Evaluating Claims of

Summary of the Method from the American Medical Association’s
AMA Guides to the Evaluation of Disease and Injury Causation
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Determining Injury-Relatedness, Work-Relatedness, Claim-Relatedness, Etc., for All Types of Claims

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NOTE: This chapter is based on the first edition of the AMA’s Guides to the Evaluation of Disease and Injury Causation (Melhorn and Ackerman). A Second Edition of that Guides was published two weeks prior to the deadline for this chapter, thereby leaving insufficient time for purposes of determining how much of this material from the first edition has been replicated in the Second Edition. However, readers can rest assured that the basic six step protocol, which is the core of this chapter, has been continued in the Second Edition of the Causation Guides.

Background: Guides to the Evaluation of Disease and Injury Causation

The American Medical Association’s (AMA) Guides to the Evaluation of Disease and Injury Causation (see reference Melhorn) is a critically important component of the AMA’s Guides Library. This text delineates a type of evaluation which is distinctly different from a diagnostic evaluation, a treatment planning evaluation, a prognosis evaluation, or an impairment evaluation. It provides a protocol for determining whether a clinical presentation, in the context of a legal or administrative claim of some nature, can actually be credibly attributed to a claimed cause. In other words, it provides an answer for questions such as:
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- How can an evaluator credibly determine if a claimed work-related clinical presentation is really work-related?
- How can an evaluator credibly determine if a claimed injury-related clinical presentation is really caused by the litigated events?

This article presents the evaluation protocol from the causation Guides, provides evaluators with self-assessment questions that can be used to scrutinize whether one’s own work complies with that protocol, highlights that protocol’s value as a model for scientifically credible practice in general (especially in terms of combatting the anti-science and anti-fact bias of court and administration systems), and clarifies that the protocol is of relevance to all types of claims which involve forensic causation issues.

The protocol from the causation Guides is only needed when referral questions specifically involve a relevant focus on causation. “Causation” in this sense is a forensic issue, rather than being a healthcare issue. Such causation analysis is unnecessary in health care. It is also unnecessary in many forensic circumstances (e.g., if the referral issues are limited to diagnosis, treatment planning, prognosis, and/or impairment, then there is no need for the causation protocol to be utilized).

Although impairment evaluation is itself a forensic issue, a causation evaluation is distinctly different from an impairment evaluation. Referral issues involving impairment evaluation are often independent from causation (e.g., workers compensation systems regularly demand impairment evaluation for issues which are not actually work-related, such as carpal tunnel syndrome, low back pain, complex regional pain syndrome type 1, mental illness, chronic pain, etc.). An impairment evaluation can be conducted without a causation analysis, and vice versa.

As is the case for any forensic work, a causation analysis should be conducted in an independent context (Barth & Brigham, 2005). Treating clinicians face extreme financial and social conflicts of interest if they attempt to engage in any forensic activity (such as causation analysis) in regard to their patients. In contrast, independent evaluations minimize the evaluator’s conflicts of interest. Therefore, treating clinicians should refrain from engaging in any forensic work that involves their patients (including refraining from causation discussions).
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An Especially Strong Example of the Guides Library’s Emphasis on Fact, Rather Than Opinions

Court and administrative systems have an extremely unfortunate emphasis on opinions from experts, rather than on facts. All too often, clinicians who are asked to interact with such systems fall prey to that emphasis, and offer opinions instead of encouraging the court or administrative decision-makers to focus on facts.

The protocol from the causation Guides is perhaps one of the best examples of how clinicians can focus on facts, and avoid surrendering to the court/administrative systems’ emphasis on opinions. The protocol provides a mechanism for addressing causation issues in a manner that is standardized, objective, fact-based, and scientifically credible. The protocol can be used in a fashion that is free from opinions. By utilizing this protocol, evaluators can demonstrate that they are men and women of science, rather than sellers of opinions.

One clear example of the importance of this distinction is the popular conception of fact and opinion as opposites of one another (Answers Corporation, 2012). Consistent with this status as the opposite of opinion, fact has also been simply defined as “a thing that has actually happened or that is really true” (Agnes and Guralnik, 2001). Science is a systematic, and credible, method of searching for, testing, and potentially verifying facts (or, alternatively, testing hypotheses so that those which are not factual can be revealed as such). Consequently, from a scientific perspective, fact has been defined in terms such as: “concrete observations based on evidence” (Huppke, 2012); truths demonstrated through the principles of science and math (Huppke, 2012).

