

CHAPTER 55

Pharmaceutical Product Liability

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Product liability is one of the fastest growing and most economically significant applications of tort law. Product liability actions against pharmaceutical companies are among the most widely publicized classes of suits in the United States and Europe, prompting pharmaceutical companies to lobby vigorously for tort reform. (Nace *et al.*, 1997). The liability burden on pharmaceutical companies has been described as grossly disproportionate to their sales in comparison with other manufacturing industries (The Progress & Freedom Foundation, 1996, p. 101). Direct comparisons, however, are difficult because the market for pharmaceuticals is unlike the usual market situation, where con-

sumers have options among competing products on the basis of quality and price. In the case of pharmaceuticals, a physician generally selects the specific drug, and the consumer bears only a fraction of the cost burden, because health insurance defrays a significant part of the cost (Mossialos *et al.*, 1994). The recent increase in product liability actions against pharmaceutical companies as well as healthcare professionals has also been described as having an impact on the practice of medicine itself (Pendell, 2003). This chapter will introduce the basic concepts of pharmaceutical product liability law, review recent developments and emerging trends among pharmaceutical companies and product liability lawyers, and discuss how they might impact the industry as a whole in the future.

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Principles of product liability law

In general terms, “product liability” refers to the liability of a seller of a product which, because of a defect, causes damage to its purchaser, user, or sometimes a bystander. Responsibility for a product defect that causes damage lies with all sellers of the product who are in the distribution chain including the product manufacturer, manufacturers of component parts, wholesalers, and retail stores that sold the product to the consumer. Laws in most countries and jurisdictions require that a product meet the ordinary expectations of the ordinary consumer. When a product has an unexpected defect or danger, that product cannot be said to meet the expectations of the consumer. Product liability law is primarily based on case law that varies from

jurisdiction to jurisdiction. In the US, there is no Federal product liability law *per se*. Typically, product liability claims are based on state laws and relevant commercial statutes, modeled on the Uniform Commercial Code (UCC), that pertain to warranty rules that govern manufacturers and their products. Early cases held that, for product liability to arise, at some point, the product must have been sold in the marketplace through a contractual relationship, known as “privity of contract,” between the person injured and the supplier of the product. However, in most countries and jurisdictions today, the privity requirement no longer exists, and the injured person does not have to be the purchaser of the product in order to recover. Any person who foreseeably could have been injured by a defective product can recover in tort for his or her injuries, as long as the product was in the stream of commerce.

Product liability law, generally and as it pertains to pharmaceutical companies, is broadly based on legal principles involving contract law, tort law, and relevant statutory provisions of the country or jurisdiction where the action is brought (Jones, 1993). However, there are three fundamental legal principles under which a seller of a product can be liable for damages incurred from the use of that product: strict liability, warranty, and negligence.

Strict liability

Strict liability is a principle of both tort law and contract law, which provides that a seller of a product is liable without fault for damage caused by that product if it is sold in a defective condition that is unreasonably dangerous to the user or consumer. Thus, strict liability would mean that pharmaceutical companies would have to pay damages in some cases, even when they had impeccably researched their drugs (Hunter, 1993). Strict product liability similarly applies not only to the product’s manufacturer but also to its retailer and to any other party in the distribution chain. However, a product would not give rise to strict liability if it is found to be “unavoidably unsafe.” This has direct relevance to pharmaceutical companies, in that most courts have agreed that a product will not give rise to strict liability if it is unavoidably unsafe, as described by labeled descriptions of adverse events, and if

its benefits can outweigh its dangers. Furthermore, most courts have also held that the existence of “unreasonable danger” and “defectiveness” should be based on the state of scientific knowledge and technology at the time when the product is sold and not on the date when the resulting product liability case comes to trial. The courts have taken a similar approach to “failure to warn” claims in that if the state of scientific knowledge and technology at the time of manufacture is such that the defect or danger is neither known nor knowable, not only is the manufacturer protected from ordinary strict liability, but also the manufacturer is relieved of its duty to warn of the unknowable danger. The manufacturer, however, is held to the standard of an expert in the product in determining what was known or knowable.

Warranty

Warranty is a principle of both tort law and contract law that allows a purchaser of a product to bring a cause of action against the immediate seller of that product if the person can demonstrate that the seller expressly or implicitly made representations about the quality of the product that were ultimately false or misleading, without the need to demonstrate negligence on the part of the seller. Thus, the seller may have reasonably and honestly believed that his or her representations or warranties were true, and could not possibly have discovered the defect in the product, and yet the plaintiff may nonetheless recover. Many countries have enacted statutes that apply to such warranties and resulting product liability actions. For example, in the US, the UCC includes provisions regarding warranties and forms the legal basis for product liability actions brought under the principle of warranty. UCC Section 2-313 provides that an express warranty may be produced by an “affirmation of fact or promise” about a product by a description of that product or by the use of a sample or model. The existence of a warranty as to the quality of a product may also be inferred from the fact that the seller has offered the product for sale. The UCC also imposes several implied warranties as a matter of law. The most important of these is the warranty of merchantability under UCC Section

2-314, which states that the warranty that goods shall be merchantable is implied in a contract for their sale if the seller is a merchant with respect to goods of that kind. Similarly, a retailer who did not manufacture a product is nonetheless held to have impliedly warranted its merchantability by virtue of the fact that he or she has sold it, assuming that the person deals in goods of that kind. In addition, under UCC Section 2-315, a seller of goods may also implicitly warrant that goods are “fit for a particular purpose” if the seller knows that the purchaser wants the goods for a particular purpose, and the purchaser relies on the seller’s judgment to purchase the goods in question.

Negligence

Negligence is a principle of tort law that may be defined as the breach of a duty of care owed by one party, the defendant, to another party, the plaintiff, the breach of which results in damage to the plaintiff. The concept of duty of care serves to define the interests protected by the tort of negligence by determining whether the type of damage suffered by the plaintiff is actionable. The plaintiff must also demonstrate that there is a sufficient causal connection between the defendant’s negligence and the damage incurred. The damage in question may arise through malfeasance (a wrongful or illegal act) or nonfeasance (a wrongful or illegal failure to act) and may consist of personal injury or damage to property, categorized as pure economic loss under civil law. Manufacturers, retailers, bailers (e.g., those who distribute pharmaceutical products on behalf of drug manufacturers), and other suppliers may be liable to plaintiffs under the principles of negligence if they are found to have breached a duty of care.

