

IN THE SUPREME COURT OF TEXAS

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No. 10-0775
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SUSAN ELAINE BOSTIC, INDIVIDUALLY AND AS PERSONAL REPRESENTATIVE OF
THE HEIRS AND ESTATE OF TIMOTHY SHAWN BOSTIC, DECEASED; HELEN
DONNAHOE; AND KYLE ANTHONY BOSTIC, PETITIONERS,

v.

GEORGIA-PACIFIC CORPORATION, RESPONDENT

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ON PETITION FOR REVIEW FROM THE
COURT OF APPEALS FOR THE FIFTH DISTRICT OF TEXAS
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JUSTICE LEHRMANN, joined by JUSTICE BOYD and JUSTICE DEVINE, dissenting.

Throughout history, science has informed our society in important ways. Educated people once believed that the sun orbited the earth, until Nicolaus Copernicus used geometry and astronomy to prove a heliocentric model of the solar system. Doctors once accepted that illness was carried by poisonous vapors, until experiments by Louis Pasteur and others provided support for germ theory. In the same way, the Court's opinion suggests that a person must be exposed to asbestos in large quantities before he develops mesothelioma as a result of his exposure. However, reliable science has now demonstrated that even low levels of exposure to asbestos are sufficient to cause the disease. *Borg-Warner Corp. v. Flores*, 232 S.W.3d 765, 771 (Tex. 2007) (citing 3 DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 28:5 (2007)).

In this case, the Court ignores this advance in scientific research and holds that a jury's verdict must be set aside because the Bostics, the petitioners here, did not present evidence demonstrating a threshold of exposure to asbestos above which a person's risk of developing mesothelioma is doubled. To arrive at this holding, the Court conflates the alternative measure of proof we announced in *Merrell Dow Pharmaceuticals, Inc. v. Havner*, 953 S.W.2d 706, 715 (Tex. 1997), and the understanding of substantial-factor causation we approved in *Flores*, 232 S.W.3d at 770. This combination is both illogical and inequitable. The Bostics showed by direct, scientifically reliable evidence that Timothy Bostic's mesothelioma was caused by exposure to asbestos, and that he was exposed to Georgia-Pacific's asbestos-containing products in substantial quantities. Because the Court holds that this evidence was insufficient to sustain a jury verdict in their favor, I am compelled to respectfully dissent.

I. Facts

In this case we consider the legal sufficiency of the Bostics' evidence on causation. Accordingly, a detailed review of that evidence is warranted. I begin by examining the testimony of the Bostics' expert witnesses on the nature and pathology of mesothelioma. Because Dr. Brody was the first expert to testify, I set forth his testimony more fully and then note the opinions with which other expert witnesses agreed. Next, I proceed to the testimony of Timothy Bostic and his father, Harold, who recounted Timothy's exposure to Georgia-Pacific's products. Finally, I conclude with the expert testimony of Dr. Longo, who determined Timothy's approximate level of asbestos exposure resulting from those products.

A.

Dr. Arnold Brody is an experimental pathologist, which means that he studies diseases and their causes. At trial, Dr. Brody explained that the only known environmental cause of mesothelioma in North America is asbestos. He testified that scientists agree that smoking plays no role. Dr. Richard Lemen, an epidemiologist, concurred with Dr. Brody, adding that the only other known cause is radiation treatment for certain types of cancer. There was no testimony at trial that Timothy was ever treated with radiation.

Dr. Brody went on to explain that, though all people inhale some asbestos, accumulation at such “background” levels “does not produce disease.” However, when a person is exposed to asbestos in amounts above background levels, every exposure “is contributing and making it more likely” that the individual will develop mesothelioma in the future. Dr. Brody explained that, though scientists have successfully established a threshold level below which exposure to asbestos does not cause asbestosis, scientists have been unable to establish a similar threshold with respect to mesothelioma. Dr. Lemen agreed, adding that the reason scientists have not been able to establish that threshold is because it is “very low.” He testified, “we’ve not been able to identify a safe level. It’s not to say there is not a safe level, but one of the reasons we recommend [the] banning of asbestos . . . is because that level is so low that we have not been able to measure [it].”

Dr. Brody also emphasized that individuals have different levels of susceptibility to mesothelioma depending on particular genetic factors, as with all carcinogens. Dr. Lemen elaborated on this point, stating that “[t]here are other factors besides the exposure . . . individual characteristics, genetic make up of individuals, some individuals are more susceptible to developing

disease than others.” Dr. Lemen also noted that epidemiologists have not yet identified the factors that make one person more susceptible than another. Both doctors agreed, however, that children were especially vulnerable to the harmful effects of asbestos.

