

THE WARNING EXPERT IN CIVIL LITIGATION

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ABSTRACT

Warnings have played an increasing role in personal injury and product liability litigation in the United States. Warning experts perform many functions in cases where there are allegations that warnings were absent or inadequate. This chapter describes some of the functions that a warning expert performs in the expert role. The topics considered include legal rules related to warnings, the definition of a warning expert, typical activities of a warning expert, and problems and issues associated with being a warning expert.

INTRODUCTION

During the past three decades, warning experts have increasingly participated in civil litigation cases. Frequently, the work concerns personal injury and property damage allegations in product and premises liability cases. Questions addressed by the warning expert may include:

1. Is there a need for a warning?
2. Is an existing warning or warning system adequate?
3. What would make an adequate warning system?
4. Would adequate warning(s) make a difference?

In this chapter, we review various topics concerning the role of the warning expert and the activities that may be undertaken leading up to opinions offered in testimony. We discuss the topics of warnings in civil litigation, the definition of a warning

expert, and typical activities and issues associated with being a warning expert. Much of the chapter specifically concerns product manufacturers, but the basic principles are applicable to premises liability.

WARNINGS IN CIVIL LITIGATION

Compared with the consumer or user, the manufacturer or seller of a product is generally considered to have superior expertise about the product and its associated risks. The manufacturer is held to be expert on how the product is used and is expected to be knowledgeable about the state of the art of the industry at the time the product was manufactured. This standard carries the burden of determining the product's dangers and then attempting to reduce them by appropriate methods of hazard control, including using practical redesigns that eliminate or substantially reduce hazards. The hazards that remain after engineering controls have been implemented are usually warned about. Warnings are used to advise consumers about anticipated dangers regarding foreseeable use and misuse. Thus, the "expert" standard necessitates that manufacturers anticipate the ways that a product may be used, including uses that may be incidental to those intended. Conversely, when injury results from unforeseeable use or misuse and there is no warning, the manufacturer is generally not held responsible.

Under common law rules regarding liability in the United States, product manufacturers have an obligation to provide warnings sufficient to permit their product to be used safely (or in some instances, directing users not to use the product). Over the past several decades, this duty to warn has developed

based on a large number of decisions in U.S. state and federal courts, which have formed a collection of rules and doctrines called the Restatement (Second) of Torts (American Law Institute, 1965) and the Restatement (Third) of Torts (American Law Institute, 1998). The failure to provide adequate warnings has become an increasingly more common claim in personal and premises liability litigation in the United States.

There are several warning doctrines in the Restatements. A product can be found defective because of defective warnings or instructions when the foreseeable risks of harm could have been avoided or reduced by giving reasonable instructions or warnings. Necessary warnings and instructions are considered part of the product. If a product needs warnings and instructions and they are inadequate, the product is defective. Inadequate or defective warnings and instructions can render the product not reasonably safe (or similarly, unreasonably dangerous). Warnings are to be communicated so as to permit ordinary users to use the product safely or to avoid the risk.

Usually, we think of product warnings as being safety-related communications that a manufacturer distributes via product labels, inserts, or manuals. These materials arriving to users or consumers would be an example of direct warnings. However, warnings may come into play indirectly—through an intermediary. A bystander hit by debris from a grinder or a chipper/shredder typically would not be warned directly by the manufacturer. Rather, the warning needs to be directed to the product user who, in turn, should take measures to avoid injury to others. Likewise, hazards to very young children would be warned via parents and caretakers, who then take measures to prevent injury. Similarly, the “doctrine of the learned intermediary” has been used in litigation involving prescription drugs, where traditionally the manufacturer’s obligation was only to communicate risks to prescribing physicians, who in turn decide how the risks are controlled. However, with increased use of direct-to-consumer advertisements about prescription drugs in the print and broadcast media, the learned intermediary’s responsibility may be lessened, with increasingly more responsibility focused on manufacturers and to some extent consumers (see Paige-Smith, Laughery, Williams, & Kalsher, chap. 50, and Williams, Kalsher & Laughery, chap. 49, this volume).

Generally, common law courts have ruled that there is “no duty to warn” of obviously hazardous conditions. The concept of “open and obvious” refers to circumstances where the appearance or function of a product communicates the necessary hazard information. Similarly, hazards that are common knowledge, such as knives and sharp scissors, are not deemed defective without a warning.

Usually, there is no duty to warn members of a trade or profession against dangers generally known to that group. This “professional user” doctrine follows from the no duty to warn doctrine about known or obvious dangers, either because of training or experience. Presumptive familiarity with the hazards associated with a job depends on whether pertinent product safety information has reached the individual using or exposed to the product. This presumption relates to the manufacturer knowing how the product is being used and whether they can rely on the adequacy of warnings having been provided from other sources to the end users.

There is a notable exception to these open-and-obvious and common-knowledge circumstances. There may be situations where a warning is needed as a reminder. Reminder warnings are intended to alert the users to the hazard at the critical point in time. The seatbelt light and chime in vehicles are intended as reminders.

The issue is not simply whether or not a warning is given. The warning must be considered adequate. For a warning to be adequate in the legal sense, it must render the product reasonably safe for its foreseeable intended uses and misuses. The adequacy of a warning considers both its form and its content.

As mentioned earlier, manufacturers are held to the state of the art regarding their product. This would indicate that manufacturers should consider the state of the art of warnings at the time a product enters the stream of commerce and potentially after the sale of the product (see Madden, chap. 45, 46, & 47 this volume; Madden, 1999). Unfortunately, many companies do not make use of current standards, guidelines, and scientific research on warnings. Frequently, warnings are based on industry custom (copycats) without considering the warning literature or evaluating the warnings to assess their effectiveness. The guiding inquiry is whether the warning design is effective in providing persons in the target audience informed consent about risks and how to avoid them. Evaluation methods are available to determine whether warnings are effective, and if they are not, there are methods to determine whether alternatives are better. This Handbook includes many chapters that review factors, both intrinsic and extrinsic to warning design, that influence effectiveness. It would seem imprudent for a manufacturer not to consider the technical literature on warnings. Notable is the fact that the warning literature has been strongly suggesting the need to test their effectiveness and making adjustments as needed. Thus, attaining the state of the art may also require evidence of having performed such evaluations.