Science (specifically including health science) values fact. In contrast, and quite astoundingly, court systems and administrative systems place an emphasis on expert opinion, rather than on fact. This emphasis on opinion rather than fact is apparently a consequence of the history of court and administrative systems giving the job of decision-maker to people who were thought to be unlikely to understand scientific facts (e.g., people such as juries and judges). Since those people presumably cannot understand scientific facts on their own, they are thought to need opinions from experts, rather than needing a presentation of scientific facts.

In one extreme example of this generalized absurdity, a few decades ago, a judge in a workers compensation case forbade the author of this paper from testifying about any facts, and ordered that the testimony be limited to opinions. That experience led to a decades-long search for a credible justification of the court/administrative systems’ anti-fact bias, but that search has been pervasively non-productive. Instead, the long-term focus on this issue has revealed that the anti-fact bias is pervasive in court and administrative systems.
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That pervasiveness is illustrated by the following examples. These examples are remarkable not only for the manner in which they illustrate the extreme nature of the court/administrative anti-fact bias, but also because they are evident within the tradition of the federal Daubert standards, which is probably the legal tradition that actually provides the greatest hope of scientific credibility in the courts. In other words, even at the highest level of scientific credibility within the courts, an anti-fact bias is still demonstrated.

- One example involves a high-legal devaluation of scientific investigations that are designed and initiated specifically because of the case at hand (Sinclair). It would be in a court’s best interest for scientific investigations to be designed and conducted for purposes of very specifically addressing the issues in the case at hand. But high-level federal court rulings, and other federal efforts, have inexplicably devalued such focused scientific investigations, in favor of scientific investigations that were prompted by circumstances other than the case at hand (investigations that will almost certainly be less relevant to the case at hand, since they were not designed or undertaken with a focus on the issues that need to be addressed within that specific case).

- Another example involves a court/administrative emphasis on the individual expertise of the person who is offering information, instead on placing an emphasis on the credibility of the information itself. In science, it does not matter who first introduces information. If the information is independently verifiable as credible, then the expertise of the individual who first introduces the information is actually irrelevant. But instead of recognizing the potential irrelevance of individual expertise, federal standards actually place an emphasis on the expertise of the individual who presents the information (Sinclair).

The AMA’s Guides Library has made many valuable contributions toward the goal of encouraging doctors to avoid cooperating with the anti-fact bias of court and administrative systems. This is inherent in the “evidence-based” focus of the *Guides to the Evaluation of Permanent Impairment (GEPI)* (Rondinelli). One especially illustrative example is the discussion of mild traumatic brain injury (MTBI) in the *6th Edition* of the *GEPI*. Specifically, while court and administrative systems regularly entertain and endorse claims of permanent impairment caused by such injuries, the *GEPI 6th Edition* simply explains that there is no credible scientific support for such claims (and, consequently, the impairment rating for any such case should automatically be zero).

Of all the Guides Library publications, the causation *Guides* makes the strongest contribution toward combatting the anti-fact bias of the court/administrative systems. For example, the
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book provides a protocol that allows evaluators to make causation determinations in a manner which is fact-based, rather than opinion-based. Additionally, the causation Guides provides several examples (similar to the GEPI example of MTBI), of issues for which scientific findings or principles have provided relatively clear facts which can be used to efficiently and credibly resolve almost every relevant claim (e.g., mental illness cannot be credibly attributed to adult life events, complex regional pain syndrome type 1 is an inherently non-injury-related concept, the dominant risk factors for chronic benign pain are of a social or psychological nature, etc.). Further, the causation Guides uniquely provides explanatory discussions of the distinction between science’s emphasis on fact, versus the court and administrative systems’ anti-fact bias.

For example, page 15 of the causation Guides provides a historical perspective which helps to explain the emergence of that distinction. That passage explains that the courts have a historical focus on the way that legal authorities believe reality SHOULD be. In contrast, science is focused on developing an understanding of the ACTUAL nature of reality (even if reality fails to comply with the expectations of legal authorities). In the example of MTBI, this aspect of the distinction is exemplified by the court/administrative systems’ apparent premise that an individual claim of permanent impairment from such an injury SHOULD be considered as potentially feasible, as compared to the scientific knowledge base indicating that there ACTUALLY is not a credible foundation for any such claim. Another example is the court and administrative systems’ apparent premise that the historical reports from a claimant or plaintiff SHOULD be considered in the process of resolving the claim, versus the fact that scientific findings have repeatedly revealed that such reports are ACTUALLY unreliable (Barth, 2009).