Using images from an electron microscope, Dr. Brody explained how a person develops mesothelioma, which is a type of cancer that afflicts the pleura, the thin membrane covering the lung. While lung cancer and asbestosis develop inside the lung, mesothelial cells are located outside the lung, which means that the asbestos fibers, once inhaled, must travel through lung tissue in order to cause mesothelioma. The fibers migrate through the lung tissue when they are picked up by macrophages and other types of cells. These cells then make their way into the “fluid flow of the lung,” which includes blood vessels and lymphatic tissue. This pathway carries the asbestos-laden cells out of the lung and into the pleura, where mesothelial cells are located. Asbestos fibers are deposited in the pleura and, once deposited, can cause genetic errors in mesothelial cells. Dr. Brody explained that “if a person has cancer, what you know is that the original cell that got that first error divided and passed on the error to the offspring.” This same cell “a year or two years later” can be “hit again with another fiber,” which causes the cell to “accumulate[] a second error.” Eventually, a cell is exposed to a sufficient number of asbestos fibers and accumulates a sufficient number of genetic errors that cell growth becomes uncontrolled. Considering this process “from a molecular biology point of view,” Dr. Samuel Hammar, another pathologist, confirmed that “a very brief exposure could be a critical exposure in the development of a single cancer cell.”

Dr. Lemen testified that, when a person is exposed to the asbestos fibers of multiple manufacturers, there is no way for a scientist to determine who manufactured the fibers that actually

migrated through the lung and triggered the genetic errors that resulted in mesothelioma. Dr. Hammar agreed. Even if a person is exposed to a large quantity of asbestos from product A, and a small quantity of asbestos from product B, it could be the product B fibers that traveled through the lung and into the pleura, causing the tumor to develop. For that reason, Dr. Lemen opined that it is impossible, in a mesothelioma case, for a scientist to determine which product or manufacturer was responsible on a cellular level for the person's condition.

B.

Trial testimony revealed that Timothy Bostic was exposed to asbestos from more than one manufacturer's products. However, his earliest exposures were to Georgia-Pacific's joint compound. From the time he was five years old, Timothy helped his father, Harold, complete sheetrock work on residential construction projects. Harold explained that, when undertaking these projects, he used Georgia-Pacific joint compound "98 percent of the time." He used Georgia-Pacific's product so frequently because, compared to other brands, it was "simply the best. Just the best." In his view, Georgia-Pacific's joint-compound was "by and far the No. 1." Timothy assisted his father by mixing the dry joint compound, sanding it after he had applied the mixture to drywall, and sweeping up the resulting dust at the end of a day's work. Harold had difficulty recalling exactly how many jobs he and Timothy completed together, but affirmed that Timothy had used Georgia-Pacific joint compound "[m]any, many, many times."

Timothy was also exposed to asbestos from the Knox Glass Company, which employed him for three summers and his father for twenty-two years. When Timothy was younger, he was exposed to fibers that were carried home on his father's clothes. However, Timothy's parents divorced when

he was nine years old, reducing the amount of time he spent at home with Harold. When Timothy was older, he joined his father as a temporary employee of the company, where he worked for three summers. Timothy estimated that, during his time at the company, he worked for approximately three months, total, at the “hot end” of the plant, where asbestos was the most prevalent. The rest of the time, Timothy swept floors, cleaned, packed cartons, inspected bottles, cut asbestos cloth, and performed other tasks.

Finally, Timothy was exposed to asbestos from Palestine Contractors, where he worked for two summers. Timothy was employed as a welder’s helper, and his job was to assist the principal welder with pipeline repairs, a task that included removing gaskets from the pipes. Some of the pipes Timothy encountered had been insulated with asbestos, exposing him to the fibers.

C.

In order to shed light on the approximate quantity of asbestos Timothy inhaled, the plaintiffs called Dr. William Longo. Dr. Longo is a materials scientist, which means that he studies products like ceramics, metals, polymers, and bio-materials to determine their properties and the contexts in which they can be safely and effectively used. At trial, Dr. Longo testified about Timothy’s exposure to Georgia-Pacific’s products, which occurred during the period Timothy assisted his father with residential construction projects. Relying on his own calculations and a study performed by the Environmental Protection Agency, Dr. Longo estimated that a twenty-five pound bag of Georgia-Pacific joint compound contains an average of 11.4 quadrillion asbestos fibers. He also detailed the average concentrations of asbestos released when a person performed tasks related to the use of joint compound. In the experiment he conducted, before performing any sample tasks, Dr. Longo

measured a background level of .0002 asbestos fibers per cubic centimeter in the room that would serve as the site for his study. After dry joint compound was sanded on the walls, the doctor measured an average concentration of 4.97 fibers of asbestos per cubic centimeter of air. When dust generated by the sanding was being cleaned up, Dr. Longo measured an average concentration of 4.7 fibers of asbestos per cubic centimeter of air. Dr. Longo noted that the precise quantity of asbestos released depends on many factors. But, after reviewing Timothy Bostic's work history, Dr. Longo testified that Timothy's exposure to Georgia-Pacific's product was "significant." When asked to clarify, Dr. Longo confirmed that he meant Timothy had been exposed to Georgia-Pacific's asbestos at levels ten to twenty times the average background level. No objection was raised to this testimony at trial.

