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WORKERS' COMPENSATION
APPEALS BOARD

TENNESSEE BUREAU OF WORKERS' COMPENSATION
WORKERS' COMPENSATION APPEALS BOARD

Johnny Johnston	)	Docket Nos. 2015-01-0023, 2018-01-0003, & 2018-01-0008
v.	)	
Siskin Steel & Supply Co./Reliance Steel & Aluminum Co., et al.	)	State File Nos. 9602-2015, 266-2018, & 1326-2018
Appeal from the Court of Workers' Compensation Claims Thomas L. Wyatt, Judge	)	Heard March 24, 2020, at Knoxville

Reversed and Certified as Final

In this appeal, the employer challenges the trial court's determination that the employee's liver, kidney, and cardiac conditions, which the trial court concluded were an occupational disease, arose primarily from exposure to heavy metal contaminants in the workplace. The trial court concluded the testimony of the employee's expert witnesses should be afforded greater weight than the testimony of the employer's experts and that the employee had proven by a preponderance of the evidence that his alleged occupational diseases arose primarily out of and in the course and scope of his employment, considering all causes. The employer contends the trial court erred in assessing the weight given the expert testimony and asserts the preponderance of the evidence weighs against the trial court's conclusions. The employee asserts the trial court correctly weighed the medical proof but questions the constitutionality of the statutory definition of "injury" and "personal injury" as applied to occupational diseases. Having carefully reviewed the record, we reverse the trial court's order awarding benefits and certify as final the trial court's order as reversed.

Judge Pele I. Godkin delivered the opinion of the Appeals Board in which Presiding Judge Timothy W. Conner and Judge David F. Hensley joined.

John Barringer, Nashville, Tennessee, for the employer-appellant, Siskin Steel & Supply Company/Reliance Steel & Aluminum Company

Linn Guerrero-Justice, Knoxville, Tennessee, for the employee-appellee, Johnny Johnston

Factual and Procedural Background

Johnny Johnston ("Employee") was sixty-one years of age at the time of trial and had worked for approximately thirty-nine years at Siskin Steel & Supply Company/Reliance Steel & Aluminum Company ("Employer") in Chattanooga, Tennessee. Employee alleged that he developed certain occupational diseases as a result of exposure to heavy metal contaminants while working in the course and scope of his employment. Employee testified to working different jobs for Employer, beginning as a scrapyard laborer in 1980. His job in Employer's scrapyard involved putting different types of scrap metal into a machine that would sort the metals before separating them into different bins. Employee testified that while working in this area, some of the metal particles got onto his clothing and were inhaled. While in the scrapyard, Employee also learned to operate various machines and heavy equipment. He testified the area was greasy, dirty, and smelled of gas and diesel, describing "just normal, typical equipment stuff." Employee wore a hard hat, steel-toed boots, safety glasses, and gloves to handle metal, but he was not required to wear any type of respiratory protective equipment while working in the scrapyard.

After working approximately ten years in the scrapyard, Employee began working inside Employer's facility fulfilling and moving orders. He testified that when certain machines in the plant "would get a little bit rusty[,] they'd throw diesel fuel, spray diesel fuel on it." Employer testified the facility is approximately 425,000 square feet and the roof is "at least a hundred-plus feet" high. While in the facility, Employee also worked in the structural bay operating overhead cranes. He testified the area was smoky, smelled like gas, and would sometimes burn his eyes. In addition, he testified that trucks would enter and exit the bay doors throughout the day and that the building was not climate controlled. At trial, Employee testified that his primary job involved operating cranes and loading trucks for the first sixteen years of his employment.

Employee began working as a saw operator in 1996, which involved sawing stainless steel, aluminum angles, and different kinds of pipe. While working in this capacity, Employee wore several types of personal protective equipment but did not wear a mask or respirator. Employee testified that he operated machines that cut metal and ground rock and that he also performed spot welding. He used cutting fluid on the blades and testified he worked about a foot away from the machines. Employee claimed the air would look and smell like smoke at times, and he testified he was exposed to fumes and dust particles. Following a heart attack in December 2016, Employee moved to another department to work as a saw operator. Employee also acknowledged that he occasionally cut steel outside of work, testifying it was usually to "cut a piece [of steel] or something like that at the house to make a stand[.]" He alleges his work activities over the course of thirty-nine years without wearing a mask or other respiratory protection resulted in occupational exposure to heavy metals that caused various occupational diseases.