Page 17 further highlights the difference between science and court/administrative systems. Specifically, while science places an almost exclusive emphasis on facts, court/administrative systems can (and do) opt for convenience over fact, truth, or justice. Examples provided in the text include:

- A legal standard has arisen in many systems which calls for hypertension to automatically be considered work-related when it is diagnosed for a police officer or firefighter, because of an assumption that the hypertension is caused by job stress. This legal standard has been widely adopted, in spite of scientific findings which indicate that job stress might actually help to prevent the development of hypertension (Barth & Roth, 2002). The administrative systems have apparently decided that it is more convenient to automatically grant benefits, than to consider facts and make determinations that are credible and fair.
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- Many court/administrative systems have developed a presumption that an opinion from a treating clinician has greater credence than any facts that might be presented by any other expert. This presumption is severely misdirected, in that treating clinicians are plagued by the most extensive and extreme financial and social conflicts of interest (e.g., independent clinicians are free from the extensive and extreme conflicts of interest that plague treating clinicians) (Barth & Brigham, 2005). The administrative systems have apparently decided that it is more convenient to allow a severely conflicted treating clinician to offer opinions, than it would be to arrange for an independent consultant to apply factual information to the claim.

Further discussion of the distinctions between science and the court/administrative systems is provided on page 115 of the causation *Guides*. That passage explains all of the following:

- Science seeks understanding through credible means, such as population based randomized studies of large groups. Page 18 of the causation *Guides* elaborates further on this point, by explaining: “Most epidemiologists are comfortable only when studies of causation are large, carefully controlled for all possible risk factors, and, ideally, repeated with similar findings”. Such credible research facilitates the analysis of any individual case, because it allows for the generation of reliable scientific findings which can be applied to that individual case (e.g. almost 40,000 available scientific citations have failed to reveal a relationship between MTBI and permanent impairment, therefore there is no credible justification for claiming that the MTBI in the case at hand has caused permanent impairment – see reference Carroll). In contrast, court/administrative systems act as if the anecdotal details of an individual case are a more important source of understanding that large scale and replicated independent studies would be. Specifically, the idiosyncratic details of the individual case at hand (e.g. plaintiff-reported history of plaintiff-reported complaints) will almost always be considered in every court/administrative process - but, the court system lacks any such automatic consideration of relevant scientific findings. Relevant scientific findings will only be considered if the involved attorneys and experts do their jobs in an honest and credible fashion, by bringing such scientific findings to the attention of the administrative decision-makers, and if administrators (e.g., judges) allow for the presentation of such scientific findings. Even when attorneys and experts actually bring relevant science into the discussion, there is no guarantee that the decision-makers will use that information. Page 17 of the causation Guides explains that court/administrative systems are not under any obligation to make scientifically credible decisions.
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- While science dismisses findings that are not reproducible across different observers, court/administrative systems act as if a claim can be credible in spite of unreliability across different observers. This is exemplified by the manner in which court and administrative systems appear to think it is normal for scientific testimony to NOT be reproducible from one expert to another, and to allow such non-reliable expert testimony to be used in attempts to support a legal claim. In the example of MTBI claims, courts regularly allow an individual expert witness to testify (or imply) that his or her idiosyncratic, unreliable, and un-reproduced observations indicate that the scientific knowledge base (which factually indicates against permanent impairment) is somehow not relevant to the specific case at hand (and such experts are often not required to present any scientific support for that aspect, or any other aspect, of their testimony). Such anti-science testimony is entrenched in court and administrative systems, due to those systems encouraging clinicians to base testimony on their training and experience (which is always an idiosyncratic and non-reproducible set of circumstances), rather than on the scientific knowledge base.