II. Causation in Toxic Tort Cases

In toxic tort cases, we determine whether a plaintiff has proven causation by addressing three areas of inquiry: (1) General Causation: Does the toxin in question have the capacity to cause the type of injury sustained by the plaintiff? And if so, what dose, or amount of exposure, is required? (2) Specific Causation: Was the plaintiff's injury actually caused by the toxin? (3) Substantial-Factor Causation: When multiple manufacturers contribute to a plaintiff's exposure, was the toxin produced by the defendant a substantial factor in causing the plaintiff's injury? *See* David E. Bernstein, *Getting to Causation in Toxic Tort Cases*, 74 BROOK. L. REV. 51, 52, 55 (2008). In this part, I explain why the alternative standard of proof we announced in *Havner* is only useful for resolving the first two causation questions, and is not useful for resolving the third causation question: whether exposure to one of several defendants' products was a substantial cause of the

plaintiff's harm. I argue that the Court improperly applies *Havner* to answer all three causation questions, and effectively renders *Havner* the exclusive measure of proof in all toxic tort cases. This ignores our affirmation that a plaintiff is always free to prove his case by "direct, scientifically reliable proof of causation." *Havner*, 953 S.W.2d at 715. By disregarding this avenue of proof, the Court turns substantial-factor causation on its head, requiring a toxic tort plaintiff to prove that exposure to a particular defendant's product was, by itself, the cause of his injury. Because this contravenes well-established principles of tort law, I disagree with the Court's opinion.

A. Causation Under *Havner*

Havner was decided in the context of the extensive litigation surrounding the manufacture of Bendectin, a prescription medication that was marketed and sold in the United States and abroad for the treatment of nausea during pregnancy. *Id.* at 708. In that case, we considered whether the plaintiff had adduced evidence sufficient to support a jury verdict that the plaintiff's ingestion of Bendectin had caused her daughter's birth defects. *Id.* In our analysis, we distinguished between general and specific causation. *Id.* at 714. While these labels are flexible, in the context of a toxic tort case they correspond to causation questions (1) and (2). *See id.*; *see also* Bernstein, 74 BROOK. L. REV. at 52. We explained, "[g]eneral causation is whether a substance is capable of causing a particular injury or condition in the general population, while specific causation is whether a substance caused a particular individual's injury." *Havner*, 953 S.W.2d at 714.

As the Court acknowledges today, the principal dispute in *Havner* concerned general causation, that is, whether scientists had determined that a pregnant woman's ingestion of Bendectin could cause birth defects in her child. *Id.* at 708. Our opinion noted that more than thirty studies

had been conducted in an effort to resolve that question, and that experts had not arrived at a consensus. *Id.* However, because we recognized the proof problems associated with toxic torts, we held that “[i]n the absence of direct, scientifically reliable proof of causation, claimants may attempt to demonstrate that exposure to the substance at issue increases the risk of their particular injury.” *Id.* at 715. More specifically, we held that when epidemiological studies show that the risk of injury in a population exposed to a certain dose of a particular toxin is more than double the risk of injury in a population not exposed to the toxin, those studies satisfy the demands of question (1), general causation. *Id.* at 718.

With respect to question (2), specific causation, we held that “a claimant must do more than simply introduce into evidence epidemiological studies that show a substantially elevated risk.” *Id.* at 720. The claimant must also show “that he or she is similar to those in the studies.” *Id.* This demonstration includes among other considerations “proof that the injured person was exposed to the same substance, that the exposure or dose levels were comparable to or greater than those in the studies, that the exposure occurred before the onset of injury, and that the timing of the onset of injury was consistent with that experienced by those in the study.” *Id.*

Havner did not address causation question (3), which considers whether, when multiple sources contribute to a plaintiff’s exposure, the plaintiff’s exposure to the defendant’s product was a substantial factor in causing his injury. This stands to reason because, in that case, the plaintiff had only been exposed to Bendectin from one source. *Id.* at 708. For that reason, proof that the plaintiff’s daughter’s birth defects had been caused by Bendectin was equivalent to proof that her birth defects had been caused by Merrell Dow. The facts did not require us to consider whether the

plaintiff's exposure to the defendant's product was substantial; there were no other sources of exposure. The framework we approved in *Havner*, then, did not contemplate a factual scenario involving multiple manufacturers. As a result, that alternative measure of proof should only be used to resolve causation questions (1) and (2).

B. The Court's Application of *Havner*

Rather than recognize the fundamental differences between *Havner* and the case at bar, the Court applies a version of our *Havner* framework to causation questions (1), (2), and (3). There are three problems with the Court's approach. First, though I agree that in the absence of direct, scientifically reliable proof of causation *Havner* may be applied to resolve causation questions (1) and (2), the Court's opinion today suggests that *Havner* is the exclusive measure of proof with respect to those questions in every toxic tort case. We spoke plainly in *Havner* when we stated that proof of causation by epidemiological studies is an *alternative measure*: a plaintiff may always establish general and specific causation by "direct, scientifically reliable proof" as the Bostics did here. *Id.* at 715. Under the Court's formulation, however, a mesothelioma plaintiff with intermittent exposure is unable to recover even when he has been exposed to the products of only one manufacturer of asbestos. This is because, with respect to plaintiffs with intermittent exposure, the Court has been made aware of no epidemiological study that has established the threshold of exposure over which the risk of developing mesothelioma is doubled.