Designers of warnings for environmental hazards generally have the goal of making a good warning so that people do not get hurt. Frequently, inadequate posted-sign warnings are a consequence of lack of skill of the warning designer. For example, designers of warnings for electrical transformers or for a hazardous waste site would likely have the genuine goal of developing a good warning to keep laypersons from being harmed. The desire to place the best warnings on consumer products is not clear-cut (or at least not the whole story) with regard to consumer products. A surprisingly infrequently stated point about product manufacturers and their warnings is the potential conflict with marketing and sales. The desire to make a very effective warning may be short-circuited by a belief by the manufacturer that a good warning will scare consumers away from purchasing its product and consequently negatively affect profit (see Egilman & Rankin Bohme, chaps. 2 & 51, this volume). Although there may be some truth to this belief, currently, it is not well supported in the research literature. Indeed, some studies suggest that people may be attracted to products and companies that inform them about risks (e.g., Ursic, 1984).

The other side to this issue is that companies have a right and perhaps a duty to shareholders to make a profit. Products of all sorts have improved lives, but many also have hazards. This is dependent largely on the product niche that the manufacturer

has taken. Nevertheless, there needs to be a balance between sales and limiting preventable injuries.

In this section, we have discussed several important legal rules regarding warnings in the courts. In addition, we have offered several implications of these rules for the warning expert. The reader is referred to three chapters by Madden (chaps. 45, 46, & 47, this volume) for more complete coverage of law relating to warnings, including duty to warn, post-sale duty, and law related to child hazards.

WARNING EXPERT'S ROLE

The plaintiff and defense sides in product liability cases retain warning experts to opine on the adequacy of warnings and whether the warning obligation was satisfied. The role of the warning expert can be characterized along two dimensions: the formal and the less formal. Formal activities are essentially defined by the law or by the courts. The less formal activities refer to tasks actually carried out by the expert. In the formal role, the expert is to educate the trier of fact (the judge, jury, or both) with regard to information that is beyond "common sense" or likely personal experience. The expert is to be impartial and demonstrate no interest in the outcome of the case. The expert must remain neutral, despite being hired by one side (plaintiff or defense) and forming opinions about the distribution of fault.

Generally, the expert does not simply examine facts and express opinions. Many other types of activities are carried out. These less formal activities may include serving as a consultant, analyst, investigator, researcher or report writer. It is not uncommon that the attorney contacting a warning expert for possible work on a case will not have a clear understanding about the warnings issues or what the expert has to offer. In such instances, experts may function as consultants regarding the area of expertise and what they can and cannot do. For example, it may be possible to determine that a warning was needed when none was provided or that a given warning was inadequate for a given set of circumstances. However, the warnings' issues may not be so simple. For example, the various media through which such information was, could have been, or should have been communicated may need to be considered. Further, the knowledge that the target audience already had may be relevant.

The warning expert relies on state-of-the-art knowledge about warnings at the time the product was manufactured or prior to the injury event. This would entail familiarization with research findings and standards and guidelines on warning design at that time. In some cases, the warning expert may be asked to collect data, such as people's knowledge about a particular relevant hazard. The expert may be asked to develop a prototype warning and test it. Usually, a full-blown study that tests the effectiveness of an alternative warning is not conducted because of time restraints and expenses involved, including the need to monitor and pay for testing. However, depending on the circumstances of the case, the time line, and the costs, an attorney may want such a study conducted. In those instances, experts may wish to carry out such a study themselves or subcontract out to another competent entity to carry out the testing

and development with some monitoring by the expert to ensure its validity and reliability.

Given the limitations on the expert's role in the case and short time frames frequently involved, it may not be possible to develop an alternative warning, although such an exhibit may sometimes be desirable. The inhalation hazard associated with a chemical solvent may not be adequately addressed in a warning, but the development of a complete warning system for such a product might require considerable time and effort to incorporate other hazard information, such as ingestion, skin contact, and flammability, to yield an appropriate warning system.

Frequently, experts are asked or required to submit a written report. In such reports, experts indicate their opinions and the basis for those opinions. Given the adversarial context of litigation, the expert can expect that the report will receive extensive examination and critique, including scrutiny by others with similar expertise. Frequently, the attorney may submit a formal designation early in the case concerning the expert's background and experience and the expert's general opinions. Also, in some instances, a notarized affidavit or declaration is used to give or supplement opinions. The use of such documents will depend on factors such as jurisdiction of the court and discovery requirements, and they can vary in length and detail.

DEFINING THE WARNING EXPERT

What qualifies a person to be a warning expert? A wide assortment of people give expert testimony on warnings, but not all are qualified. In the following sections, we discuss what constitutes a warning expert and who is not a warning expert.

Who Is a Warning Expert?

According to Rule 702, a person may qualify as an expert on the basis of knowledge, skill, experience, training, or education. Specific kinds of experience or advanced academic degrees are not necessarily required. An experienced plumber with limited formal education might be accepted as an expert witness on some subject related to the gas lines leading to a water heater. A university professor in electrical engineering may have never designed a circuit breaker but may be qualified on the basis of education and knowledge on circuit breaker failures. Ultimately, the court decides the issue of whether a person is qualified to testify as an expert. For a general discussion of the matter, see Slater (1993).

What education, knowledge, and experience, should a warning expert have? A degree in warnings obviously is not a criterion because there are no such degrees. Some answers may be gleaned from noting what a warning is. It is a communication. It has the purpose of providing information about hazards, consequences, and instructions. It is also intended to influence people's behavior. Warnings are also displays. From this perspective, a warning expert would have knowledge about hazards, consequences, and appropriate forms of behavior as well

as knowledge about how much information should be displayed to influence behavior.