- This section reiterates the court/administrative systems’ emphasis on expert opinion (which, as was discussed above, has actually been defined as the opposite of fact). For the example of MTBI, the scientific facts include a lack of credible scientific support for claims of permanent impairment, and repeatedly established indications that eligibility for compensation/litigation is actually the best predictor of persistent complaints (while the injury itself is not predictive of persistent complaints) (Rondinelli; Carroll). Court/administrative systems regularly fail to emphasize such facts (which are readily available through means that are not dependent on expert testimony), in favor of expert opinions (including regularly allowing for the introduction of expert opinion that is dramatically contradicted by scientific facts).

Page 436 of the causation *Guides* adds a discussion of the additional anti-fact tendencies that are inherent in many workers compensation systems, such as:

- Many systems ask clinicians to make causation determinations at the beginning of the claim. This elevates the risk of cases being incorrectly classified as work-related. This risk stems from the tendency for an early classification of work-relatedness to be applied long-term, even when the course of the clinical presentation takes a non-work-related turn (e.g., an inherently non-work-related presentation of complex regional pain syndrome type 1 is covered under workers compensation because a work-related fracture preceded it). The text explains that it can be almost impossible for workers compensation systems to prevent such unjustifiable generalizations.
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- Many states mandate “lifetime medical treatment”. This set of circumstances is based on an inherent, but unjustifiable, assumption that “the original work-injury is responsible for all subsequent disease or illness”.

- Many systems demand “yes” or “no” responses from doctors, for questions of work-relatedness. The text from the causation Guides advises doctors to resist such pressure toward unjustifiably dichotomous thinking.

- The text advises that if the above examples of misdirection had not been adopted by the involved systems, determinations of work-relatedness would be more accurate and more just, claimants would receive better health care, health outcomes would be better, and the societal effects would be less harmful. The text further advises: “The cost to society of misclassification of conditions as occupational greatly exceeds that of establishing a formalized investigative period before appropriate determination”.

The above discussion can be summarized, for the sake of simplicity and emphasis, in the following manner. The court and administrative systems have placed an unfortunate and misdirected emphasis on opinions from doctors (and on convenience), rather than on fact. Far too often, clinicians who were educated in a tradition of science, abandon that tradition and fall prey to the opinion-focused misdirection from the court system. Such clinicians regularly offer opinion-based testimony, based on non-scientific foundations such as their own idiosyncratic experience and training, rather than focusing on scientific facts.

The causation Guides is especially notable for the powerful manner in which it directs doctors away from the anti-fact bias that is inherent in court and administrative systems. The causation Guides probably makes a stronger contribution in this regard than any other element of the Guides Library (and perhaps a stronger contribution than any other health science literature). In addition to providing the above explanatory descriptions of the differences between court/administrative systems and science, the causation Guides provides a protocol that is standardized, fact-based, and rooted in science. Through this protocol, the AMA has given clinicians a tool that can be used to effectively and emphatically focus on fact, rather than on opinion. By using this protocol, evaluators can demonstrate their allegiance to, and adherence to, the scientific tradition of professional health care, and can demonstrate and justify their resistance to the anti-fact bias of court and administrative systems. Details of that protocol are provided in the final section of this article.

Avoiding Common Trends Toward Reliance on Unreliable Information and Logical Fallacies
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All too often, perhaps even in most cases, a health science expert offers an opinion of the following nature in regard to issues of work-relatedness or injury-relatedness: “My opinion is that this clinical presentation is injury-related, and that opinion is based on the patient telling me that he/she did not have this problem prior to the litigated accident.” There are at least two problems with this common set of circumstances, and both are addressed in the causation Guides.

First, page 324 of the causation Guides explains, in a brief fashion, that this common basis for causation claims is not credible because such reports from examinees are not reliable. Relevant scientific findings have been more extensively reviewed in a more recent Guides Library publication (Barth, 2009). Such findings include: when an examinee blames someone else for their injury or accident, and claims that he or she never experienced relevant health problems before the injury or accident, such denials of pre-existing health problems are found to be false at a rate of approximately 100% (when a relatively comprehensive set of pre-existing records are available for the purpose of scrutinizing the denial of pre-existing problems). Given the extreme unreliability of such denials of relevant pre-existing problems, the common reliance on reports from claimants or plaintiffs for purposes of making causation determinations is not justifiable.