In 2013, Employee was diagnosed with granulomatous hepatitis with non-alcoholic cirrhosis of the liver. A hair test conducted in 2014 was reported as revealing the presence of elevated levels of heavy metal contaminants, and Employee's physician recommended treatment, but when Employee reported the results to Employer, his claim for workers' compensation benefits was denied. As noted above, Employee suffered a heart attack in December 2016 and, as a result, he underwent surgery for the placement of stents and a pacemaker. During a 2017 evaluation with Dr. Edward Workman, a neuropsychiatrist, Employee was diagnosed with chronic kidney disease.

Employee filed three separate petitions for workers' compensation benefits, claiming he suffered from work-related liver disease, work-related kidney disease, and a work-related heart attack.[1] Because Employee alleged each condition arose from the same occupational exposures, the trial court consolidated the claims.[2] During the November 14, 2019 trial, the parties presented medical testimony by deposition. Employee relied on the medical opinions of Dr. Edward Workman, a neuropsychiatrist, and Dr. Matthew Lee, a physician, pharmacist, and toxicologist. Employer relied on the medical opinions of Dr. Johnathan Schneider, a gastroenterologist; Dr. Douglas Linfert, a nephrologist; and Dr. William Fleet, a cardiologist.

Employee's Expert Testimony

Dr. Workman

Dr. Workman is board certified in pain medicine, psychiatry, neurology, and forensic medicine. He performed a medical records review and first interviewed Employee on June 9, 2017. Dr. Workman recorded a medical history of Type II Diabetes, cardiovascular disease with congestive heart failure, atrial fibrillation, gastrointestinal reflux, airways disease with pleural thickening, chronic renal failure,

[1] Employee filed petitions for medical and indemnity benefits for: (1) liver disease, alleging a date of injury of January 30, 2015, which was reported to Employer on February 9, 2015; (2) kidney disease, alleging a date of injury of August 29, 2017, which was reported to Employer on January 8, 2018; and (3) a heart attack, alleging a date of injury of December 29, 2016, which was reported to Employer on January 8, 2018. The parties introduced evidence addressing whether Employee's heart disease was an occupational disease, and Employer has not raised any issue concerning the trial court's expansion of Employee's claim of a compensable heart attack to include a claim for an occupational heart disease.

[2] At various times during the course of this litigation, the parties, the medical experts, and the trial court used the terms "condition" and "disease" interchangeably. The term "occupational disease" was defined in Tennessee Code Annotated section 50-6-301, but the legislature, in effect, repealed that section as of July 1, 2014 by not including it in the 2013 Workers' Compensation Reform Act, thus removing any definition of the term "occupational disease" from the workers' compensation statutes. We conclude the terms "condition" and "disease" are not synonymous, as any person may have a "condition" that does not arise from a disease process. Nevertheless, because the issue has not been raised by the parties, we generally use those terms as used by the parties, the medical experts, and the trial court.

hypertension, hypercholesterolemia, and granulomatous hepatic cirrhosis. Dr. Workman also documented Employee's family history of cardiovascular disease. He saw Employee twice, once for the initial evaluation and once for an impairment rating evaluation.

In determining the nature and cause of Employee's various diseases, Dr. Workman relied upon a Genova Diagnostics Elemental Analysis ("Genova Screen") to determine Employee's levels of heavy metal contaminant exposure. Dr. Workman testified that Employee's liver disease was due in large part to exposure to antimony, cadmium, lead, and gadolinium as detailed in the Genova Screen. When asked whether lead exposure was the primary cause of Employee's liver cirrhosis, Dr. Workman responded, "[i]t's one of several primary causes." Dr. Workman testified that testing hair is a superior way to determine chronic exposure to heavy metal contaminants because it is a cumulative measure, whereas blood and urine tests are acute measures, noting that "[s]ome people like hair, some people like urine, some people like blood as a measure for this, that and the other. For chronic intake of drugs, toxins, other things, in my opinion, hair is the way to go." He testified that Employee's Genova Screen revealed "significant [heavy metal] exposures . . . [a]nd that's why I reasoned the causation between those exposures . . . ." Dr. Workman reported that the Genova Screen results showed Employee had 4.8 times the "accepted upper limit" of cadmium, 4.7 times the "accepted upper limit" of lead, and marginally elevated levels of antimony and gadolinium. Dr. Workman testified that his opinions and testimony were based on the Genova Screen and other doctors' reports, acknowledging that the Genova Screen was "critical."