The role suggested by this definition is actually too large. It needs pruning for several reasons. First, information about hazards, consequences, and appropriate behaviors does not generally derive from the warning expert; instead, these are matters about which warning experts make assumptions based on information from others, such as engineers, toxicologists, and safety professionals. The warning expert typically would not be the source of information about the physiological and health effects from breathing chemical vapors or the handling dynamics of a vehicle with a high center of gravity. Such information is typically gleaned from other experts or technical literature. The relevant expertise for the warning expert is communications, displays, and human behavior. Thus, psychologists, human factors professionals, and ergonomists (some of whom who have been educated in industrial engineering) and people in the field of communications represent the most likely sources of such expertise.

Whatever the background of warning experts, there are specifics they should know. The first requirement is to be thoroughly familiar with much of the scientific, peer-reviewed research literature that has emerged over the past two to three decades. This Handbook covers much of that research (see also Edworthy & Adams, 1996; Miller & Lehto, 2001; Parsons, Seminars, & Wogalter, 1999; Rogers, Lamson, & Rousseau, 2000; Wogalter, DeJoy, & Laughery, 1999). Warning experts should also be familiar with other warning-related knowledge, such as available standards and guidelines, hazard and task analyses, display design, data collection methods, analysis techniques, and the relevant areas of perception and cognitive psychology.

A few observations on who is not a warning expert are worth mentioning. Simply having written or constructed a set of warnings that, according to accepted principles, are not very good does not qualify a person to be a warning expert. Outstanding experts in the fields of engineering or health generally lack knowledge about important specifics concerning warnings criteria, design aspects, and their impact on people and should not opine on them. The point, of course, is not intended to be critical of engineers, toxicologists, or physicians. The intent is to help clarify what a warning expert is or should be. Individuals with a wide variety of credentials and experiences have been permitted to give expert testimony about warnings in the U.S. courts. The qualifications of many could be seriously questioned.

The Court's Judgment on Warning Expertise

Courts must distinguish between legitimate warning experts and those who do not have such expertise. Attorneys make initial decisions on expertise in deciding to retain someone in that role. Later, judges make decisions either before trial or during voir dire. In federal courts, there may be a formal (Daubert) hearing prior to trial in dealing with an attempt to limit or exclude an expert's testimony. Such decisions are not simple, particularly when one considers the fact that judges are not expert in the

vast array of subject matter, including warnings, addressed by expert witnesses. Although the decision making involved is beyond the scope of this chapter, it is important to be aware that such decisions are made and that information may be sought from the expert that may factor into the judge's decision to allow the expert to testify at trial. Examples of information that may serve as a basis for such decisions are:

- The expert's education or knowledge. Is it in an area such as cognitive psychology, human factors/ergonomics, communications, or a related discipline?
- Knowledge about or familiarity with the technical literature on warnings.
- Having authored research publications on warnings. Has the research been funded? By whom? Have the publications appeared in peer-reviewed journals, proceedings, and books?
- Experience in designing good warnings.
- Participation in activities in national organizations, advising government agencies, consulting with or working for industry on relevant projects, serving as an editor or peer-reviewer of scientific literature, etc.

All of these points need not be met to qualify as a warning expert; but to be accepted as an expert on warnings, at least some of these credentials should be satisfied. Ultimately, it is the jury that decides what to believe of the expert's testimony after hearing the expert's qualifications and any objections from the other side's attorney. The jury may or may not choose to believe the information offered.

ACTIVITIES OF THE WARNING EXPERT

As already noted, the warning expert may engage in several types of activities. Every case is different to some extent, and the expert's activities will vary from case to case. Figure 48.1 presents a general overview of the expert's activities. It shows a generalized sequence of activities from initial contact to trial. Although the time line is shown as a linear sequence, in some cases, the order may be different, and steps may be repeated. The expert should be flexible about the expectations of his or her activities in a case, as different jurisdictions have different requirements, and attorneys and judges try cases differently.

Initial Contact

The expert's involvement in a case begins when contacted by an attorney. This contact usually takes the form of a phone call, letter, fax, or e-mail. Following introductions, the attorney will provide a brief description of the accident or exposure, the injuries or illness, and the issues or aspects of the case about which the attorney is seeking expert assistance.

It is important at this point for the expert and the attorney to determine if this is the right expert for the case. The attorney needs to decide, after looking at the curriculum vitae and fees,

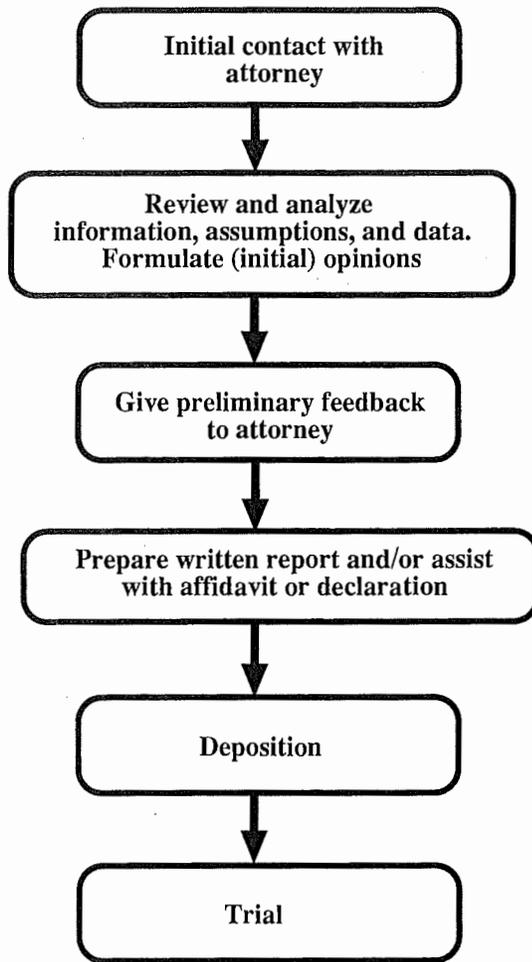


FIGURE 48.1. An overview of the sequence of activities that a warning expert may participate in during litigation.