Second, the Court mistakes testimony that Timothy was exposed to "significant" levels of asbestos as dose-related evidence that might only be relevant to the epidemiological approach outlined in *Havner*. Because the Bostics were unable to produce an epidemiological study

establishing a threshold of exposure over which risk is doubled for individuals who are exposed only intermittently, the Court dismisses as insufficient the evidence of Timothy's exposure to asbestos. However, evidence of the approximate quantum of fibers Timothy ingested is also relevant to plaintiffs who opt to prove causation by direct, scientifically reliable evidence. Imagine a negligence case in which a plaintiff attempts to prove that her son's death was caused by his ingestion of a certain medication. And assume there is no debate among scientists that this medication is fatal to some children when ingested in sufficient doses. If the plaintiff proves general causation with reliable scientific evidence that approximately 400 milligrams of the medication can cause death in children, the plaintiff will be able to prove specific causation in at least two ways. First, she may produce an autopsy report showing that the child's body contained approximately 400 milligrams of the medication at the time of his death. Second, she may demonstrate, perhaps by the testimony of an observer, that the child swallowed approximately 400 milligrams of the medication an hour before he died. In this way, plaintiffs may employ evidence of approximate dose to prove causation by direct, scientifically reliable evidence. In other words, the dose-related evidence proves that the child ingested a sufficient quantity of medication to actually cause his injury, not that the child ingested a sufficient quantity to more than double his risk of dying.

The same is true in this case. Though the Bostics did not produce an autopsy demonstrating the concentration of asbestos fibers in Timothy's lungs, they did produce the testimony of reliable expert witnesses who stated that Timothy's ingestion of asbestos exceeded the level over which that toxic substance can cause mesothelioma. When the Court is confronted with this evidence, it only considers its probative value in relation to the method of proof by epidemiological study we

explained in *Havner*. But the Court also should have considered whether the Bostics proved their case in the traditional way, by “direct, scientifically reliable proof of causation.” *Havner*, 953 S.W.2d at 715. As I demonstrate in the forthcoming sections, the Bostics accomplished this task.

Finally, and most problematically, the Court implements *Havner* to resolve causation question (3). This makes little sense in light of the fact that *Havner* contemplated the degree of increased risk a plaintiff must demonstrate in order to prove that a certain toxin caused her injury in the absence of direct proof. *Id.* But causation question (3) has nothing whatsoever to do with whether a toxin caused a plaintiff’s injury: that inquiry is resolved by causation questions (1) and (2). Rather, causation question (3) contemplates whether the actions of a specific defendant were significant enough to be denominated a substantial factor in bringing about the plaintiff’s disease. *See* Bernstein, 74 BROOK. L. REV. at 55. The first two questions contemplate risk, and resort to *Havner* is appropriate. The third question contemplates substantiality, and *Havner* has no place.

In order to apply that case’s framework to a causation question that was not presented by its facts, the Court must alter the standard in a subtle, but significant way. According to the Court, multiple-exposure toxic tort plaintiffs must now produce “scientifically reliable proof that the plaintiff’s exposure to the *defendant’s* product more than doubled his risk of contracting the disease.” *Ante* at ___ (emphasis added). This is a marked departure from our precedent. The Court now holds that in multiple-exposure cases a plaintiff must isolate his exposure to each defendant’s product and show that exposure to that particular defendant’s product, alone, more than doubled his risk. This transforms a substantial-factor inquiry into a singular-factor inquiry. Rather than require a plaintiff to prove that exposure to each defendant’s product was, relative to his exposure from other sources,

a substantial factor in causing his mesothelioma, the Court now requires the plaintiff to prove that exposure to each defendant's product was sufficient by itself to cause his mesothelioma. It is a foundation of tort law, and of substantial-factor causation in particular, that the actions of multiple defendants may converge to cause a plaintiff's harm. *Atchison v. Tex. & Pac. Ry. Co.*, 186 S.W.2d 228, 231 (Tex. 1945); *Travis v. City of Mesquite*, 830 S.W.2d 94, 98 (Tex. 1992). These causes may be independently sufficient to cause the plaintiff's harm, or independently insufficient to cause the plaintiff's harm. In either instance, our precedent makes plain that a defendant may not escape liability simply because his tortious acts were accompanied by the tortious acts of others. *See, e.g., Atchison*, 186 S.W.2d at 231 (“[I]f an injury occurs from two causes, both due to the negligence of different persons, but together constituting an efficient cause, all persons whose acts contribute to the injury are liable therefor, and the negligence of one does not excuse the negligence of the other.”). In today's case, the Court affirms that substantial-factor causation governs in the context of toxic torts, but, at the same time, requires plaintiffs to isolate the exposure to each defendant's product and prove that exposure to that defendant's product alone was sufficient to cause the plaintiff's disease. I affirm that tort law requires a plaintiff to show that each defendant's product caused his injury, but I do not agree that in a multiple-exposure case a plaintiff must show that a single defendant's product was sufficient by itself to cause his disease. We have never required plaintiffs to meet this arbitrary standard of proof, and we should not do so today.