Dr. Workman further testified that he initially "equivocated" regarding the cause of Employee's kidney disease and heart condition before reviewing research articles he obtained from the National Institute of Health's website for his own "edification." Dr. Workman discussed several studies he reviewed, including one he understood to link cadmium with processes of fatty liver, impaired gluconeogenesis, hypertension, and increased myocardial infarction risk. He explained that the study described how "fatty liver and liver necrosis typically cause[] hypertension," stating that "we know that hypertension is a risk factor for myocardial infarction, congestive failure, et cetera."

Dr. Workman was asked to provide a causation opinion regarding the relationship between Employee's work environment and the diseases involving his kidney, liver, and heart. When asked if heavy metal exposure primarily caused Employee's diabetes, Dr. Workman opined, "I think that heavy metal exposure contributed to his diabetes . . . yes, it's a primary cause among others. It's not the primary cause but it's a primary cause." He similarly testified that antimony was the primary cause and lead exposure was "one of several primary causes" of Employee's chronic renal failure. Dr. Workman testified that cadmium was "a contributing factor" to Employee's heart attack, later clarifying that cadmium exposure was a "primary cause" of Employee's heart attack and agreeing that it was more than fifty percent the cause of Employee's heart attack. Dr. Workman also testified that exposure to lead and antimony were primary causes of Employee's heart

disease, which he opined was a primary cause of his heart attack. However, when asked whether the metal exposure "primarily caused [Employee's] cardiovascular disease," Dr. Workman responded, "No. It's a primary cause among others."

Dr. Workman could not recall if he reviewed any Material Safety Data Sheets ("MSDS") for the metals used in Employer's facility prior to giving his testimony. He had no reports of Employer's air-sampling tests and did not review any TOSHA records. In the end, Dr. Workman testified that the "big battle of the experts has to do with hair. That's what it boils down to."

Dr. Lee

Dr. Lee is a physician, pharmacist, pharmacologist, and toxicologist licensed to practice medicine in Virginia.[3] He is not board certified and is not licensed to practice medicine in Tennessee. Dr. Lee performed a medical records review, examined Employer's MSDS sheets, and reviewed Employee's job description. However, he did not examine Employee, he did not order a heavy metal test, he did not visit Employer's facility, and he did not perform any type of independent testing. Dr. Lee also did not review any reports of air testing or TOSHA records from Employer's facility.

Dr. Lee testified that, based on his review of the records and materials provided to him, Employee received a "sufficient dose" of heavy metal contaminants to cause his liver, kidney, and cardiovascular system to begin shutting down. He described a "cocktail effect" as occurring with exposure to multiple contaminants, which he testified can lead to a "synergistic effect" of all the toxins in Employee's body.[4] Dr. Lee explained the synergistic effect as "one plus one equals four" and testified that "in this case, we have at least four heavy metals we know of that [Employee's] been exposed to and at toxic levels . . . so this is like a one plus one plus one plus one. So it's way beyond a one plus one equals four; it's a one plus [one] – equals 20."

Dr. Lee testified that if an individual is exposed to heavy metals for long periods of time, the heavy metals will accumulate in the body and become more toxic. He identified four heavy metals detected by the Genova Screen at toxic levels: cadmium, lead, antimony, and arsenic. Dr. Lee testified that he was not "looking at any of these metals in isolation, but [was looking at] . . . the combination of them all," since they all

[3] Dr. Lee testified that he obtained a master's degree in toxicology from Virginia Commonwealth University in 1999.

[4] Dr. Lee testified that a "cocktail effect" is "when you have a mixture of components or chemicals that have an effect versus taking the individual entities, looking at them in isolation." He explained further that "there are a variety of chemicals or substances . . . involved, so it's a cocktail, which leads into a synergistic effect . . . so having the cocktail, whether they affect the same organ systems or different organ systems, you can't look at any one in isolation but you have to look at them together."

were "contributing factors [and] . . . they could have been a primary cause in and of themselves." He testified that these heavy metals are deposited in the liver, kidneys, and spleen, noting there is an overlap of heavy metals affecting Employee's organ system. He stated "[t]here is no doubt [Employee] was exposed to [heavy metals] . . . [t]here is no doubt that he had heavy metals in his body, some at toxic concentrations, and there is no doubt that he has [his] current health condition."