and after a relatively brief conversation, whether to retain the expert. The expert has to make a decision to pursue the case, even though all of evidence is not in. The attorney will offer the best side of his or her client's story. It is important in deciding to take a case to find out what, if any, "warts" may be in the case. For example, was the driver of the vehicle intoxicated at the time of the accident? If so, the expert may not want to take such a case, even if other factors are favorable. A point worth mentioning here is relevant to individuals just starting out in the role of a warning expert: Pick your cases carefully. Testimony and reports are recorded history, and the expert may eventually be questioned about apparent changes in opinion. Also, the expert can get locked into viewpoints, such as on matters of effectiveness.

If the expert's credentials and the issues coincide, and if there is agreement on procedures, fees, and so forth, the expert's role in the case will begin. Some experts require a formal agreement in the form of a contract, whereas others proceed on a less formal basis. Such contracts are usually two-to three-page documents that give details on the scope of the work and billing

and payment procedures. Some have a schedule of hourly rates for various activities, such preparation, deposition and trial testimony, and travel. Office help and other expenses are typically billed. Some experts require a retainer, whereas others do not. Experts are not paid contingent on the outcome of the case; rather, they are paid for their time and expenses.

There is another consideration associated with time. What is expected from the expert and when? Will a report be required and, if so, by what date? Is there a date by which a deposition must be completed? Has the trial date been set? It is not uncommon for an attorney to decide well into the discovery period that a warning expert is needed. For example, a defense attorney may have recently deposed the plaintiff's warning expert and decided he or she also needs to employ a rebuttal expert. The expert is well advised to take into account the time requirements when deciding whether or not to get involved in a case. Sometimes, there will be time conflicts with the expert's schedule, and it is important to work these out with the attorney well in advance, if possible. Trial dates can be the most difficult to pin down, often requiring the expert to be flexible in his or her availability.

Analysis

Early work on a case focuses on analysis of information and the formulation of opinions.

Although Fig. 48.1 implies a serial sequence of activities, it is not entirely accurate. The stage of analysis may continue right up to the time of courtroom testimony. As new relevant information becomes available in the discovery period leading to trial, the expert may prepare supplemental reports, declarations, or affidavits, or even be deposed more than once.

Information. Most of the information examined by warning experts comes from two sources: the retaining attorneys and the experts themselves. By the time the expert is retained, some, and occasionally a lot of, information is available and may include the following:

- The complaint or petition (and any amendments).
- Information about the product involved or about a job and work environment (if the injury or illness was job-related).
- Accident reports.
- Statements and/or depositions of fact witnesses.
- Reports and/or depositions of other experts.
- Standards and guidelines.
- Warnings that were provided.

Of course, one of the most critical tasks is to obtain copies of warnings that have been alleged to be inadequate and see how they were placed with respect to the subject product or environment. Color photographs should be requested. Also, product manuals, brochures, and advertising materials should be requested, as well as information about warnings on competitor products. In some cases, visiting the site or viewing the machine may be necessary, whereas sometimes a video is a satisfactory

substitute. When warning experts are retained early in a case, they have an opportunity for input as to the kinds of information that will be useful in evaluating the warnings issues. The expert may assist the retaining attorney in formulating Interrogatories and Requests for Production that ask, in a formal manner, the opposing side for additional information. Such information may include:

- Results of hazard analyses (failure mode, fault tree, etc.) that have been done.
- Procedures and criteria involved in developing the existing warning system.
- Relevant past safety behaviors of the plaintiff.
- Safety history of the product or environment.

The warning expert may also raise issues and assist in the formulation of questions for the retaining attorney to ask fact witnesses and other experts during deposition and trial testimony.

The expert may also gather information. Such information may include the relevant scientific literature. The expert may carry out tests, surveys, and other procedures (e.g., consumer interviews and focus groups) to gather relevant information if necessary. Such information might include:

- Are the hazards, consequences, and appropriate modes of behavior apparent to those at risk (i.e., "open and obvious")?
- What do people already know about the relevant hazards, consequences, and appropriate modes of behavior?
- How do people use a product?
- Do people notice, understand, and respond to the warning system?

As mentioned earlier, a full-blown study with relevant target populations may not be possible or practical. For example, many cases are on a short time line, and sometimes resources are not available to conduct warning effectiveness testing. Also, formal testing in the litigation context may not be necessary. For example, the task requested of the warning expert may be to comment when there is a complete absence of a warning. Or if the allegation is warning inadequacy, testimony might only address those aspects that make the warning inadequate or adequate, based on existing research results. Obviously, one cannot "test" the warning when the plaintiff is deceased or badly brain-damaged, nor can one return to the time the injury event occurred. Hence, there are circumstances in which relevant warning questions cannot be answered.

Problems can arise during the information-gathering phase. One important category is relevant information that is not being provided by the retaining attorney. This omission could occur because the attorney did not realize the information was relevant, because an office clerk forgot to send it, or because the attorney withheld it, thinking it was harmful to his or her case. The latter circumstance is clearly unacceptable. An example would be the plaintiff's attorney failing to tell the expert that the driver (plaintiff) in a crash was drunk. An example on the defense side might be failing to reveal a letter or memorandum found in the product manufacturer's internal files indicating that

the warning system was deliberately weakened so it would not negatively affect sales. Such withholding of information is rare, but it can be embarrassing to the warning expert. It can also be especially distracting if the opposing attorney introduces it during the time the expert is giving testimony. It can also change the expert's opinions. Avoid surprises, if possible.