Types of product defects

Under strict liability, a plaintiff in a product liability case must prove that the product that caused injury was defective, and that the defect made the product unreasonably dangerous. There are three types of defects that might cause injury and give rise to

manufacturer or supplier liability: manufacturing defects, design defects, and failure-to-warn defects.

Manufacturing defects

Manufacturing defects involve a product where the particular item that causes damage to the plaintiff is different from the design intended to be manufactured by the defendant, and the difference is attributable to the manufacturing process for the item in question. However, very few pharmaceutical product liability claims allege manufacturing defects because quality control standards are closely regulated and have traditionally been extremely high in the pharmaceutical industry (European Federation of Pharmaceutical Industries and Associations, 1999).

Design defects

Design defects involve a product where all similar items manufactured by the defendant are the same, and they all bear a feature whose design is defective and unreasonably dangerous. These design defect claims often involve additional allegations of negligence on the part of the defendant even though they may be based on strict liability principles in that the plaintiff often alleges that the manufacturer should have been aware of the safety attributes of its design and, in failing to do so, breached its duty of care.

Failure to warn

Finally, failure-to-warn defects—also known as marketing defects—are flaws in the way a product is marketed, such as improper labeling, insufficient instructions, or inadequate safety warnings. Recently, these type of claims are more commonly referred to as “failure to warn” and simply refer to the legal premise that manufacturers and suppliers of products must give proper warnings of the dangers and risks of their products so that consumers can make informed decisions regarding whether to use them. However, the success of any such claim depends not just on the adequacy of the warning in question, but also on the plaintiff’s own knowledge of the product. A negligent or intentional misrepresentation regarding a product may also give rise to a product liability claim.

Legal defenses in product liability cases

The defenses available to manufacturers in product liability actions vary, depending on the jurisdiction in which the action is filed. However, certain legal principles commonly constitute a full or partial defense to product liability actions. These broad legal principles, among others, are: disclaimers, contributory negligence, and learned intermediaries.

Disclaimers

With regard to product liability actions brought under the principles of warranty, a defendant may assert a defense based on a disclaimer from a warranty associated with the purchase or use of the product in question. For example, in the US under UCC Section 2-316(2), a seller of a product may make a written disclaimer of the warranty of merchantability if it is conspicuous. However, it should also be noted that the Magnuson–Moss Federal Trade Commission Improvement Act of 1974, 15 USC Section 2301, *et seq.*, provides that, if a written warranty is given to a consumer, there cannot be any disclaimer of any implied warranty.

Contributory negligence

A defense of contributory negligence asserts that a plaintiff who is him- or herself negligent in that he or she does not take reasonable care to protect him- or herself from damage, and whose negligence contributes proximately to his or her injuries, is either entitled only to reduced recovery from his or her damages, or in some countries and states, is totally barred from recovery (Heuston and Buckley, 1992). In these cases, the plaintiff is held to the same standard of care as the defendant, which is that of a reasonable party similarly situated.

Although a plaintiff's contributory negligence will be a defense in product liability actions brought under the principles of negligence, some courts have agreed that in most actions brought under the principles of warranty or strict liability, contributory negligence may not be a viable defense—but this varies from jurisdiction to jurisdiction. For

example, if a plaintiff's contributory negligence lies in a failure to inspect the product or a failure to become aware of the danger from that product, virtually all courts agree that this is not a defense. However, if the plaintiff learns of the risk and voluntarily assumes the risk in purchasing and/or using the product, contributory negligence may be a defense to strict liability. Similarly, if the plaintiff's contributory negligence consists of his or her abnormal use or misuse of the product in question, this may be a defense to strict liability, depending on the degree of foreseeability of the abnormal use or misuse.

Learned intermediaries

Pharmaceutical manufacturers often rely on the “learned intermediary” defense, which asserts that if the manufacturer properly warned or instructed a physician (the “learned intermediary”) who then prescribes the drug to a plaintiff, liability may not be imposed. However, liability may be imposed in circumstances such as “direct-to-consumer” advertising, which may be held to have diluted other warnings made by the manufacturer.

It should be noted that until 2009, regulatory compliance or “preemption” was frequently used by pharmaceutical manufacturers as a defense in product liability cases. In the US, the general rule had originally been that, unless Congress intended to preempt the states from requiring stricter or different warnings, the defendant's compliance with regulatory requirements did not preclude liability (McCartney and Rheingold, 1996). However, several states, such as New Jersey, enacted statutes that allowed regulatory compliance as a valid defense in pharmaceutical product liability actions (N.J. Code Section 2A:58C-4). A handful of other states also adopted modified versions of a regulatory compliance defense which, for example, barred punitive damages for drugs approved by the FDA or created a rebuttable presumption of nonliability in light of FDA approval (Lifton and Bufano, 2004). However, in a landmark decision handed down by the US Supreme Court in 2009, the Court held that the labeling approval by the FDA may not preempt state laws or shield companies from legal

damages as part of liability claims (*Wyeth v. Levine*, 129 S. Ct. 1187 (2009)).

International issues

In recent years, pharmaceutical companies have faced increased litigation from overseas claimants because of the international differences in product liability laws that make them easier targets in the US. Such differences include the absence of discovery mechanisms, jury trials, legal contingency fees, and variations in the learned intermediary doctrines in many foreign jurisdictions. Lawsuits are also being filed in the US because foreign parties claim they cannot get justice or adequate compensation in their own country—for example, they may claim that they do not have a claim under their own nation's laws or that they are unable to have their case heard for many years. The concept of *forum non conveniens* developed in the US (and other so-called “common law” jurisdictions such as Australia and New Zealand¹) as a device that permitted US courts to return cases to foreign jurisdictions when litigation in the US was determined to be inconvenient or a foreign jurisdiction was deemed to be a more appropriate forum.

The plaintiffs' bar also has become increasingly sophisticated in using global regulatory inconsistencies to their clients' advantage during discovery and at trial. During the course of litigation, pharmaceutical companies are now routinely faced with discovery requests, designed to identify documents and data relating to their dealings with foreign regulatory agencies. Plaintiffs' counsel regularly point to differences in labeling and product design resulting from pharmaceutical companies' compliance with foreign regulations as evidence of “defectiveness” in similar or identical products marketed in the US (Moore and Cullen, 1999). Thus, in overview, the global marketing of pharmaceuticals has had significant product liability impli-

cations resulting from jurisdictional issues, maintaining records for different regulatory agencies, and compliance or noncompliance with regulatory requirements in different marketing venues.