This extension of *Havner* not only imposes an illogical burden on plaintiffs, but also departs from *Flores*, in which we first approved substantial-factor causation in the multiple-exposure toxic tort context. After today, the law in these types of cases will be that exposure to a single defendant's

product is a “substantial factor” in bringing about a plaintiff’s injury only when that exposure would have been sufficient, by itself, to more than double the plaintiff’s risk of developing a particular disease. But imagine a case in which a plaintiff demonstrates that she has been exposed to a certain toxin, from two different sources, that was certainly the cause of her disease. In other words, the plaintiff proves causation questions (1) and (2), but question (3) remains disputed. Now also imagine that the plaintiff’s expert witness testifies that the plaintiff’s exposure to Company A’s toxin is 75% responsible for her illness, while the plaintiff’s exposure to Company B’s toxin is 25% responsible for her illness. However, on cross-examination, the expert admits that neither exposure, by itself, would more than double the plaintiff’s risk of developing the disease. He also concludes that the plaintiff’s illness is not overdetermined. Under the paradigm the Court urges, a jury would not be entitled to conclude that the plaintiff’s exposure to the toxin produced by Company A was a substantial factor in bringing about her injury, even though the plaintiff’s expert testified that it bore 75% of the responsibility for causing that injury, because the plaintiff’s exposure to that toxin was not sufficient, by itself, to cause the plaintiff’s illness.

This is in stark contrast to the position taken by the Restatement with respect to substantial-factor causation. In explaining its stance, the Restatement envisions a car, owned by Paul, parked at a scenic overlook. RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 27 cmt. f, illus. 3 (2010). It then suggests that Able, Baker, and Charlie negligently lean against the car, which results in the vehicle’s “plummeting down the mountain to its destruction.” *Id.* The commentators add that the force exerted by any one of the three men “would have been insufficient to propel Paul’s car past the curbstone, but the combined force of any two of them is sufficient.” *Id.* Under these

circumstances, the Restatement concludes that each of the three men is a factual cause of the destruction of Paul's car. *Id.* This is true even though the force exerted by each of the men was independently insufficient to destroy the vehicle. *Id.* In today's opinion, the Court moves in the opposite direction by holding that unless a plaintiff's exposure to a particular defendant's product was sufficient by itself to more than double the plaintiff's risk of sustaining an injury, it cannot be a substantial factor in bringing that injury about. This holding does not just offend logic—it offends justice, and it misconstrues *Flores* to do so.

C. The Court's Analysis of the "Any Exposure" Theory

In an attempt to justify its graft of a modified version of the test we developed in *Havner* onto the model of substantial-factor causation *Flores* approved, the Court criticizes what it perceives to be its only alternative. Specifically, the Court enumerates the many shortcomings of the "any exposure" theory of causation, which would permit a plaintiff to prove causation by showing any exposure to a defendant's product. The puzzling aspect of the Court's insistence that we should not adopt this position is that no one urges the Court to do so. At oral argument, the Bostics' attorney stated: "I want to be very clear . . . because Georgia-Pacific has stated repeatedly that we're after the[] any exposure test or [argue that] a single fiber can cause [mesothelioma]. That is not the standard that *Borg-Warner* adopted nor is it the standard we're proposing." So far as I can tell, this misunderstanding has arisen from a misreading of the expert testimony. At trial, several expert witnesses stated that every exposure to asbestos contributes to the causation of mesothelioma insofar as an increased quantity of asbestos concentrated in the lungs heightens a person's risk of developing the disease. Dr. Brody, for example, affirmed that "each and every exposure that a person has to

asbestos contributes to their risk for developing disease.” The doctor then clarified, “What that means is every time a person is exposed . . . some proportion of those fibers will concentrate in the lung and some of those fibers will reach that site where the disease develops. There’s no way to exclude any of them. . . . So everything the person’s exposed to is contributing and making it more likely that the person gets disease.” Other experts provided similar explanations. I agree with the Court that evidence that the plaintiff was exposed to any quantity of the defendant’s asbestos, without more, is insufficient by itself to prove the causal link between a particular defendant’s product and the plaintiff’s injury. But this is not a controversial stance—no one argues that it should.

Still, the Court attempts to bolster its position by arguing that “[i]f any exposure at all were sufficient to cause mesothelioma, everyone would suffer from it or at least be at risk of contracting the disease.” *Ante* at ____ . This statement misunderstands the expert testimony regarding the nature of mesothelioma. As the expert witnesses testified at trial, mesothelioma is caused by asbestos fibers that migrate through the lung and cause genetic errors in mesothelial cells. When the exposure is only at background levels, “we tend to keep up and it’s not a problem. As you start being exposed . . . in other settings where it’s above background, then it’s more difficult.” And even when a person’s exposure exceeds background levels, that exposure is not sufficient to cause the disease without additional misfortune. Fate must frown upon a person in more than one respect before he develops this rare form of cancer. As Dr. Brody explained at trial, a cell must accumulate a sufficient number of genetic errors of precisely the right kind before it becomes cancerous. This accumulation depends on at least two factors that are governed by chance. First, the accumulation of asbestos fibers in the pleura occurs unpredictably, and depends on a macrophage or other cell

picking up the fiber and transporting it into the fluid flow of the lung. Second, this accumulation is subject to a host of individual genetic factors that affect a person's susceptibility to mesothelioma. Because these genetic factors vary from individual to individual, no person's risk of developing mesothelioma is the same as another's. To state that any exposure to asbestos is not sufficient to cause mesothelioma, simply because every person has not developed mesothelioma, is to ignore the testimony of the expert witnesses at trial and to misunderstand fundamentally the nature of the disease.