Like Dr. Workman, Dr. Lee also relied on the Genova Screen results to determine Employee's levels of heavy metal contaminants. He testified that hair testing is the "gold standard" for evaluating long-term heavy metal exposure. He reviewed Employer's MSDS sheets and confirmed that the materials Employer manufactured contained the heavy metals found in Employee's system. Dr. Lee testified that he also considered Employee's lengthy tenure working with heavy metals, years of work without barrier protection, and the kind of duties he performed for Employer in his analysis. He concluded that heavy metals were the primary cause of the damage to Employee's liver, heart, and kidney, as well as the primary cause of Employee's diabetes and pulmonary compromise.

On cross-examination, Dr. Lee was questioned about his use of the Genova Screen as a diagnostic tool in light of the following language included on the report regarding diagnosis, treatment, and confirmation testing:

> NOTE: Commentary is provided to the practitioner for educational purposes, and should not be interpreted as diagnostic or treatment recommendations. Comments regarding clinical significance for the various elements are based on endogenous concentrations. Hair analysis is always a reflection of both endogenous levels and external contamination (elements on the hair surface), thus is considered a screen rather than a definitive diagnostic assessment of body burden.

Dr. Lee testified the Genova Screen should be taken into consideration with the entire clinical picture and stated the screen "provides a key piece of information regarding [Employee's] health history, work history, [and] exposure history." He testified he did not use the Genova Screen for diagnostic purposes but considered the results of the Genova Screen in light of Employee's lab tests, medical records, and documentation from other physicians who saw him. Dr. Lee confirmed the screen was a "key part of the whole clinical picture." He disputed the need for confirmation testing and emphasized that the commentary in the report stated toxicity "may" be confirmed by blood or urine testing. In response to the issue of potential external contamination on the surface of the hair sample, Dr. Lee testified that the hair sample is washed "to eliminate or minimize the potential exogenous contamination." He testified that the Genova Screen was "part of the clinical picture" in his analysis and an "important component" in forming his opinion.

Dr. Lee reviewed Employee's oncology report from January 26, 2016, and agreed that the blood tests for lead, mercury, and arsenic were within normal limits. Dr. Lee also testified that he had not "seen or been provided with" any blood tests performed to check for cadmium, gadolinium, antimony, or beryllium. Dr. Lee stated that he did not know the levels of exposure Employee had to any metal contaminant at Employer's facility, and, although he knew Employee's job involved cutting metal, he was unaware of the location or conditions in Employer's facility where this work was performed. He noted that evidence of toxic levels of heavy metals was derived from Employee's hair samples, job description, clinical picture, and Employer's MSDS sheets, but he did not have an air sample to corroborate the exposure levels. Dr. Lee acknowledged that he had not authored any publications on heavy metals and that this was his first time testifying in a case involving heavy metal exposure.

Employer's Expert Testimony

Dr. Linfert

Dr. Linfert is board certified in nephrology and internal medicine, specializing in kidneys and the treatment of renal failure. Dr. Linfert performed a records review and evaluated Employee on July 5, 2019. He documented a medical history of diabetes, hypertension, coronary disease, dyslipidemia, cirrhosis, renal disease, and stage three chronic kidney disease, along with other comorbidities. When asked how long Employee had renal disease, Dr. Linfert testified that Employee's creatinine levels were elevated intermittently dating back to April 2014.

Dr. Linfert noted the results of the Genova Screen revealed elevated levels of cadmium, lead, antimony, arsenic, and gadolinium, although the arsenic and gadolinium levels fell within the high normal range. Dr. Linfert testified that the maker of the Genova Screen emphasized the test was a screening tool and not to be used for diagnosis, stating that "if I were using this, I would – as the maker of the test says it's not a diagnostic test, I would not use it as a diagnostic test." He reiterated that "[p]er the company . . . it is not a diagnostic test" and testified that, based on his review of the Genova Screen, Genova Diagnostics would not consider the hair test to be an adequate way to assess causation. When asked what the Genova Screen recommended to determine accurate exposure levels, Dr. Linfert responded that the test result itself said that "confirmation of toxicity may be accomplished by a blood or urine testing." Dr. Linfert also reviewed a lab report from Tennessee Oncology, dated January 26, 2016, which tested for arsenic, mercury, and lead, all of which were within normal ranges. When asked if he would rely on a hair test to determine the cause of renal failure, Dr. Linfert answered, "I would not."