Even if such denials of relevant pre-existing problems were reliable, they still could not serve as a credible basis for causation determinations. This additional issue is addressed on page 16 of the causation Guides. That discussion actually identifies such reasoning as being a logical fallacy (“false reasoning”), rather than being a credible basis for causation determinations. The text explains: “It is a fallacy to conclude that one event followed by a second necessarily demonstrates a causal relationship between the events. A collision that occurs minutes after a black cat crosses a person's path does not establish a causal relationship between the encounter and the collision because the cat did not cause the accident.” Given this identification of the relevant thought process as “false reasoning”, the common reliance on claimed pre-versus-post differences for purposes of making causation determinations is not justifiable.

Because of the above considerations, such claims of pre-versus-post differences are not considered within the causation Guides’ protocol.

Relevance to All Types of Medical-Legal Claims

The text of the causation Guides explains that its protocol is relevant to tort cases, as well as workers compensation claims (for example, see page 15). Given this relevance to multiple
types of claims, and given the strong focus on scientific credibility, the author of this article has often informed various stakeholders within court and administrative systems that the causation *Guides* is perhaps the most important text for medical-legal claims of all kinds.

Some such stakeholders, from systems other than workers compensation, have responded with disappointment after reading the causation *Guides*. They have explained that their disappointment was caused by the text’s frequent use of words such as “work-related” and “occupational”. The use of such words has apparently precipitated malicious attempts, from some unscrupulous attorneys and doctors, to mislead decision-makers into thinking that the protocol from the causation *Guides* is not relevant to claims which are not in the workers compensation system.

Such false allegations are a major reason for the creation of the current article. The detailed description, provided below, of the causation *Guides*’ protocol has been crafted in a manner which highlights and emphasizes that the protocol is relevant to any medical-legal claim which involves forensic causation issues (e.g., injury-relatedness in tort claims).

**The Protocol**

The causation *Guides* specifies that the protocol is based on previous work conducted by other groups. For example, the original work toward the creation of this protocol is credited to the National Institute of Occupational Safety and Health, and prior adaptation of the protocol is credited to the American College of Occupational and Environmental Medicine (see pages 40 and 43 of the causation Guides for more detailed referencing).

The text of the causation *Guides* points out that this protocol, in its various forms, may be the most common structured method used. The text also points out that the protocol does not seem to have major weaknesses.

The causation *Guides*’ protocol is presented repeatedly in the text of the book. The following represents an attempt to incorporate all of those passages into a single discussion.

The protocol involves a six step process, as described below. Page 40 of the causation Guides explains that the six steps must be performed in sequence, and the failure to complete any individual step halts the entire process. Any such set of circumstances (failure to complete any step in a manner that credibly supports a causative relationship) eliminates credibility for claims of injury-relatedness, work-relatedness, etc.
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**Step 1: Definitively establishing a diagnosis**

This step is simply a diagnostic evaluation. An unusually high level of rigor and scrutiny might be warranted, due to the elevated jeopardy that an evaluator faces in a forensic process, but this step is entirely consistent with the best diagnostic evaluations that take place outside of forensic contexts.

This step involves:

- For the aspects of the examinee’s clinical presentation (complaints, symptoms, signs, etc.) which are the focus of the medical-legal claim, the examiner applies health science expertise, in an attempt to identify any objective and credible evidence of a diagnosis which might explain that presentation.

- If such objective and scientifically credible evidence is discovered, then a diagnosis is to be established in a credible and definitive fashion.

If an evaluator intends to make a diagnostic claim, then the following self-assessment questions can be used in order to scrutinize that claim:

- What diagnostic method or protocol have I used?

- Have I clearly documented my utilization of that method in this case, and the results of that utilization?

- If asked, can I reference healthcare literature which verifies that my method is actually an example of professional clinical work (e.g. in some way consistent with professional standards or with scientific credibility)?

- Has my method been scientifically validated?

- If asked, can I reference scientific validation of my diagnostic method?

- Do I know the error rate that has been scientifically established for this method? If asked, can I reference the scientific findings regarding that error rate?

- Is my diagnosis based on objective and scientifically credible evidence, instead of being based on the examinee’s subjective complaints?
  - Did I find evidence of the diagnosis which is completely independent of what the examinee told me (in contrast to allowing the examinee to self-diagnose,
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- Would my findings justify this diagnosis, even if the patient did not have the ability to communicate his or her complaints? For example, if I am diagnosing an injury, is that diagnosis based on something more objective and more credible than a complaint of pain?