Landmark cases

In contrast to the ostensibly uniform framework of product liability law that defines drug-induced tort, the history of high-profile pharmaceutical injury litigation shows that the practical prosecution of drug-related injury claims is broadly varied as it reflects the many possible types of drug-induced injuries. Although the breadth of potential harms from the use of pharmaceuticals is, in theory, limitless, adverse drug effects generally fall into one of seven groups (Dukes, Mildred, and Swartz, 1998):

- toxic effects, where the drug causes an undesired pharmacologic effect on the body;
- allergic effects, where the drug has an unpredictably severe or harmful effect on hypersensitive individuals;
- dependence, where users of the drug develop a psychological or physiologic need for the drug;
- indirect injury, where the drug interferes with mental or physical functions, resulting in collateral injuries;
- interactions, where ingesting the drug in the context of other drugs or foods causes injury;
- inefficacy, where the drug fails to perform its intended function;
- socially adverse effects, where a drug (usually an antibiotic) is overused by a population of patients, resulting in the rise and spread of resistant microorganisms.

The following discussion of two high-profile product liability cases shows how plaintiffs, corporations, attorneys, and courts have applied product liability jurisprudence to varied types of pharmacological injury and the impact of product liability matters on the laws and regulations governing pharmaceutical products.

Thalidomide

The drug thalidomide caused one of the most vivid and widely publicized tragedies in the history of

¹ The concept of *forum non conveniens* is generally not recognized in most non-US jurisdictions that are based on “civil law”—e.g., many nations in the European Union

medicine (Bernstein, 1997).² Thalidomide was first synthesized in West Germany in 1953 by Ciba A.G., but it was initially abandoned after tests in laboratory animals revealed neither a beneficial nor a toxic effect. A few years later, chemists at another West German pharmaceutical company, Chemie Grunenthal A.G., deduced from thalidomide's chemical structure that it might have an anticonvulsant effect, and they experimented with giving thalidomide to epileptics. Ensuing studies revealed thalidomide to be ineffective anticonvulsant, but showed that it acted as a mild hypnotic or sedative. On the basis of these data, Chemie Grunenthal A.G. brought thalidomide to market under the trade name Contergan in October 1957 (Robertson, 1972). Thalidomide was an early success and the drug soon became a favorite sleeping tablet for over-the-counter consumers and in healthcare institutions. Promoted as a safe tranquilizer, suggested uses of thalidomide included mild depression, flu, stomach disorders, menstrual tensio, and even stage fright (Allen, 1997). Also an antiemetic, Contergan was commonly prescribed for the nausea of pregnancy (Sherman and Strauss, 1986; cf. Burley, 1986).

Although thalidomide had shown no toxicity to laboratory animals when tested by Ciba and Chemie Grunenthal A.G., potentially irreversible peripheral polyneuritis was soon identified in patients following long-term use of thalidomide (Crawford, 1994). Other reported toxicity symptoms included severe constipation, dizziness, hang-over, loss of memory, and hypotension (D'Arcy, 1994). Chemie Grunenthal A.G. initially defended thalidomide as a safe product and attributed the reports to overdosage and prolonged use. A pharmacologist at the FDA, Dr Frances Kelsey, saw

reports of these adverse effects and requested more data from the drug's manufacturers to show that it was safe (see D'Arcy, 1994).³ In what has been heralded as "one of the FDA's finest hours" (see D'Arcy, 1994), Dr Kelsey withheld FDA approval of thalidomide—a decision that was subsequently validated as the reports of neurotoxicity were confirmed and even more troubling reports arose concerning thalidomide's adverse effects on fetuses. In 1961, physicians in Germany realized with alarm that the growing number of otherwise rare severe congenital malformations, including phocomelia (defective development of limbs) and amelia (absence of limbs), could be attributed to the use by women of even a single dose of thalidomide during the critical first few weeks of their pregnancy (Wiedemann, 1961). In subsequent years, it became clear that thalidomide was one of the most potent teratogens in the medical pharmacopoeia. Almost 100% of women who took thalidomide during the sensitive period (days 21–36 of gestation) produced malformed infants (D'Arcy, 1994). The spectrum of malformations was also notable for its breadth. In addition to phocomelia and amelia, so-called "thalidomide babies" suffered from spinal cord defects, cleft lip or palate, absent or abnormal external ears, and heart, renal, gastrointestinal, or urogenital malformations (D'Arcy, 1994; see also US HHS, 1997). Before the epidemic ran its course, over 12,000 infants were born with deformities attributable to thalidomide (Flaherty, 1984; Sherman and Strauss, 1986; see also Szeinberg and Sheba, 1968⁴).

Not surprisingly, the thalidomide episode spawned numerous lawsuits based on strict product liability, defective design, negligence, and other theories of liability (Cook, Doyle, and Jabbari, 1991; Dworkin, 1979). Some of these cases settled for substantial sums of money

² Bernstein notes that thalidomide quickly entered the lexicon as a metaphor for poison and evil. "For years I have heard the word Wait!," wrote Martin Luther King Jr in his famous Letter from Birmingham City Jail (1963). "It rings in the ear of every Negro with a piercing familiarity. This 'Wait' has almost always meant 'Never.' It has been a tranquilizing *thalidomide*, relieving the emotional stress for a moment, only to give birth to an ill-formed infant of frustration." (emphasis added)

³ Dr Kelsey was particularly conscious of the potentially harmful effects of drugs on fetuses after working on a malaria project during World War II in which quinine (another teratogen) was studied

⁴ Szeinberg and Sheba (1968) estimates that 10,000 deformed babies were born in Germany, 1,000 in Japan, 400 in England, and 280 in Scandinavian countries

(Waterhouse, 1995). However, the true legal legacy of the thalidomide episode was to focus the attention of lawmakers and scientists on the potential risks of all medications. The thalidomide episode is generally credited with promoting the institution of stronger and more effective drug regulations worldwide. In the US, the thalidomide tragedy is credited with helping to win passage of the 1962 Kefauver-Harris Amendment to the Federal Food, Drug, and Cosmetic Act, which introduced or strengthened requirements for drug manufacturers to demonstrate the safety and efficacy of their drugs prior to market approval. The German Pharmaceutical Law of 1976 and the Japanese Drug Side-Effect Injury Relief Fund Act of 1979 were also indirect products of the thalidomide experience (Bernstein, 1997). Drug manufacturers in Sweden adopted voluntary regulations, and drug legislation in Canada was tightened in accordance with the stricter laws and regulations in the US. The experience with thalidomide resulted in a generally safer pharmaceutical market in many parts of the world.