D. The Concurrence Forecloses Proof by Direct Evidence

Though both the Court and the concurrence disregard scientific consensus that very low levels of exposure to asbestos cause mesothelioma, the concurrence does so in a way that forecloses the avenue of "direct, scientifically reliable proof of causation" that our opinion in *Havner* preserved. 953 S.W.2d at 715. The concurrence states that the Bostics were required to resort to proof by epidemiological studies because they were unable to "tie a specific manufacturer's asbestos fiber to [Timothy's] ailment." *Ante* at _____. This statement is troubling for two reasons. For one, it reveals that the concurrence shares the Court's misunderstanding of the nature of mesothelioma. The expert testimony at trial flatly forecloses the notion that a single asbestos fiber could generate a sufficient number of genetic errors in a cell to cause a person to develop that disease. More problematically, however, the concurrence's statement suggests that a plaintiff must identify the particular fibers that contributed to the development of his mesothelioma should he opt to prove causation by direct, scientifically reliable evidence. This replaces substantial-factor causation with the equivalent of but-for causation, insofar as it requires a plaintiff to identify the fibers without which he would not have

developed mesothelioma. Taken at its word, the concurrence obligates a plaintiff to chart the progress of his disease on a molecular level as it actually occurred. This would amount to conclusive evidence of a defendant's liability. In this manner, the concurrence advocates that the standard of proof be altered.

The concurrence also insists that the Bostics' evidence with respect to Timothy's exposure lacked specificity. As I recount in further detail in the next part, Dr. Longo concluded that Timothy was exposed to chrysotile asbestos in "significant" quantities, that is, at levels ten to twenty times the average background level. In light of the fact that exposure to very low levels of asbestos can cause mesothelioma, that Timothy did develop the disease, and that asbestos is the only known environmental cause of mesothelioma, I fail to see how the evidence the Bostics adduced was inadequate to prove causation by a preponderance of the evidence.¹ For those reasons, I cannot agree with the position the concurrence urges.

III. Application

Having outlined the available avenues by which a plaintiff may prove causation in a toxic tort case, I turn to the facts at hand. I consider whether the Bostics have proven (1) that asbestos has the capacity to cause mesothelioma, and in what quantity, (2) that asbestos caused Timothy's mesothelioma, and (3) that Timothy's exposure to asbestos from Georgia-Pacific's product was a substantial factor in causing his mesothelioma. As I determine whether there is more than a scintilla of evidence to support the jury's findings, I consider "whether the evidence at trial would enable

¹ Whether a plaintiff relies on traditional science or the alternative measure of proof announced in *Havner*, she must prove her case by a preponderance of the evidence. *Havner*, 953 S.W.2d at 728. Obviously, this writing affirms that standard.

reasonable and fair-minded jurors to reach the verdict.” *Whirlpool Corp. v. Camacho*, 298 S.W.3d 631, 638 (Tex. 2009). This examination, which hinges on the reliability of expert testimony, encompasses the entire record. *Id.*

A. General Causation

In toxic tort cases, we have indicated that general causation may be proved in two ways. Under *Havner*, a plaintiff may produce epidemiological studies that establish a threshold of exposure to a toxin over which a person’s risk of sustaining injury is more than doubled. 953 S.W.2d at 715–18. From this evidence, jurors may infer that the toxin probably causes the injury in persons who are exposed to quantities at or above the threshold. *Id.* at 715. However, *Havner* has never been the exclusive measure of proof. *Id.* The plaintiff is always free to establish causation in the traditional way, by “direct, scientifically reliable proof.” *Id.*

In the case at bar, multiple expert witnesses testified that chrysotile asbestos, which is the kind of asbestos Georgia-Pacific included in its products, causes mesothelioma. Dr. Lemen detailed the history of scientific research with respect to this important question, and concluded that the research supported an opinion that mesothelioma is caused by this type of asbestos, even when a person is exposed to only very low doses of the toxin. Dr. Hammar agreed and noted that the National Institute for Occupational Safety and Health, the Environmental Protection Agency, the American Industrial Hygiene Association, the International Agency for Research on Cancer, and the World Health Organization all affirm that chrysotile asbestos causes mesothelioma. As I recounted in Part I, Dr. Brody detailed the biological process by which asbestos fibers migrate through the lung, into the pleura, and cause genetic errors in mesothelial cells. He affirmed that chrysotile fibers were

capable of causing these errors, even in very small quantities. This evidence is compelling. Taken together, it would have enabled reasonable jurors to conclude that asbestos from Georgia-Pacific's products can cause mesothelioma.