The absence of relevant information is another potential information problem. Information about whether the plaintiff noticed or understood the warnings is not available from a person no longer living. Contradictory information is still another problem. It is not uncommon for multiple witnesses to report different and contradictory accounts of an accident. The absence of information or the existence of contradictory information may require the expert to consider alternative scenarios of an event.

Assumptions Versus Opinions. The distinction between assumptions and opinions is important. En route to formulating opinions, the warning expert typically makes assumptions based on answers to the questions: (a) what were the hazards and consequences associated with the product being used or activity being carried out? (b) what warnings were provided, and how were they provided? (c) what did the relevant people know about the hazard, consequences, and appropriate behavior? and (d) where, when, and how did the accident, injury, and/or illness occur?

These questions refer to factual matters. The facts, or assumptions, may be held with varying levels of confidence depending on the quality of available information, but they are still assumptions. Assumptions made by the warning expert may also be based on opinions of other experts. For example, the hazards and potential consequences of handling some chemical solvent may be defined by the opinions of an expert toxicologist. To the warning expert, they are assumptions.

Formulating Assumptions. Two of the major difficulties in formulating assumptions are missing information and contradictory information. Knowledge about the hazards from a person injured is important to the warning expert, but if that person is now brain-damaged or deceased, then it will not be available. Assumptions regarding this knowledge may be based on testimony of coworkers and family members as well as records of training, experience and past performance of the person. Similarly, information about a product warning system may not be available if the product was destroyed in an accident. Was the label legible? Was the manual available? Contradictory information presents different but often equally difficult problems for the warning expert. Different perspectives and memories of fact witnesses are problems noted earlier.

Simple answers or solutions to the aforementioned problems do not exist for the warning expert who is trying to decide what are appropriate assumptions to make. Following are a few suggestions to consider when carrying out the analysis:

1. What information is available, and what is needed?
2. What information can be requested, and what was asked and not provided?
3. What are the reasons the information was not provided?

4. What are the issues about which one needs to make assumptions?
5. What are the relevant warning-related factors in the case, and what does the research literature say about them?
6. Be prepared to express opinions while being asked to assume different facts.

The plaintiff's attorney will often prefer one set of assumptions, whereas the defense attorney will prefer a different set. During deposition or trial testimony the expert may be asked his or her opinions given the different assumptions (e.g., whether a product manual was available or read). If different assumptions warrant different opinions, give the different opinions.

Formulating opinions. There are several areas about which the warning expert typically opines: (a) was a warning (system) needed? (b) was it adequate? and (c) would it have made a difference? The expert can expect to be asked about the basis for his or her opinions.

Is a Warning System Needed? Several considerations are relevant. The first is whether or not a hazard exists. There is no need to warn about nonexistent hazards. Second, is the hazard open and obvious? As mentioned earlier, it is generally not legally necessary to warn about open and obvious hazards. Fire may be the obvious hazard with the obvious consequence of burns. However, the hazards and consequences of solvent vapors typically are not.

Many hazards are not easily classified. Although some aspects may be open and obvious, other important related aspects might not be. For example, it may not be obvious that a fire might start from a "hidden" ignition source (e.g., a gas-fired water heater) many feet away from heavier-than-air solvent vapors, yet the idea of fire fueled by solvents may be known.

A third related consideration is whether and how much people already know about the hazard. If the hazard is known, a warning may not be needed. Nevertheless, even if the hazard is "known" by users, a warning may be needed as a reminder, as in circumstances of high-task loading. Also, as already noted, people may only know part of the story.

Is the Warning System Adequate? This question is central to the warning expert. An important consideration is the definition of adequacy. In the context of litigation, a warning is either adequate or inadequate. However, the goodness or badness of a warning system is a continuum: It may be good or very good, or it may be bad or very bad. The expert's task includes deciding where that adequacy criterion lies with respect to the available information. Some rules of thumb are discussed in the paragraphs and sections that follow; they may be helpful, but not always applicable.

The warning system is considered as a whole. A poor warning in a manual may or may not render the warning system inadequate if a good warning is on the product. Indeed, an adequate on-product component is frequently necessary for the system to be adequate. It is the primary location that users are more likely to see. Different components of the system do not necessarily get equal weight in deciding adequacy.

Minor violations of criteria or guidelines are probably not a basis for inadequacy. Although standards (e.g., ANSI [2002] Z535 warning standard) have certain specifications for warnings, slight variations are usually not the main issue. An example would be using the color yellow instead of orange as specified in the standard. By itself, this violation probably is not enough to make a difference (particularly when research suggests that there is little or no difference in perceived hazard for these two colors). It is often the accumulation of many deficiencies in the warning system that render it inadequate.

Would the Warning System Have Made a Difference? This issue is a central topic to the warning expert, as is the issue of causation. It is directly tied to warning effectiveness. If a warning system is inadequate but has no bearing on the accident, injury, or illness in question, its inadequacy is irrelevant. The warning effectiveness issue can be a difficult one for the warning expert. The difficulty lies in formulating opinions about how effective the warning system would be in the circumstances of the case. Effectiveness is being quantified when some or a lot of information is likely to be absent or of poor quality. Categorical judgments may be made, such as "more likely than not," but they must be made with careful consideration of the best information available. Factors relevant to the issues include the design of the subject warning and any proposed warning system, characteristics of the target audience, circumstances of the task or activities of the people involved, and the empirical scientific literature.

Sometimes questions arise in a case for which the existing technical literature contains no directly relevant information or data. Examples might be a specific risk perception issue (e.g., what do people know about this hazard or its consequences?) or a specific warnings issue (e.g., is the existing warning understandable to this target audience?). Sometimes, straightforward inferences from the technical literature to the case at hand can be made. In other circumstances, data may be collected. An excellent example of the utility of data collection was reported by Senders (1994), who surveyed how people would connect a gas heater.