Diethylstilbestrol (DES)

DES is a synthetic analog of estrogen, first manufactured in the United Kingdom in 1937. The inventor's altruistic decision not to patent DES led to the drug's manufacture by more than 300 companies (Ferguson, 1996), a fact that substantially impacted later legal actions. The therapeutic benefits of DES were largely theoretical at the time of its introduction, with few if any rigorous clinical trials performed to evaluate its efficacy. Nevertheless, physicians and industry began to promote the use of DES to prevent miscarriages and generally improve the outcomes of pregnancies. The FDA approved DES in 1947 for the prevention of early miscarriage. Despite early evidence that DES did not prevent miscarriage or other pregnancy complications (Schrager and Potter, 2004), DES came into wide use, due largely to support by physicians and industry, approval by the FDA, and low cost (partly attributable to the competition between many manufacturers). It is estimated that between 3 and 4 million women ingested DES in the US alone, with 20,000 to 100,000 fetuses

exposed to DES *in utero*, each year, for 20 years (Dutton, 1988).

Beginning approximately 15 years after the peak of DES use, doctors found that female children of mothers who had taken DES during their gestation tended to develop preneoplastic vaginal and cervical changes in adolescence or adulthood. An association between *in utero* DES exposure and vaginal clear cell adenocarcinoma was documented (Schrager and Potter, 2004). Male and female DES children also showed an increased incidence of fertility disturbances after puberty (Dukes, Mildred, and Swartz, 1998). In 1984, the World Health Organization estimated that hundreds of thousands of pregnancies, especially in the US and The Netherlands, were potentially affected (Buitendijk, 1984).

Since the early 1980s, thousands of pharmaceutical product liability cases have been brought against the manufacturers of DES. These plaintiffs had a stronger strict liability design defect claim than those for thalidomide because DES, marketed to prevent miscarriages, had no demonstrable clinical benefit. In *Barker v. Lull Engineering Co.* (1978), a California court adopted a "risk-benefit" test to assess whether a product was defective. This test for defectiveness required a court to weigh a drug's benefits against its potential risks, in light of evidence that the drug could have been designed more safely, or that other drugs were available that confer similar benefits with less risk. A drug with little or no demonstrable therapeutic benefit, like DES, was far more likely to be found defective in design under the *Barker* risk-benefit test.

An interesting aspect of the DES story has been the alleged impact of DES on multiple generations with a single exposure. Unlike thalidomide's teratogenicity, which affects only fetuses exposed during gestation, DES is thought by some potentially to affect three generations—the woman who originally took the DES, the daughter of that woman, and the granddaughter of that woman. Women who took DES while they were pregnant have a slightly elevated risk of developing breast cancer, which is more likely to occur after the age of 50 (Schrager and Potter, 2004). Their daughters who were exposed *in utero* have an increased risk

of vaginal and cervical clear cell adenocarcinoma, which is more likely to develop between 17 to 22 years of age (Schrager and Potter, 2004). It has been asserted that the grandchildren of women who took DES are also at increased risk for certain conditions. In one case, *Enright v. Eli Lilly & Co.* (1991), the plaintiff claimed that her cerebral palsy resulted from deformities in the reproductive system of her mother, which had been caused by her grandmother's ingestion of DES during pregnancy. Stressing the need to limit manufacturers' exposure to tort liability, the New York State Court of Appeals decided that a cause of action could be brought only by those who ingested the drug or were exposed to it *in utero* (Brahams, 1991). Both the delayed manifestation of injuries possibly associated with DES exposure and the possible multigenerational effects have important legal implications, including statutes of limitation and other restrictions on liability.

Although the two-generation limitation excluded a few plaintiffs outright, a more important hurdle facing DES plaintiffs was establishing specific causation to prove that one specific manufacturer of DES produced the pills that were ingested by their mothers. This burden of proof was challenging to meet, in part because of the two- to three-decade delay between ingestion of DES by the mother and the manifestation of injury in the exposed child. The passage of time and the loss of medical and pharmacy records made it difficult in most cases for plaintiffs to determine the specific manufacturer that made their mothers' DES. Also, anecdotal evidence suggested that pharmacists commonly dispensed DES from different manufacturers fungibly (Schreiber and Hirsh, 1985).

A lasting legal legacy of the thousands of DES cases litigated in the US are novel approaches to causation that allow plaintiffs who cannot prove specific causation by a specific manufacturer to hold one or more of the manufacturers of DES liable for their injuries. Among these theories, the four most commonly and successfully invoked are the following:

- *alternative liability*, where a plaintiff sues all the manufacturers of DES and the court places the

burden on the defendants to prove that they were not the manufacturer of the allegedly injuring drug;⁵

- *concerted action*, where the plaintiff shows express or implicit agreement among defendants to commit the tort, in which case all defendants are equally liable;⁶

- *market share liability*, where the plaintiff is required only to show that the defendants benefited from a substantial share of the drug market, to shift the burden to the defendants to show that they did not produce the particular injuring drug;⁷

- *Hymowitz theory*, where the court focuses on the assertion that all manufacturers of an injurious product increase the risk to the general public, and thus holds each defendant liable in proportion to its share of the drug's nationwide market, regardless of whether the defendant could prove that it did not make the actual preparation that injured the plaintiff.⁸

Recent cases and developments

Since the thalidomide and DES cases, a growing number of drugs have been the subject of product liability actions including Accutane (acne), Baycol (high cholesterol), Bextra (pain and inflammation), Crestor (high cholesterol), Celebrex (pain and inflammation), Fen-Phen (weight loss),

⁵ Alternative liability originated in the landmark case *Summers v. Tice*, 1948, where the plaintiff was shot in the eye by one of two negligent hunters who had shot in his direction. The doctrine is now memorialized in the Second Restatement of Torts: "Where the conduct of two or more actors is tortious, and it is proved that harm has been caused to the plaintiff by only one of them, but there is uncertainty as to which one has caused it, the burden is upon each actor to prove that he has not caused the harm" (Second Restatement of Torts § 433 B (3))

⁶ See, e.g., *Bichler v. Eli Lilly & Co.*, 1982; concert of action found among DES defendants who pooled information on the basic chemical formula and model package inserts

⁷ See *Sindell v. Abbott Laboratories*, 1980; market share liability introduced by the California court specifically in response to the difficulties in proving causation faced by DES plaintiffs

⁸ See *Hymowitz v. Eli Lilly & Co.*, 1989

Rezulin (Diabetes), Propulsid (acid reflux), Trovan (bacterial infections), Vioxx (pain and inflammation), and Zyprexa (schizophrenia). Among these, the cases that have developed most quickly and arguably have the greatest potential size, scope and visibility involve Baycol, Fen-Phen, and Vioxx.