Dr. Linfert testified that gadolinium, antimony, and beryllium are not associated with renal failure. He was not aware of any studies that suggested antimony was toxic to

kidneys in humans and testified that the National Institute of Health's website made no comment on antimony's renal toxicity in humans. Dr. Linfert noted that cadmium has the potential to be nephrotoxic but stated that it typically presents with significant changes in the urine prior to renal dysfunction. He said Employee did not have the classic presentation for this or for lead nephropathy. Dr. Linfert testified that diabetes, hypertension, and coronary artery disease were Employee's most important medical concerns pertaining to renal failure. In addition, he noted that some of the medications Employee was taking could cause an elevation in creatinine levels, noting some had been linked to kidney disease. Dr. Linfert testified that Employee was overweight and had swelling in his legs. He stated that, "[c]onsidering all the possible etiologies of [Employee's] renal disease, I believe his chronic kidney disease resulted from his underlying hypertension, diabetes and vascular disease." Further, Dr. Linfert testified that "those are the three things that caused [Employee's] chronic kidney disease definitively."

Dr. Linfert disagreed with Dr. Workman's testimony that lead exposure was the primary cause of Employee's renal failure. He testified that heavy metal exposures did not cause Employee's obesity or contribute to his hypertension and did not affect his diabetes or vascular disease. Dr. Linfert said that he saw no need to order a heavy metal screen based on his review of Employee's medical records, and that, with the exception of Dr. Workman's report, he saw no reference to heavy metal exposure as a primary cause of Employee's diseases in his review of Employee's medical records.

Dr. Schneider

Dr. Schneider is a board-certified gastroenterologist and testified that this specialty encompasses the entire digestive system as well as the associated organs. He stated that one-third of his practice is focused on treating liver conditions. Dr. Schneider reviewed Employee's medical records, including a 2013 liver biopsy, imaging studies, and the Genova Screen. He also performed a physical examination and documented Employee's relevant medical history that included gastroesophageal reflux disease, high cholesterol, obesity, Type II Diabetes, high blood pressure, and heart disease.

After reviewing Employee's medical history, the report of the Genova Screen, and literature concerning heavy metal exposure, Dr. Schneider concluded he could not state whether the environmental exposures contributed to or caused Employee's liver disease. Dr. Schneider testified that although the Genova Screen looked like a reasonable screening method, there was no confirmation testing to ascertain the accuracy of the screening results. In addition, Dr. Schneider testified that, according to Genova Diagnostics, its hair screening system was just that: a screen not intended to serve as a definitive diagnostic assessment of tissue levels. As a result, Dr. Schneider testified he would not consider the Genova Screen to be a valid diagnostic test. He testified that, in

his mind, a liver biopsy would be the only way to confirm whether Employee had toxic levels of heavy metals in his liver.

Dr. Schneider also consulted LiverTox.nih.gov, a website sponsored by the National Institute of Health, and he testified that the information he read indicated cadmium "has not been linked specifically to clinically apparent liver injury in humans." He noted that the website also indicated there "does not appear to be a major liver toxicity from environmental lead exposure." He testified that arsenic was associated with non-cirrhotic portal hypertension in some individuals, but, unlike Employee, there was no cirrhosis in those individuals. He also testified that his review of the academic literature revealed no connection between antimony and liver disease or cirrhosis. Further, Dr. Schneider reviewed an article cited by Dr. Workman that linked low doses of cadmium to fatty liver disease in mice. He agreed that the study showed cadmium was toxic to the liver cells of mice but found no evidence relating cadmium exposure to human liver disease. He testified he "would not feel comfortable making any assumptions regarding humans based on animal studies." In addition, Dr. Schneider found no evidence linking gadolinium exposure to liver disease.