Preliminary Feedback to Attorney

At some point, the expert will provide feedback to the attorney regarding preliminary opinions. This feedback may be more interactive than the sequence of steps implied by Fig. 48.1. The attorney will want to know what the expert thinks in order to decide whether to continue his or her employment. If the opinions of the expert are not supportive of his or her case, the expert's work will be done. This conclusion, of course, is a potential downside for the expert in that future work and fees on the case are no longer available. However, continuing in the case when the opinions are discordant is filled with even greater peril.

The feedback should be as frank and as complete as possible. It is also important that the attorney understand what assumptions the expert is making as a basis for the opinions. If there is a question about the validity of the assumptions or

if there are relevant alternatives to be considered, the attorney needs to know how the expert's opinions would be influenced by the alternatives.

Preparing Reports

Reports are primarily intended to provide the opposing attorney with information regarding who the expert is, what he or she has done, and what his or her opinions are. Reports are not required in all cases. Cases in federal courts require a report as well as a current curriculum vitae, a list of cases in which the expert has given testimony during the past four years, a list of potential trial exhibits, and the rates and fees paid to date. Report requirements for cases in state courts vary, and often there is no report requirement.

Reports vary in specificity. A report may be brief and very general, stating opinions in the broadest terms. Such a report might state only that, the warning was inadequate and that, had a well-designed warning been provided, the injury event would have been prevented. In other instances, reports must be specific and complete. If a warning is judged to be inadequate, the specifics of its inadequacies must be described as well as the basis for the opinion. Finding out the report requirements early can increase the likelihood that it will comport with the level of analysis required or expected. In some circumstances, if an opinion is not provided in the report, the expert may not be permitted to express that opinion in trial.

In general, the report of a warning expert will include opinions on the issues mentioned earlier: Was a warning needed? Was the warning system adequate? Would the warning system have made a difference? The report should be prepared with great care. Expect it to be scrutinized and every point to be questioned and perhaps challenged.

Deposition Testimony

In most cases, the next step is a deposition. The procedure usually involves the attorney for the opposing side examining the expert in a question-answer format. There may be more than one questioning attorney when there are multiple parties being represented. The expert is under oath, the procedure is recorded, and the testimony is considered part of the formal record of the case. It can be used later during trial and possibly in future testimony in other cases. It is important for the expert to be well prepared and consistent. Contradictions between deposition testimony and trial testimony are likely to be noticed and can discredit the expert. The deposition is adversarial, and the opposing attorney will be attempting to establish such things as:

- Questions or shortcomings regarding the expert's credentials.
- What are the bases for the opinions.

What evidence did the expert rely on?

What scientific data, theory, or experience was used?

- Are there any contradictions in the assumptions and the opinions?
- What are the limits of the theories used by the expert extrapolated to the extreme?
- Are there flaws in the analyses carried out?

The tone of depositions is generally professional. Attorneys come prepared, and they get on with the business at hand. There are exceptions, and bad manners and hostile behaviors sometimes emerge. It is critical that the expert not get caught up in the argumentative or emotional aspects of the situation. The opposite of bad manners and hostility can also occur — overfriendliness. It is sometimes a setup. Watch out for questions that start with "Dr., you will agree with me, won't you sir, that" Also, be alert to questions that take twists and turns or ones that include a list of items, all of which seem correct, but with one embedded item that is not quite right. Sometimes, the most difficult questions come after hours of questioning. Being prepared and alert is requisite.

Also, if the expert has previously provided deposition and trial testimony, the opposing attorney may have researched your previous work, and questioning may focus on opinions in earlier cases. It is yet another reason for consistency, and it again suggests that it is wise to be selective in taking cases to establish a good track record and not be weighted down later by previous regrettable experiences.

At depositions, the expert is sworn in, and the testimony is transcribed by a court reporter. It is increasingly common for depositions to be videotaped. Giving testimony is generally the most difficult part of the work, particularly when just starting in this role. The expert should be prepared and should have studied and restudied the material. Nevertheless, even with experienced testifiers, there are sometimes surprises. Some surprises come from the outward demeanor of the opposing counsel. The opposing attorney controls the deposition in that he or she asks the questions. Generally, the expert will not know what the style and manner of the questioning attorney will be until the deposition itself. Some attorneys simply want to get the expert's opinions and their basis. Some attorneys will go through their curriculum vitae line by line, asking questions about every piece of paper the expert has brought and then several hours later go through the expert's report line by line. Still, there are other styles to expect, such as "badgering," presumably to find out how the expert handles tough questions under pressure. Sometimes, but not frequently, the retaining attorney may ask a few questions at the end of the deposition. Of course, if there are multiple defendants, there may be additional questions and attorney styles to accommodate.

Trial Testimony

The final step in the activities of an expert is to testify in court. The attorneys representing both sides question the expert. Credentials are established, and opinions are expressed. Three aspects of the warning expert's role in the courtroom are noted

here. First, he or she will be addressing questions and giving opinions that may be technical to lay jurors. The expert should keep the jargon to a minimum and the descriptions simple and direct. They should be understandable to individuals with a middle or early high school grade level. Visual aids and demonstrations can be helpful. A chart listing criteria for warnings and examples might benefit the jury's understanding of the expert's opinions.

The second aspect is that the jury may have attitudes or information that is inaccurate and needs to be changed. For example, by the time the warning expert begins testimony, the jury will usually have heard descriptions of the accident or illness and presentations about the hazards associated with the product. A role of the warnings expert is often to provide an analysis in terms of how a product was used and sometimes to evaluate what the injured party knew or did not know about the hazards at the time of the accident. In short, the warning expert must help the jury analyze the issues in the proper context, not in terms of what everyone in the courtroom knows at that point in the trial, because the jury knows more than was probably known at the time of the accident. For example, no one on the jury may have known 10 years ago that air bags can cause injury to infants in the front passenger seat. But the extent of knowledge back then may be difficult for the jury to evoke and may need some assistance from the expert. Another point concerns attitudes. Many people, including jurors, have a predisposition to believe that people gets hurt, it is because they made a mistake. The warning expert needs to help the jury take a more systems-oriented view, including the possibly of telling them about communications that are tolerant to foreseeable human error.