- If my diagnosis is completely based on subjective complaints, have I documented the nature of that set of circumstances, and the associated vulnerability of the diagnosis to manipulation by the examinee?

- Have I engaged in, and documented, a comprehensive and credible differential diagnostic process?

  - Have I conclusively ruled out all other potential explanations for this clinical presentation, especially those that are more likely than my diagnosis? For example, for a complaint of back or neck pain, have I ruled out the social and psychological risk factors that have been scientifically established as being more important than general medical factors (for example, see Linton)?

  - Have I clearly documented that differential diagnostic process?

  - Do I even know where my diagnosis lies on the continuum from most likely explanations for this type of presentation, to least likely?

- Is the history, as documented in a relatively extensive set of records that I was able to obtain and review, especially including pre-claim records, adequately supportive of my diagnosis?

  - Did I ask for a full set of records, especially pre-claim records?

  - Was I provided with such a set of records?

  - Was I authorized to dedicate time to reviewing those records?

- Does the diagnosis really explain the clinical presentation?

  - For example, if the presentation involves back pain, most types of spine abnormalities would be a poor diagnostic choice, given the lack of association between most types of spine abnormalities and back pain (see reference 984).
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Carragee as an example of scientific findings which demonstrate the lack of association between spine abnormalities and back pain).

- Has the claimed course of the clinical presentation been consistent with the scientifically established course of the diagnosis? For example, a diagnosis of mild traumatic brain injury is inconsistent with a clinical presentation which involves a claimed course of persistent impairment or worsening impairment (Rondinelli; Carroll), even if the occurrence of a mild traumatic brain injury has been confirmed, and even if the symptoms are consistent with the short-lived effects of such an injury.

**Step 2: Applying relevant findings from epidemiologic science to the individual case**

This step involves applying scientific findings, which are of relevance to causation, to the case at hand. The obvious place to look for relevant scientific findings is in scientific publications, although it is feasible for unpublished scientific findings to be of value. (Although, as was reported above, research that was prompted by the case at hand is inexplicably devalued by court/administrative systems, and such research would probably not be published during the course of the case which prompted it. The same court standards devalue all other unpublished research, without regard to the inherent credibility of that research. Evaluators do not have to adopt or endorse such examples of the court/administrative anti-fact bias, but it is helpful to be aware of such examples, and of the bias in general.)

The key issue for this step is: In order for a causative relationship between a definitively established diagnosis and a suspected cause to be claimed in a credible fashion, the claim must be based on credible and reliable scientific findings which have convincingly established that such a specific causative link actually exists. In other words, such claims are only credible if they are grounded in credible and reliable scientific findings that indicate that the specific claimed cause is a significant risk factor for the specific claimed clinical presentation. Additionally, any such claim must also account for any contradictory scientific findings, by involving clear justification for concluding that the contradictory findings are not relevant to the case being evaluated.

For an evaluator, preliminary efforts in this regard can include reading scientific reviews of the etiology of the definitively established diagnosis. Such reviews can provide direction (at least preliminary direction) in regard to at least two primary considerations:

- Has the claimed cause (in this individual case) been scientifically identified as a significant risk factor for the diagnosis that was definitively established in step 1?
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- What are the most well-established risk factors? Scientifically established findings in this regard can then be applied to the case at hand, in order to determine which scientifically established risk factors are relevant for this one case (whether the scientifically established risk factors include the claimed cause or not).

This process can go beyond reviews, by involving literature searches of the nature that is described in Chapters 4 and 9 of the causation Guides.

If scientific findings are discovered which appear to support the causative relationship that is being claimed in the case at hand, then those scientific findings must be scrutinized in an attempt to determine if they are sufficiently credible and reliable. Many passages in the causation Guides provide direction on how to determine if scientific findings which seem to establish causative relationships are credible and reliable, but pages 34-39 focus on that issue most intensively.

If an evaluator is considering endorsing a claimed causative relationship, then the following self-assessment questions can be utilized for this step:

- Am I aware of scientific findings which provide credible and reliable support for the premise that this specific claimed cause is capable of producing this specifically claimed clinical presentation?
- If asked, can I reference and explain the relevant scientific findings?