B. Specific Causation

As with general causation, there are two methods by which a plaintiff may prove specific causation. Pursuant to *Havner*, a plaintiff may produce evidence that he was exposed to a dose of the toxin that brings him in line with epidemiological studies showing that his risk of injury was more than doubled. 953 S.W.2d at 720. As noted above, “[t]his would include proof that the injured person was exposed to the same substance, that the exposure or dose levels were comparable to or greater than those in the studies, that the exposure occurred before the onset of injury, and that the timing of the onset of injury was consistent with that experienced by those in the study.” *Id.* If other plausible causes of the injury can be negated, the plaintiff must negate those causes with reasonable certainty. *Id.* However, once again, the plaintiff may prove specific causation in the traditional way, by “direct, scientifically reliable proof.” *Id.* at 715.

In the case at bar, Dr. Hammar testified that chrysotile asbestos caused Timothy's mesothelioma. Dr. Hammar based his opinion on his own experience. TEX. R. EVID. 702. He explained that he had “personally diagnosed cases of mesothelioma in individuals with low exposures to chrysotile asbestos.” In considering Timothy's level of exposure, Dr. Hammar reviewed Timothy's pathology materials, medical records, and work history. Dr. Hammar then testified that he had concluded that Timothy was “exposed at high enough levels . . . in doing this drywall work, in mixing[,] sanding[,] and cleaning up of drywall materials” that asbestos exposure

was, to a reasonable medical certainty, the cause of his mesothelioma. Dr. Longo affirmed this conclusion by testifying that Timothy had been exposed to chrysotile asbestos in “significant” quantities, that is, at levels ten to twenty times the average background level. This exposure is greater than the very low levels of exposure sufficient to cause mesothelioma. Dr. Longo based his conclusion on Timothy’s and Harold’s testimony, as well as experiments he had conducted to determine how much asbestos is released during the installation of drywall.

The testimony of Drs. Hammar and Longo was in keeping with the testimony of Dr. Lemen, who explained that individuals who work with joint compound are susceptible to mesothelioma. Dr. Lemen clarified that his conclusion was not limited to those with occupational exposure. He explained that his opinion was based on a study conducted by Dr. Selikoff, who found mesothelioma in drywallers who had “three months or less of exposure to asbestos.” Dr. Lemen also testified that if a patient has a history of asbestos exposure above background levels, and no history of therapeutic radiation, then the “accepted” cause of his mesothelioma is asbestos. *See also* 3 DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 26:24 (2013–14) (“It is generally accepted that any pulmonary asbestos concentration that is substantially above background is an indication of causation.”). Taken together, the testimony of these expert witnesses would have enabled reasonable jurors to conclude that exposure to chrysotile asbestos caused Timothy Bostic’s mesothelioma.

C. Substantial-Factor Causation

This final inquiry required the Bostics to show that Timothy's exposure to Georgia-Pacific's chrysotile asbestos was a substantial factor in causing his mesothelioma. As I explained in Part II, *Havner* may not be applied to resolve this question.

In *Flores*, we explained that “[t]he word ‘substantial’ is used to denote the fact that the defendant’s conduct has such an effect in producing the harm as to lead reasonable men to regard it as a cause, using that word in the popular sense, in which there always lurks the idea of responsibility, rather than in the so-called ‘philosophic sense,’ which includes every one of the great number of events without which any happening would not have occurred.” 232 S.W.3d at 770 (citation and internal quotation marks omitted). We clarified further that a plaintiff may satisfy the dictates of substantial-factor causation “‘by demonstrating that the plaintiff’s exposure to defendant’s asbestos-containing product in reasonable medical probability was a substantial factor in contributing to the aggregate *dose* of asbestos the plaintiff or decedent inhaled or ingested, and hence to the *risk* of developing asbestos-related cancer.’” *Id.* at 773 (quoting *Rutherford v. Owens-Illinois, Inc.*, 941 P.2d 1203, 1219 (Cal. 1997)). This relieves plaintiffs of an impossible burden: proving “that fibers from the defendant’s particular product were the ones, or among the ones, that *actually* produced the malignant growth.” *Id.* (citation and internal quotation marks omitted). Still, we maintained that a plaintiff must produce “[d]efendant-specific evidence relating to the approximate dose to which the plaintiff was exposed,” though with the caveat that the dose “need not be reduced to mathematical precision.” *Id.*

For this reason, plaintiffs are not required to calculate dose in absolute terms. When it comes to the question of whether a plaintiff's exposure to a defendant's product in a multiple-exposure case was substantial, the *relevant* quantification is *relative* quantification: a plaintiff can prove causation by showing that her exposure to a certain defendant's product was sufficiently significant, in relative terms, that it should be considered a substantial factor in causing his injury. This is not the first time we have indicated that this consideration might be important. In *Flores*, we held that the plaintiff had failed to quantify his exposure to the defendant's product with sufficient particularity in part because this lack of evidence made us unable to determine whether that exposure "sufficiently contributed to the aggregate dose of asbestos Flores inhaled, such that it could be considered a substantial factor in causing his asbestosis." *Id.* at 772.

As the Court notes, consideration of a plaintiff's aggregate dose is in keeping with all three volumes of the Restatement of Torts. Both the first and second volumes recognize that an important consideration in determining whether a factor is so causative as to be considered substantial is "the number of other factors which contribute in producing the harm and the extent of the effect which they have in producing it." RESTATEMENT (SECOND) OF TORTS § 433(a) (1965); RESTATEMENT (FIRST) OF TORTS § 433(a) (1934). The third volume advises that "[w]hen an actor's negligent conduct constitutes only a trivial contribution to a causal set that is a factual cause of harm . . . the harm is not within the scope of the actor's liability." RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 36 (2010).