The third aspect is that juries will have experience with and knowledge about warnings. However correct or incorrect,

complete or incomplete, this knowledge exists. It is appropriate to assume that most juries will have a limited understanding of the area of display design and communication principles that are relevant to warnings design, and they will not appreciate where warnings fit into the overall safety scheme. Thus, another role of the warning expert is to expand the jury's understanding of warnings and their role in safety so that the expert's opinions can be better appreciated and accepted.

OTHER ISSUES

There are a number of notable issues, problems, and temptations associated with the expert witness role. Several are discussed in this section. Anyone working as an expert is well advised to keep them in mind. In the adversarial context, others are quick to capitalize on errors that the expert may make.

Ethics

Codes of ethics generally define principles that are applicable to the role of warning expert in litigation. Professional and scientific societies have codes such as those promulgated by the Human Factors and Ergonomics Society, shown in Table 48.1. The expert should be familiar with applicable ethics codes as a professional responsibility.

Boundaries

One of the rules of success for experts in the civil litigation context is knowing what they know and knowing what they do

TABLE 48.1. A Section From the Human Factors and Ergonomics Society (HFES) Code of Ethics

Article V—Forensic Practice

Human factors scientists and practitioners do not allow the adversarial system of jurisprudence to affect the quality or integrity of their practice.

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| Principle 1 | Members provide testimony objectively and without bias; their testimony is based on credible data and/or scientific principles; they are prepared to identify the merits and limitations of the data and principles as well as their own capability to interpret those data and apply those principles. |
| Principle 2 | Members avoid impugning the integrity of other expert witnesses without a factual, reasonable and substantive basis. |
| Principle 3 | Members do not accept fees on a basis contingent on the outcome of the matter. |
| Principle 4 | Members accept that the client is the attorney who engaged them and not the client of that attorney who is party to the suit. |
| Principle 5 | Except where required by the Federal Rules of Evidence, members avoid discussing the suit with others in a manner that would disclose the caption of the suit or parties involved, absent the permission of the engaging attorney, until the suit is absolved. |
| Principle 6 | Members participating in the suit do not make public statements likely to influence or prejudice the judicial proceedings during their pendency. |
| Principle 7 | Following suit resolution, members do not review information detrimental to the litigant's or client's interests, except where they believe silence would breach the greater duty of protecting public health and safety. |
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not know. It is critical that experts stay within the boundaries of their expertise. Warning experts should limit their analyses and opinions to warnings issues, and not address matters associated with mechanical engineering design, medical issues, or a host of other potentially "nearby topics." This rule is not as straightforward as it may seem. First, the boundaries may be unclear. The psychologist serving as a warning expert may know a great deal about human cognition, depending on his or her background. But when testimony from different fact witnesses is contradictory as to circumstances relevant to the warning, it may be tempting to offer opinions about that testimony based on knowledge of human memory. A good heuristic is not to do so unless the expert really is an expert on memory and has specifically been asked to evaluate and form opinions about those issues. A second reason boundaries are sometimes violated is that the expert gets questions in a deposition or in trial about peripheral issues, such as the design features of some piece of equipment. Although the warning expert may be tempted to provide an answer, the temptation should be avoided. Such questions may represent an effort to maneuver the expert out onto a limb that can then be sawed off from behind without the expert realizing until it is too late. A third reason the boundary rule can be difficult is related to the fact that use of experts can represent a significant cost in litigation, and the attorney who hired the expert may understandably want to keep costs under control. If the warning expert provides opinions on other issues, the attorney may not need to hire other experts, thus cutting expenses. Avoid such "favors" because they might be a source of problems later.

Consistency

It is important to be consistent within the boundaries of one's expertise. An opinion today that differs from an opinion tomorrow is not likely to go unnoticed. Consistency seems like an easy rule to follow. For example, when applying criteria for warnings design and considering the factors that influence when warnings will and will not be effective, it would seem relatively easy to be consistent in formulating opinions across cases. This unfortunately is not so. First, situations or circumstances are seldom the same, but they are also not extremely different. Frequently, there are shades of gray. Accidents, injuries, illnesses, products, and people vary in numerous dimensions, which, in turn, make the analyses and formulation of opinions complex. Second, the opposing attorney may, through artful questioning, attempt to get the expert to be contradictory. Third, attempts at consistency can be challenging because the warning expert may have opportunities to work on the plaintiff side of some cases and the defense side of other cases. The attorneys representing the different sides are looking for different opinions. Warning experts who work only for defendants or plaintiffs will have less difficulty being consistent, but they will face other challenges regarding integrity and impartiality. It is important to keep in mind that the expert is not a defense or plaintiff expert, but a warnings expert. The real solution to the consistency challenge is to be true to the empirical and theoretical science of warnings.

Being Current

Related to the consistency issue is the challenge of staying current with the empirical and theoretical science in the area of warnings. This is not a minor challenge given the increase in research activity during the past 2 to 3 decades. There have also been concurrent significant efforts in the development of warning standards and guidelines. Clearly, the warning expert needs to be knowledgeable about the current state of the science. The growth and development of knowledge about the design and effectiveness of warnings is probably the one legitimate basis for changing opinions about how warnings should be designed and how they function.

Adversarial Setting

There are many aspects of the adversarial setting in which the warning expert functions.

The plaintiff attorney's role is to *win* the case for the plaintiff, and the defense attorney's role is to *win* the case for the defendant. Depending on the outcome of the case, the attorneys and their clients win or lose. However, the expert's role in this process is to advise or educate the jury. Although one side of the case employs the expert, he or she must be impartial and unbiased. The expert does not win or lose depending on the outcome of the case.