**Step 3: Obtain and Assess the Evidence of Exposure**

If credible and reliable scientific support for a claimed causative relationship is actually found in step 2, then the causation analysis continues with consideration of whether the case at hand involved sufficient exposure to the claimed cause.

The essential questions that need to be addressed in this step are:

- Magnitude of exposure: What evidence, predominantly objective, is available which clearly verifies that the exposure to the claimed cause was of sufficient magnitude to account for the development of the claimed clinical presentation?
- Relationship in time between the exposure and the clinical presentation: Did the clinical presentation develop and evolve in a manner that has been scientifically established as being consistent with the claimed or documented temporal exposure to the claimed cause?
The causation *Guides* explain that actual measurements of exposure are the most reliable information for this step, while the examinee’s report of exposure is among the least reliable information.

An example of the need for this step is provided by water poisoning. Drinking water is a risk factor for seizures, coma, respiratory arrest, brainstem herniation and death (Ballantyne). However, the relationship between drinking water and these consequences is only manifested when the exposure to drinking water is extremely high, and when the health problems develop shortly after the extreme water drinking.

This example illustrates that it is not credible to conclude that a scientifically established risk factor caused the definitively established diagnosis in the case at hand, simply because the risk factor is relevant to the case (e.g. it is not credible to conclude that drinking water caused a brainstem herniation, when the only reasons for that conclusion is that there has been verification that the patient drank water, and it has been scientifically established that drinking water is a risk factor for brain stem herniation). Before such a conclusion can be credible, evidence has to be collected which verifies that the exposure to the risk factor was of a sufficient magnitude to cause the clinical presentation (e.g., evidence verifies that water was consumed in sufficient quantities, within a sufficiently limited time period, to create the level of exposure to drinking water that has been scientifically established as a risk factor for brainstem herniation). Additionally, in order for such a conclusion to be credible, the clinical presentation must develop and evolve in a manner that is temporally consistent with the scientific findings regarding the timing of the relationship (e.g. a herniation due to water drinking occurs within a few hours of the extreme water drinking (Petzold), rather than days later).

In general terms, the history of the clinical presentation should correlate in time with the exposure to the risk factor. Exposure to more extreme levels of the risk factor should be associated with more severe clinical reactions (an allergic reaction to rubber is more severe when the level of exposure to rubber is more extreme). A closer relationship in time should be associated with more severe clinical reactions (symptoms are more intense in the short-term aftermath of an injury, and less intense as the person moves away from the injury in time).

If an evaluator is considering endorsing a claimed causative relationship, then the following self-assessment questions can be utilized for this step:

- Have I collected evidence of the details of the claimed exposure?
- Is my method for collecting such evidence credible? If asked, can I reference and explain scientific validation of my method?
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- Have I documented my utilization of a method for collecting evidence of exposure in this case, and the results of that utilization?

- Was the level of exposure sufficient to cause the claimed clinical condition? Have I explained this in my documentation? If asked, can I reference and explain scientific findings which verify that this level of exposure is sufficient to cause this presentation?

- Is the timing of the claimed exposure and claimed clinical presentation consistent with relevant scientific findings? Have I explained this in my documentation? If asked, can I reference and explain scientific findings which verify that the timing details from this case are consistent with the claimed causative relationship?

**Step 4: Consider other relevant factors**

This step can be conceived of as an expansion and double-check of step #2. The purpose is to consider the relevance of scientific findings for causation of the definitively established diagnosis, with an emphasis on risk factors other than the cause that is being claimed in the case at hand. In other words, this step is dedicated to determining if other risk factors provide a better explanation for the clinical presentation, than that which is provided by the claimed cause.

The causation Guides specifies that questions which need to be addressed in this step include:

- Are there risk factors, other than the cause that is being claimed in this specific case, which could contribute to the development of the claimed clinical presentation?

- Are any such risk factors relevant to this case?

In order for a causation conclusion to be credible, the process of creating that conclusion must have included comprehensive consideration of the epidemiological scientific findings for the definitively established diagnosis, determination of risk factors for the diagnosis (based on scientific findings), determination of which of the risk factors apply to the case at hand (which ones are relevant), and determination of which relevant risk factors are of greatest significance for the diagnosis in general, and for this case in particular.