In addition, the US Supreme Court addressed the issue of Federal preemption in pharmaceutical liability suits in the landmark *Wyeth v. Levine* case. These matters are briefly discussed below. It is important to note that litigation involving many of these drugs is ongoing, and new developments can occur on an ongoing basis, which may materially alter the landscape of other pharmaceutical product liability actions.

Baycol (cerivastatin)

Baycol (cerivastatin) was developed by Bayer A.G. and approved by the FDA for use in the US in 1997. It is a member of a class of cholesterol-lowering drugs that are commonly referred to as “statins.” Statins such as Baycol lower cholesterol levels by blocking a specific enzyme in the body that is involved in the synthesis of cholesterol. Although all statins have been associated with very rare reports of rhabdomyolysis, a muscle disorder, cases of fatal rhabdomyolysis in association with the use of Baycol have been reported significantly more frequently than for other approved statins. On August 8, 2001, Bayer announced that it was voluntarily withdrawing Baycol from the US market because of reports of sometimes fatal rhabdomyolysis.

Since Baycol’s withdrawal, lawsuits comprising over 9,000 cases have been filed against Bayer.⁹ The actions in the US, which included many class action suits, have been based primarily on theories of product liability, consumer fraud, medical monitoring, predatory pricing, and unjust enrichment. These lawsuits sought remedies including compensatory and punitive damages, disgorgement

of funds received from the marketing and sales of Baycol, and the establishment of a trust fund to finance the medical monitoring of former Baycol users.

Since there were an extremely large number of Federal cases filed, the cases were considered for transfer to a single Federal court through a process known as “multidistrict litigation” or MDL. Transfer of cases to a single Federal court through the MDL process is intended to make pretrial proceedings (e.g., the discovery process) more efficient. The transfer of cases usually requires a finding that the cases share common questions of fact. The Federal Judicial Panel on Multidistrict Litigation determined that many of these cases did indeed involve common questions of fact and virtually all cases filed in Federal court were transferred to the US Federal court in the District of Minnesota in December 2001. That federal court then dealt with discovery and other pretrial matters. When cases were ready for trial, they were returned to their “home” Federal court for the actual trial. A number of cases remained in various state courts as well. The vast majority of cases did not go to trial. Many cases were dismissed and many were settled out of court. As of November 2008, the defendants and plaintiffs in the MDL proceedings jointly reported that 3,134 cases had been settled for a total sum of US\$1,168,233,835. As of that time, only about 35 active cases remained and 141 cases had been submitted for mediation.¹⁰ The Baycol matter is a good illustration of how mass pharmaceutical tort litigation is handled in the US, especially when it is impractical to take every case to trial.

Fen-Phen (pondimin/phentermine)

Until the late 1990s, fenfluramine and the other drug that made up the Fen-Phen regimen, phentermine, had been on the market in the US for over 20 years. Fenfluramine is an appetite suppressant that was sold by A.H. Robins Inc., and

⁹ See the US District Court of the District of Minnesota’s website on the Baycol Product Liability Litigation at: <http://www.mnd.uscourts.gov/MDL-Baycol/index.shtml>; accessed August 25, 2009

¹⁰ *In re: Baycol Products Liability Litigation*, case no. 01-md-01431, Transcript of Status Conference on November 12, 2008, available at: <http://www.mnd.uscourts.gov/MDL-Baycol/transcripts/111208bc.PDF>; accessed on August 25, 2009

Wyeth-Ayerst Laboratories Co., divisions of American Home Products Corp. Phentermine is a type of amphetamine that has been sold under many names and made by many companies. Fenfluramine is thought to cause weight loss by increasing the levels of a brain chemical, serotonin, which suppresses appetite. Phentermine, which acts on another brain chemical, dopamine, increases the body's metabolism and is thought to have a role in reducing minor side effects caused by fenfluramine. Both drugs were approved by the FDA as short-term diet aids, but they were never approved for use together as part of a weight reduction regimen.

The Fen-Phen combination regimen started in 1992 after the publication of an article that showed dramatic weight loss when both drugs were taken together. In 1995, the FDA was asked to approve a new diet drug, dexfenfluramine or Redux. Developed by Interneuron Pharmaceuticals Inc., a Massachusetts company, Redux is a purified form of fenfluramine. However, prior reports had linked fenfluramine use with primary pulmonary hypertension (PPH), a rare but potentially fatal cardiopulmonary disease. The FDA finally approved fenfluramine and Redux went on the market in April 1996. In July 1997, the Mayo Clinic released results from a study that found 24 cases of heart valve damage in Fen-Phen users, all of whom were women. The FDA subsequently issued a warning about heart valve problems associated with the use of Redux and Pondimin (another brand of fenfluramine). The FDA warning and the publication of the Mayo Clinic study in the *New England Journal of Medicine*, led to the withdrawal of Pondimin and Redux from the market in September 1997.

Product liability litigation involving American Home Products (now called Wyeth, a part of Pfizer) has continued since then, with Wyeth being named as a defendant in numerous legal actions alleging that the use of Redux and/or Pondimin, independently or in combination with phentermine, caused certain serious conditions, including valvular heart disease and PPH. As large as the Baycol litigation was and is, it is dwarfed by the Fen-Phen litigation. For Fen-Phen litigation alone, Wyeth recorded litigation charges of US\$4.5 billion in 2004, US\$2 billion in 2003 and US\$1.4 billion in 2002. Pay-

ments to the nationwide class action settlement funds, individual settlement payments, legal fees, and other items were US\$850.2 million, US\$434.2 million, and US\$1.307 billion for 2004, 2003, and 2002, respectively. By 2008, the final value of the class action settlement—which did not actually settle all cases—was approximately US\$6.44 billion. Plaintiffs' attorneys from approximately 70 firms who worked on the class action suit were awarded legal fees totaling more than US\$567.67 million for 578,048 hours of work (roughly equivalent to 66 years of round-the-clock work), for an hourly rate of more than US\$982.¹¹ These numbers in the Fen-Phen litigation provide a good example of the financial interests that play an immense role in driving mass pharmaceutical tort litigation.

