. 1994), *reh'g and reh'g en banc denied*, (Nov. 9, 1994) (recognizing that differential diagnosis is "a standard diagnostic tool used by medical professionals to diagnose the most likely cause or causes of illness, injury and disease").

lxxxi For a more extensive discussion see Branch, Turner W. and Branch, Margaret Moses, *Environmental Tort Litigation,* ATLA's Litigating Tort Cases, §67:35, pp. 88-91 (Roxanne Barton Conlin and Gregory S. Cusimano, eds.) (West & ATLA 2003).

lxxxii 174 F.3d 661 (5th Cir. 1999).

lxxxiii *Moore v. Ashland Chemical, Inc.,* 151 F.3d 269 (5th Cir. 1998), also authored by Judge W. Eugene Davis.

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Abuse of discretion is the federal standard of review to be applied to admissibility of an evidentiary opinion. *General Electric Co. v. Joiner,* 118 S.Ct. 512, 139 L.Ed.2d 508 (1997). The seminal case for admissibility of expert testimony is *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

lxxxv The Supreme Court set out four non-exclusive factors to aid in the determination of whether the methodology is reliable. They are: (1) whether the theory or technique has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error of the method used and maintenance of standards controlling the technique's operation; and (4) whether the theory or method has been generally accepted by the scientific community. *Daubert*, 509 U.S. at 593-94, 113 S.Ct. at 2796-97.

lxxxvi *Curtis,* 174 F.3d at 670, citing *Lakie v. Smithkline Beecham,* 965 F.Supp. 49, 58 (D.D.C. 1997).

lxxxvii *Curtis,* 174 F.3d at 671-672.

lxxxviii151 F.3d 269 (5th Cir. 1998).

lxxxix *Id.* at 279 (Benavides, J., concurring).

xc *Id.* at 278.

xci *Curtis v. M & S Petroleum, Inc.*, 174 F.3d 661 (5th Cir. 1999).

xcii 288 F.3d 239.

xciii 526 U.S. 137 (1999).

xciv *See Skidmore v. Precision Printing and Packaging, Inc.*, 188 F.3d 618 (5th Cir. 1999) (holding that the district court properly admitted testimony of a psychiatrist who diagnosed plaintiff because the psychiatrist "testified to his experience, to the criteria by which he diagnosed [the plaintiff], and to the standard methods of diagnosis in his field"); *St. Martin v. Mobil Exploration & Producing U.S., Inc.*, 224 F.3d 402, 406-07 (5th Cir. 2000) (holding that ecologist's first-hand observation of flooded marsh at issue combined with his expertise in marshland ecology were sufficiently reliable bases of his opinion on causation under *Daubert* to admit the testimony).