The causation Guides offers this example: If the claim involves carpal tunnel syndrome being attributed to work, have the non-work-related factors which have actually been scientifically established as risk factors for that diagnosis been considered in this case (risk factors such as pregnancy, obesity, diabetes, etc.)? This example can be considered further by a review of
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Chapter 9 of the causation Guides, which provides a discussion of the manner in which non-work-related factors are the dominant risk factors for carpal tunnel syndrome (and a discussion of the insignificance of most work-related factors).

The direction for this step that is provided in the causation Guides provides a basis for the following self-assessment questions. These questions can be used, for evaluation of one’s work, by any examiner who is considering the endorsement of a causation claim:

- Have I thoroughly reviewed scientific findings in regard to risk factors for this diagnosis? Can I reference and explain relevant scientific findings if asked to do so?

- Have I evaluated this specific case for the relevance, or lack thereof, or every scientifically established risk factor for the diagnosis, and especially for all risk factors which are not being claimed as a cause in this individual case? Have I documented my work in this regard?

- Have I considered scientifically identified covariates and confounders (e.g., issues that might have an indirect effect, an interaction effect, which might create a false impression of a causative effect, etc.)? Have I documented my work in this regard?

- Have I had an opportunity to review a significant portion of pre-claim records, so that I can consider issues such as pre-claim injuries and other pre-claim health issues? Have I documented my work in this regard?

- Have I taken steps to ensure that my considerations have not been artificially limited to risk factors that are within the typical boundaries of my specialty? For example, has an orthopaedic surgeon gone beyond the typical limits of orthopaedics, to consider the dominant role of psychological and social issues in the genesis of chronic pain complaints (Linton)?

- Have I considered the effects of treatments? For example, in cases of chronic pain, have I considered the effects of prescription narcotics, which scientific findings have indicated as a reliable cause of worsening of chronic pain (Barth, 2011)?

- For all of the relevant risk factors in the case at hand, have I provided an objective and credible basis for determining which are of primary importance in the creation of the claimed clinical presentation? This question is especially important when the claimed cause is credibly established as a significant factor, and there are other significant factors as well.
Step 5: Scrutinizing the Validity of the Evidence

This step calls for the evaluator to intensely scrutinize the evidence from the individual case. The causation Guides explains that the primary goal of this step is to determine if there is any data which contradicts or confounds the information that has otherwise been presented in the case.

Chapter 3 of the causation Guides states that this step involves two main issues:

- Details of the claim: Is there conflicting information in regard to date of injury / timing of exposure, mechanism of injury or exposure, prior injuries or prior health problems, the examinee’s activity level, the examinee’s ability to work, etc.?

- Adequacy of professional services: Have other clinicians offered opinions which lack scientific credibility? Have clinical services been relied upon which actually lack scientific credibility, or which lack relevance to the specifics of this case?

The causation Guides advise evaluators to “qualify all statements appropriately by noting a lack of knowledge and/or certainty” when the scrutiny that is called for in this step is not feasible (e.g., the evaluator does not have an opportunity to compare and contrast different sources of information regarding the claimed exposure).

Relevant self-assessment questions can include:

- Have I carefully scrutinized the details of this case, such as scrutinizing the claimed details of exposure and injury?

- Have I carefully scrutinized the examinee’s reported history? In this regard, evaluators should note the scientific findings which indicated an approximate rate of 100% of examinee-reported histories being false when the examinee was blaming someone else for his or her health complaints (Barth, 2009).

- Do I have enough information to engage in such scrutiny, in a meaningful way?

- If I am relying on any previous clinical conclusions, have I studied the documentation of those clinicians, in an effort to make sure that their work was scientifically credible?

- Have I documented discoveries of conflicting information and non-credible clinical work?
Notes:

- Have I documented the uncertainty that is associated with any aspects of the evidence which cannot be intensely scrutinized?

**Step 6: Evaluation of the Results from All of the Above Steps, and Generation of Conclusions**

This step involves a re-examination of the findings from all of the previous steps, and determining whether they coherently justify the claimed causative relationship.

The essential self-assessment questions for this step are:

- Have I completed the first five steps in a credible fashion?

- Do the findings from those steps provide credible and convincing support for the claimed causative relationship?

**References:**


Answers Corporation, accessed 04-27-2012: [http://wiki.answers.com/Q/What_is_the_opposite_of_the_word_opinion](http://wiki.answers.com/Q/What_is_the_opposite_of_the_word_opinion)


Notes:


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