Vioxx (rofecoxib)

Vioxx (rofecoxib) was developed by Merck & Co. Inc. (Merck) and approved by the FDA in May 1999, for the treatment of osteoarthritis, menstrual pain, and the management of acute pain in adults. Vioxx belongs to a class of non-steroidal anti-inflammatory drugs (NSAIDs) that block the enzyme, cyclooxygenase-2, commonly referred to as "Cox-2". On September 30, 2004, Merck announced that it was voluntarily withdrawing Vioxx from the market worldwide after results from a clinical trial indicated that Vioxx users may have an increased risk of suffering a heart attack, stroke, or other cardiovascular event. The risk-benefit profile of Vioxx and other Cox-2s has been widely debated since then. On February 16–18, 2005, the FDA held a joint meeting of the Arthritis Advisory Committee and the Drug Safety and Risk Management Advisory Committee. The committees discussed the overall benefit to risk considerations (including cardiovascular and gastrointestinal safety concerns) for Cox-2 selective NSAIDs and related agents. On February 18, 2005, the members of the committees were asked to

¹¹ Frankel A. US\$982 an hour for Fen-Phen plaintiffs' lawyers. *American Lawyer*, 2008, available at: <http://www.law.com/jsp/tal/PubArticleTAL.jsp?id=900005508457>; accessed on August 25, 2009

vote on whether the overall risk versus benefit profile for Vioxx supported marketing in the US. The members of the committees voted 17 to 15 in support of the marketing of Vioxx in the US.

The FDA Advisory Committee meeting and vote, of course, had little effect on the filing of litigation. Federal and state product liability lawsuits involving individual claims, as well as several putative class actions, were filed against Merck with respect to Vioxx. As with other mass pharmaceutical tort actions, the cases filed in Federal court were consolidated into a single MDL action—in the US District Court for the Eastern District of Louisiana in February 2005—for more efficient handling of pretrial matters. To date, over 5,000 cases are currently pending before that Federal court as part of the MDL action. Many, if not most, of the cases were to be resolved through the Vioxx Resolution Program announced on November 9, 2007.¹² Under this Resolution Program, Merck was to pay approximately US\$4.85 billion into a settlement fund. This was not a class action settlement. Instead, cases involving claims of myocardial infarction or stroke were to be evaluated on an individual basis.

Multiple cases have gone to trial in Federal and state courts. The experience from those trials permitted the judge handling the MDL action to outline very specifically what plaintiffs were required to show in order to prevail at trial. As in all pharmaceutical product liability suits involving personal injuries, the plaintiffs were required to prove both *general causation* (i.e., that Vioxx can cause the claimed injury) and *specific causation* (i.e., that Vioxx caused the specific injury claimed by the specific plaintiff). As Judge Eldon Fallon put it:

In order to prevail, the plaintiff must show that Vioxx was problematic; that Merck knew at some time that it was problematic and continued either manufacturing or selling the drug and not alerting doctors to this. That's general causation. If that is successfully proved by the plaintiff, then the plaintiff

must prove special [i.e., specific] causation; namely, that they took Vioxx and received an injury as a result of Vioxx and didn't know of the risks while they were taking Vioxx.¹³

As seen in this quote, a plaintiff must always prove general causation first and must then prove specific causation. It is not possible to prove specific causation without proving general causation first.

An interesting corollary to this matter was the attention that the Vioxx litigation drew to all drugs in its class (the Cox-2 inhibitors). When the adverse events for Vioxx were reported, the FDA began examining data for all Cox-2 inhibitors and the even broader class of drugs known as NSAIDs to which Cox-2 inhibitors belong. Ultimately, the FDA required manufacturers of other Cox-2 inhibitors (e.g., Bextra and Celebrex) to include boxed warnings (aka “black box warnings”) highlighting the increased risk of cardiovascular adverse events. NSAID manufacturers were asked to including more specific information regarding the potential cardiovascular and gastrointestinal risks of their products.¹⁴ The Vioxx litigation shows how mass tort litigation for one member of a class or family of drugs can have a substantial impact on related products.

Federal preemption (Phenergan and *Wyeth v. Levine*)

In light of the enormous expense of litigating matters such as those involving Baycol, Fen-phen, and Vioxx, pharmaceutical companies and their attorneys explored ways to avoid altogether certain types of product liability claims. One approach that had gained momentum in recent years was to argue Federal preemption of failure-to-warn claims. The basic idea is straightforward. It was argued that

¹² *In re: Vioxx Products Liability Litigation*, MDL Docket No. 1657, Joint Report No. 49 of Plaintiffs' and Defendants' Liaison Counsel, available at: <http://vioxx.laed.uscourts.gov/Reports/JointReport49.pdf>; accessed on August 25, 2009

¹³ *In re: Vioxx Products Liability Litigation*, MDL Docket No. 1657, Transcript of October 21, 2008 Video Conference Before the Honorable Eldon E. Fallon, United States District Judge, available at: <http://vioxx.laed.uscourts.gov/Transcripts/October%2021%20Transcript.pdf>; accessed August 25, 2009

¹⁴ See <http://www.fda.gov/Drugs/DrugSafety/Postmarket-DrugSafetyInformationforPatientsandProviders/UCM103420>; accessed on August 25, 2009

since the FDA's approval was required for all pharmaceutical labeling, state laws and state tort actions could not penalize pharmaceutical marketers for claimed deficiencies in that labeling. This argument has its roots in the Supremacy Clause of the US Constitution (Article VI, paragraph 2), which established Federal laws as the "supreme Law of the Land." This argument for Federal preemption of failure-to-warn claims had a mixed reception in federal district courts around the country and was ripe for resolution by the US Supreme Court.

In pushing for Federal preemption, the pharmaceutical industry was hoping to replicate the success of the medical device industry in *Riegel v. Medtronic, Inc.* (128 S. Ct. 999 (2008)), where the US Supreme Court had granted medical device manufacturers some limited Federal protection from certain product liability claims based on state tort law. However, the Federal preemption issue considered in *Riegel* differed in a fundamentally important way. In *Riegel*, there was an argument made for *express* Federal preemption of certain state tort claims based on a provision of a Federal statute, the Medical Device Amendments of 1976, which prohibits states from establishing "any requirement . . . which is different from, or in addition to, any [Federal] requirement" and "which relates to the safety or effectiveness of the device."¹⁵ The Supreme Court in *Riegel* interpreted this provision as an explicit expression of Congress's intent to preempt state law for certain safety-related requirements for medical devices. In contrast, there was no equivalent Federal statute extending such protection for pharmaceutical manufacturers. What the

pharmaceutical industry was advocating was an *implied* Federal preemption of state tort claims in situations where it was arguably impossible to comply with both Federal law (i.e., FDA mandates) and state law.