The attorneys in a case will do whatever is necessary within the boundaries of the law and acceptable practice to win. In the course of doing so, the attorney for the other side will make every effort to discredit the expert and their testimony. This effort will include getting experts to contradict themselves. They are likely to research the expert's work in past cases to identify inconsistent opinions. Frequently, it also includes employing other warning experts with different opinions.

The attorney for the other side may attempt to discredit the entire domain of warning expertise. This effort may include the argument that the issues of warnings design and effectiveness are within the province of the jury, or in other words, arguing that lay jurors are capable of evaluating the warning issues without the help of experts. Also, the effort may include telling the tale that there is an ongoing debate in the warnings literature about their effectiveness or that there is no "hard science" associated with warnings. However, given the extensive research literature on warnings, an expert should be able to deal with scientific-merit challenges. Also notable here is that several studies in the warning literature indicate that lay beliefs about warnings can be in error, strongly suggesting that expert advisement could be helpful in explaining issues (e.g., Frantz, Miller, & Main, 1993).

The prior examples may at first seem excessively critical of attorneys and the adversarial system. That is not the intent. Rather, these are simply the circumstances in which the warning expert's activities occur. Awareness of them could prevent potentially serious errors. As we have said, the expert's best defense against the various challenges is to be true to the empirical and theoretical science of warnings.

Everything Is on the Table

The expert's credentials, past experiences in other cases, and specific work on a case must all be revealed on request when working on a case. There are variations of this rule in different jurisdictions, but generally the expert should assume that everything he or she does in a case will be revealed to the other side. This information could include anything provided or discussed with the retaining attorney. It includes all handwritten and typewritten notes, conversations, activities, and publications reviewed related to the case. It can also include work in other past and present cases. Thus, the warning expert needs to be aware that "everything is on the table."

Advertising

Some experts advertise, others do not. Experienced warning experts often do not do any marketing because they already have more cases than they need or want. Frequently, new cases come from word of mouth or from having worked on cases previously with attorneys or someone in their firms. There is nothing inherently wrong with putting one's name out there. Advertising could involve purchasing space in a publication or a consultant's Web site listing. It could be a personal Web page. Other forms of marketing may include volunteering to make presentations to various attorney groups or letting others know one is available to take cases.

Some of the negatives aspects of advertising are: cost (in some cases), disapproval by some professionals, it may be and questioned by opposing attorneys. None of these are truly negative strikes or the sort of issues that cannot be managed. One substantial positive feature is that advertising can help attorneys find good experts. Of course, there are people who advertise as being a warning expert who would have difficulty qualifying as one.

CONCLUSIONS

The expert witness is in a potentially powerful position with regard to litigation. This influence is primarily the result of two aspects of the role. First, the expert is generally interacting with people who know much less about this area of expertise. Thus, except for similar experts who may be employed on the opposite side of a case, there is no one qualified to challenge or evaluate the opinions of the expert at a scientific or technical level. The second source of influence stems from the fact that the expert can give opinions. This aspect of the role differs from fact witnesses who provide information but are not permitted to render an opinion.

As the body of scientific literature in the field of warnings design and effectiveness has grown and developed as demonstrated by this Handbook, so apparently has the role of warnings issues in product liability and personal injury litigation. As these issues continue to be addressed in litigation, there will be a continuing need for capable experts in the subject matter. The role of the warning expert can be challenging, but it is also important. And it is important that it be done well.

In this chapter, some of the techniques, procedures and challenges associated with the role of warning expert are explored. Most of the topics presented could be addressed in much greater depth than the scope of this chapter permits. It is increasingly common for each side of a warning's case to have a warning expert and for these experts to disagree. Such circumstances are to be expected and are not a reason to abandon the role of warning expert in litigation. Engineers, physicians, toxicologists, and economists also disagree and work on both sides of cases. The important point is that the people who serve as warning experts be qualified and that they do their best to provide high-quality guidance to the judicial system.

References

- American Law Institute. (1965). *Restatement (Second) of Torts* §§ 388, 395, 402A. Author.
- American Law Institute. (1998). *Restatement (Third) of Torts: Products Liability*. Author.
- American National Standards Institute. (2002). *Product Safety Signs and Labels*. Rosslyn, VA: National Electrical Manufacturers Association.
- Edworthy, J., & Adams, A. (1996). *Warning design: A research prospective*. London: Taylor & Francis.
- Frantz, J. P., Miller, J. M., & Main, B. W. (1993). The ability of two lay groups to judge product warning effectiveness. *Proceeding of the Human Factors and Ergonomics Society*, 37, 989-993.
- Madden, M. S. (1999). The law relating to warnings. In *warnings and risk communications* (pp. 315-330). London: Taylor & Francis.
- Miller, J. M., & Lehto, M. R. (2001). *Warnings & safety instructions: Annotated and indexed*. Ann Arbor, MI: Fuller Technical.
- Parsons, S. O., Seminara J. L., & Wogalter, M. S. (1999, January). A summary of warnings research. *Ergonomics in Design*, pp. 21-31.
- Rogers, W. A., Lamson, N., & Rousseau, G. K. (2000). Warning research: An integrative perspective. *Human Factors*, 42, 102-139.
- Senders, J. W. (1994). Warning assessment from the scientist's view. *Ergonomics in Design*, 2, 6-7.
- Slater, A. D. (1993). Federal standards for admissibility of expert testimony and the applicability of privileges to communications with experts and materials generated by experts. In *The role of expert witnesses in the 1990's and beyond* (pp. 16-51). Falmouth, MA: Seak.
- Ursic, M. (1984). The impact of safety warnings on perception and memory. *Human Factors*, 26, 677-682.
- Wogalter, M. S., DeJoy, D. M., & Laughery, K. R. (Eds.). (1999). *Warnings and risk communication*. London: Taylor & Francis.