In multiple-exposure cases, once a plaintiff proves causation questions (1) and (2), the only question that remains is whether the plaintiff's exposure to a defendant's product was substantial

enough to be regarded as a cause “in the popular sense, in which there always lurks the idea of responsibility.” *Flores*, 232 S.W.3d at 770. A jury is well-suited to make this determination. As the Court admits, “some discretion must be ceded to the trier of fact in determining whether the plaintiff met that standard. One respected treatise has opined that it is ‘neither possible nor desirable to reduce [substantial factor] to any lower terms.’” *Ante* at ___ (quoting W. PAGE KEETON, ET AL., PROSSER AND KEETON ON THE LAW OF TORTS § 41 (5th ed. 1984)). As part of this determination, jurors may consider whether the plaintiff proved that a certain defendant’s product was independently sufficient to cause his illness, either by resort to *Havner* or by “direct, scientifically reliable proof.” *Havner*, 953 S.W.2d at 715. Jurors should consider this as one factor among many, as it may be more fitting to denominate an exposure substantial when it is independently sufficient to cause the plaintiff’s disease. However, in contrast to the Court, I maintain that this consideration is relevant, rather than prerequisite.

In the case at bar, the Bostics produced evidence that Timothy Bostic was exposed to asbestos from three primary sources: First, Timothy ingested Georgia-Pacific’s joint compound, which he and his father used “98 percent of the time” while completing residential construction projects. Timothy was also exposed to asbestos at the Knox Glass plant, which may have been produced by any number of manufacturers. Finally, while employed by Palestine Contractors Timothy inhaled particles from the asbestos used to insulate pipes, which again may have been produced by any number of manufacturers.

The Bostics also produced evidence as to the approximate quantum of time Timothy was exposed to each source of asbestos: Timothy worked with his father throughout his childhood on

residential construction projects. When he was only a boy, Timothy mixed dry joint compound, sanded it on the walls “[a]s far up as he could reach,” and swept the dust generated by sanding. Expert witnesses consistently maintained that exposure to asbestos during childhood can be particularly detrimental. Timothy also worked at the Knox Glass plant for three summers, where his ingestion of asbestos may have been more severe in one part of the plant than in another. In addition, Timothy was exposed to fibers that his father carried home on his clothing from the plant. Because Timothy did not live with Harold full-time, this exposure was sporadic. Finally, Timothy worked at Palestine Contractors for two summers, where he encountered asbestos on an intermittent basis.

The Bostics also produced evidence that Timothy’s exposure to Georgia-Pacific’s products was independently sufficient to cause his mesothelioma. Dr. Hammar testified that Timothy was exposed to sufficiently high levels of asbestos that his exposure was, to a reasonable medical certainty, the cause of his mesothelioma. Dr. Longo agreed, testifying that Timothy had been exposed to Georgia-Pacific’s asbestos at levels ten to twenty times the average background levels. This exposure is greater than the very low levels of exposure sufficient to cause mesothelioma.

And though the evidence the Bostics put forward with respect to Timothy’s exposure is hardly exact, we do not require a plaintiff to reduce the quantity of exposure “to mathematical precision.” *Flores*, 232 S.W.3d at 773. I would hold that the evidence the Bostics presented in this case was sufficiently specific to enable a jury to determine that Timothy’s exposure to Georgia-Pacific’s asbestos was a substantial factor in causing his illness.

IV. Conclusion

By requiring every plaintiff to produce epidemiological studies demonstrating that exposure to every defendant's product independently more than doubled his risk of developing a disease, the Court renders *Havner* a hindrance rather than a help. In this case, the Bostics produced scientifically reliable evidence that asbestos causes mesothelioma, that it caused Timothy's development of that disease, and that Timothy's exposure to Georgia-Pacific's asbestos-containing products was substantial in relation to his exposure to other asbestos sources. Because they adduced this evidence in the traditional way, they had no need to resort to the alternative measure we approved in *Havner*. By elevating this standard to the exclusive measure of proof, the Court effectively forecloses recovery for mesothelioma plaintiffs with intermittent exposure to asbestos until researchers develop epidemiological studies demonstrating a doubling of the risk in that population. The Court also forecloses recovery for mesothelioma plaintiffs who were exposed to multiple sources of asbestos when no single source of exposure is sufficient, by itself, to more than double that plaintiff's risk of developing mesothelioma. Under the paradigm the Court propounds, this would remain true even in the face of reliable expert testimony that the plaintiff's mesothelioma was overwhelmingly attributable to one source. For these reasons, and because in this instance I would hold that the Bostics proved that exposure to Georgia-Pacific's asbestos-containing product was a substantial factor in causing Timothy's injury, I would reverse the judgment of the court of appeals and reinstate the trial court's judgment in favor of the Bostics.

Debra H. Lehrmann
Justice

OPINION DELIVERED: July 11, 2014