The US Supreme Court finally took up the issue in 2008 by hearing arguments in *Wyeth v. Levine* (129 S. Ct. 1187 (2009)). *Wyeth v. Levine* involved the drug Phenergan (promethazine hydrochloride), which is used to treat nausea. Phenergan can be administered either intramuscularly or intravenously. If the IV route is used, the drug may be given rapidly by the IV-push method or more slowly through an IV-drip. Phenergan is a "corrosive" drug that can cause gangrene if it enters a patient's artery, an event that is more likely to occur with the rapid IV-push method. The Plaintiff's injury resulted from an IV-push injection of Phenergan. The injected Phenergan entered her artery (due to the negligence of the physician assistant performing the injection) and Ms Levine eventually developed gangrene, requiring amputation of her right hand and forearm. This was a particularly devastating loss for Ms Levine because she was a professional musician. Ms Levine filed suit against Wyeth, basing her claims on Vermont state common-law negligence and strict liability tort theories.

In the Vermont state trial court, Ms Levine argued that Wyeth's labeling for Phenergan was defective because it failed to instruct clinicians to use the safer IV-drip method instead of the higher-risk IV push technique. She also alleged that Phenergan was not reasonably safe for intravenous administration because the foreseeable risks of gangrene and loss of limb are too great in relation to the drug's therapeutic benefits. Wyeth filed a motion for summary judgment, arguing that Ms Levine's failure-to-warn claims were preempted by Federal law. The trial court rejected Wyeth's preemption argument, finding no evidence that Wyeth had "earnestly attempted" to strengthen the intravenous injection warning and finding no evidence that the FDA had "specifically disallowed" stronger language in the Phenergan labeling concerning intra-articular injections. The trial court found no evidence that the FDA had established

¹⁵ 21 U.S.C. § 360k(a). The provision reads: "Except as provided in subsection (b) of this section, no State or political subdivision of a State may establish or continue in effect with respect to a device intended for human use any requirement—(1) which is different from, or in addition to, any requirement applicable under this chapter to the device, and (2) which relates to the safety or effectiveness of the device or to any other matter included in a requirement applicable to the device under this chapter"

a “ceiling” on the warnings that Wyeth could put into its labeling. In its instructions to the jury, the trial judge stated that compliance with FDA requirements did not establish that warnings in the Phenergan label were adequate. The trial judge also informed the jury that FDA regulations permit a drug manufacturer to change a product label to add or strengthen a warning without prior FDA approval so long as it later submits the revised warning for review and approval—a reference to Federal regulations permitting certain immediate labeling changes through a so-called “Changes-Being-Effectuated” (or “CBE”) supplement.¹⁶ The jury found Wyeth to be negligent and that Phenergan was a defective product because of inadequate warnings and instructions in the Phenergan label. The Vermont Supreme Court eventually affirmed the jury’s decision and the US Supreme Court agreed to hear the appeal.

At the Supreme Court, Wyeth made two distinct preemption arguments. First, Wyeth argued that Ms Levine’s state law claims were preempted because it was impossible to comply with both the state-law duties underlying her claims and the Federal labeling duties with which Wyeth was obligated to comply. The Supreme Court rejected this argument by noting that Wyeth could strengthen the warnings and instructions in the Phenergan label without prior FDA approval through a CBE supplement. The Court went further and asserted that it was always the pharmaceutical company, and not the FDA, who “bears responsibility for the content of its label at all times.” The Supreme Court concluded that Wyeth had failed to demonstrate that it was “impossible” to comply with both Federal and state requirements.

Wyeth also argued the Ms Levine’s state law claims were preempted because requiring Wyeth to comply with a state-law duty would interfere with “Congress’s purpose to entrust an expert [Federal] agency [i.e., the FDA] to make drug labeling decisions.” The Supreme Court also rejected this argument. The Court noted that Congress has never provided for a Federal remedy in the

Food, Drug, and Cosmetic Act for consumers who were harmed by unsafe or ineffective drugs. The Court also noted that Congress had not enacted a preemption provision like the one that protected medical device manufacturers for pharmaceutical products. In the Court’s view, Congress did not intend FDA oversight to be the exclusive means for ensuring drug safety and effectiveness. The Court also rejected Wyeth’s reliance on a preamble to a 2006 FDA regulation that governed the content and format of prescription drug labels. In that preamble, the FDA declared that the Food, Drug, and Cosmetic Act establishes both a “floor” and “ceiling” for drug regulation and that FDA approval of a label “preempts conflicting or contrary State law.”¹⁷ The Court determined that this statement from the FDA did not merit deference from the Court because it had been finalized without notice or opportunity for comment, was contrary to the apparent purposes of Congress, and reversed the FDA’s own long-standing views regarding Federal preemption. The Supreme Court affirmed the Vermont Supreme Court’s ruling in favor of Ms Levine.

In summary, it appears that Federal preemption of state tort law claims against pharmaceutical manufacturers—absent a specific warning submitted to the FDA that was rejected—is unlikely to be a viable option following the *Wyeth v. Levine* decision. The Supreme Court has firmly placed the ultimate responsibility for the content of pharmaceutical labels in the hands of the manufacturers, and it is now the responsibility of manufacturers to ensure that their drug labels comply with FDA regulations as well as the requirements of state law.

Conclusions

This chapter has provided a brief overview of the doctrinal framework of products liability law that is applied in pharmaceutical injury cases. Though a full explication of the theories, definitions and defenses involved with products liability law is quite complex, this chapter summarizes these

¹⁶ See 21 C.F.R. § 314.70(c)(6)(iii)

¹⁷ 71 Fed. Reg. 3922, 2006

elements as they most specifically relate to pharmaceuticals. Although the drug industry is heavily regulated in the US by the FDA and abroad by analogous agencies, products liability tort in the forms discussed here constitutes an increasingly prominent parallel regulatory means by which defective products can be removed from the market and negligent manufacturers can be censured. Despite the increase in products liability litigation, plaintiffs such as those who brought suits in the thalidomide and DES litigations frequently face unpredictable and difficult hurdles to recovery under existing legal theories. This makes the area of pharmaceutical products liability an especially productive area for new theories of liability and for defense from liability. Ultimately, it is the responsibility of courts to approve or disapprove of these novel theories and to strike the right balance between deterring irresponsible drug manufacturers and encouraging beneficial drug development.

References

- Allen W. The return of thalidomide: are we ready to forget images like this and give the drug another chance? *St. Louis Post-Dispatch*: 28 September 1997; 01B.
- Allen D, Bourne C, Holyoak J (eds) *Accident Compensation after Pearson*. Sweet & Maxwell: London, UK, 1979, Chapter 3, p. 161
- Barker v. Lull Engineering*. 20 Cal. 3d 413, 573 p. 2d 443, 143 Cal. Rptr. 225, 1978.
- Bernstein S. Formed by thalidomide: mass torts as a false cure for toxic exposure. *Colum L Rev* 1997; **97**:2153.
- Bichler v. Ru Lilly & Co*. 79 App. Div. 2d 317, 436 N.Y.S. 2d 625 (App. Div. 1981); 55 N.Y. 2d 571, 450 N.Y.S. 2d 776, 436 N.E. 2d 182, 1982.
- Brahams D. Diethylstilbestrol: [sic] third-generation injury claims. *Medico-Legal J* 1991; **59**:126.
- Buitendijk S. DES—The Time Bomb Drug. In *Report of the 13th European Symposium on Clinical Pharmacological Evaluation in Drug Control*. World Health Organization: Regional Office for Europe, Copenhagen, Denmark, 1984.
- Burley D. The decline and fall of thalidomide. In *Orphan Diseases and Orphan Drugs*, Scheinberg IH, Walshe JM (eds). Manchester University Press, in association with The Fulbright Commission: London, UK, 1986.
- Cook T, Doyle C, Jabbari D. *Pharmaceuticals, Biotechnology and the Law*. Macmillan: Basingstoke, UK, 1991, 364.
- Crawford CL. Use of thalidomide in leprosy. *Adverse Drug React Toxicol Rev* 1994; **13**:177.
- D'Arcy PF. Thalidomide revisited. Thirteen adverse drug reactions. *Toxicol Rev* 1994; **13**:65.
- Dukes G, Mildred M, Swartz B. *Responsibility for Drug-induced Injury: A Reference Book for Health Professions and Manufacturers*. IOS Press: Oxford, UK, 1998.
- Dutton D. *Worse than the Disease: Pitfalls of Medical Progress*. Cambridge University Press: Cambridge, UK, 1988, 87.
- Dworkin G. Pearson: implications for severely handicapped children and products liability. In *Accident Compensation after Pearson*, Allen D, Bourne C, Holyoak J (eds). Sweet & Maxwell: London, UK, 1979.
- Enright v. Eli Lilly & Co*. 77 N.Y. 2d 377, 570 N.E. 2d 198, (1991).
- European Federation of Pharmaceutical Industries and Associations. Green Paper on Liability for Defective Products, 1999.
- Ferguson PR. *Drug Injuries and the Pursuit of Compensation*. Sweet & Maxwell: London, UK, 1996.
- Flaherty, FJ. Last thalidomide suits settle to end legal era. *Natl Law J* 1984; **6**:32.
- Heuston RFV, Buckley RA. *Salmond & Heuston on the Law of Torts*, twentieth edition. Sweet & Maxwell: London, UK, 1992, 310–312.
- Hunter R. Product liability: dangerous to development. *Int Corporate Law* 1993; **27**:27–28.
- Hymowitz v. Eli Lilly & Co*. 73 N.Y. 2d 487, 539 N.E. 2d 1069, 541 N.Y.S. 2d 941, 1989.
- Jones MA. *Textbook on Torts*, fourth edition. Blackstone: London, UK, 1993, 302–213.
- Lifton DE, Bufano MM. A call for continued state law tort reform. *Pharmaceutical & Medical Device Law Bulletin* 2004; **4**(3).
- McCartney TE, Rheingold PD. From prescription to over-the-counter: watered-down warnings. *Trial* 1996; **32**(34):24.
- Moore TM, Cullen SA. Impact of global pharmaceutical regulations on US products liability exposure. *Defense Counsel J* 1999; **66**(1):101–108.
- Mossialos E, Ranos C, Abel-Smith B. *Cost Containment, Pricing and Financing of Pharmaceuticals in the European Community: The Policy-Maker's View*. LSE Health and Pharmetrica: Athens, 1994, 18–19.
- Nace BJ, Robb GC, Rogers JS, et al. Products liability: tips and tactics. *Trial* 1997; **33**(11):38.
- Pendell J. *The Adverse Side Effects of Pharmaceutical Litigation*. AEI-Brookings Joint Center for Regulatory Studies: Washington, DC, USA, 2003.

- Robertson G. Thalidomide revisited. *Okla St Med Assoc J* 1972; **65**:45.
- Schrager S, Potter BE. Diethylstilbestrol Exposure. *American Family Physician* 2004; **69**(10):2395–2400.
- Schreiber L, Hirsh HL. Theories of liability applied to overcome the unique “identification problem” in DES cases. *Med Law* 1985; **4**:337.
- Sherman M, Strauss S. Thalidomide: a twenty-five year perspective. *Food Drug Cosmetic Law J* 1986; **41**:458–466.
- Sindell v. Abbott Laboratories (1980) 26 Cal. 3d 588, 607 p. 2d 924, 163 Cal. Rptr. 132.
- Szeinberg A, Sheba C. Pharmacogenetics. *Israel J Med Sci* 1968; **4**(3):488.
- The Progress & Freedom Foundation. *Advancing Medical Innovation: Health, Safety and the Role of Government in the 21st Century*. The Progress & Freedom Foundation: Washington, DC, USA, 1996.
- Summers v. Tice*. 33 Cal. 2d 80, 199 P. 2d 1, 1948.
- US HHS. MIH will hold public scientific workshop on thalidomide—potential benefits and risks. August 9 1997, M2 Presswire.
- Waterhouse R. Thalidomide victims given £3.75 million bail-out. *The Independent*, May 4, 1995; 2.
- Wiedemann HR. Hinweis auf eine derzeitige Haufung hypo-und aplastischer Fehlbildungen der Gliedmassen. *Med Welt* 1961; **37**:1864.

Further reading

- Ferguson P. Pharmaceutical products liability: 30 years of law reform? *Juridical Rev* 1992; **3**:226–39.
- DeConinck J (1994) The impact of product liability on the marketing of prescription drugs. *Am Business Rev* **12**(1): 79–85.
- Hamilton v. Fife Health Board* (1993) 4 Med. L.R. 201; 1993 S.L.T. 624; 1993 S.C.L.R. 408.
- Harris Interactive Inc. (1993) Pharmaceutical Liability Study commissioned by the U.S. Chamber Institute for Legal Reform: Washington, DC.
- The Sunday Times* (1973). *The Thalidomide Children and the Law*. Andre Deutsch: London.