Dr. Schneider testified that he considered heavy metal exposure as a potential cause when evaluating Employee's liver disease but that, in his opinion, the primary cause of Employee's liver disease was a "combination of his diabetes, obesity, and high cholesterol, which induces the fatty liver, which causes inflammation and, over time, turns into scar tissue." He noted that Employee has persistent liver disease, but no history of ascites, and he testified that the primary cause of Employee's liver condition is the "synergistic effect between obesity, high cholesterol, diabetes, which incites inflammation of the liver, and, ultimately, fibrosis and cirrhosis."[5] He testified that Employee's diabetes, cholesterol, and obesity are not work-related conditions.

Dr. Fleet

Dr. Fleet is a cardiologist licensed to practice in Tennessee and is board certified in internal medicine, cardiology, and interventional cardiology. He was asked to perform a medical records review and provide an opinion regarding the cause of Employee's heart disease and heart attack. In providing his opinions, Dr. Fleet noted Employee's history of diabetes dating back to 2000, dyslipidemia with lipid abnormalities, high cholesterol, hypertension, severe obesity, untreated sleep apnea, anxiety, and a strong family history of coronary artery disease. Dr. Fleet testified there are five traditional significant risk factors for coronary artery disease: diabetes, hyperlipidemia, hypertension, family history, and smoking. He noted that Employee had four out of five of these factors and that he was at a "very high risk" of developing heart disease or having a heart attack.

[5] Ascites is defined as "the abnormal accumulation of serous fluid in the spaces between tissues and organs in the cavity of the abdomen." Merriam-Webster Dictionary (11th ed. 2016).

Dr. Fleet testified that the medical history taken by physicians at Memorial Hospital on the day Employee suffered his heart attack contained the same risk factors he described. He stated that Employee was also diagnosed with atrial fibrillation and noted that the risk factors for atrial fibrillation are similar to those for coronary disease: obesity, sleep apnea, diabetes, and coronary artery disease. He also agreed there was no record of work-related physical exertion or any mention of a sudden emotional stressor at work that could have triggered Employee's heart attack. Dr. Fleet noted that Employee had pre-existing undiagnosed and untreated coronary artery disease when he had his heart attack. He testified Employee also had an angiogram that revealed severe coronary atherosclerotic disease and was diagnosed with systolic congestive heart failure. Dr. Fleet testified that Employee's congestive heart failure was caused by coronary artery disease and that Employee's left bundle branch block was caused by a combination of diabetes and coronary artery disease. Dr. Fleet further opined that "[t]he cause of [Employee's] heart attack was severe coronary artery disease or coronary atherosclerosis. The cause of the coronary atherosclerosis was diabetes, dyslipidemia, obesity, family history, and secondary . . . a contribution of anxiety disorder and sleep apnea." He testified that Employee's chronic kidney disease had no causal relation to his heart disease. In addition, Dr. Fleet stated that, although Employee's hypertension was well controlled, it may have been a minor contributing factor to his heart attack.

Dr. Fleet opined that coronary artery disease is a complex process with multiple risk factors, all of which seem to be causative in some way. He testified that if he were making a list of causes of coronary artery disease, diabetes, obesity, dyslipidemia, and family history would be the primary causes. He stated that secondary risk factors would include untreated sleep apnea and anxiety disorder, and that "[h]eavy metal exposure comes in as an honorable mention." Dr. Fleet testified that occupational exposure to heavy metals was not the primary cause of Employee's heart attack or his need for treatment as a result of his heart attack. He did not believe heavy metal exposure was a significant contributing factor to Employee's heart disease.

Dr. Fleet further testified that lead and cadmium were not significant causes of cardiovascular disease, and that he was not aware of lead being known to increase cardiovascular mortality. Instead, he said that whether lead exposure plays any role would be "highly speculative at best" and testified there are "large epidemiologic studies that show a slight increased incidence of cardiovascular risk associated with cadmium." He also agreed there is an epidemiologic[al] study showing arsenic has a slight association with increased cardiovascular risk but noted it was an "association, not [] causation." Dr. Fleet also testified that he was not aware of any link between heavy metal exposure and diabetes or high cholesterol. Based upon his expertise and his review of the medical records, he opined that, considering all causes, Employee's coronary artery disease was not primarily related to any toxin exposure he may have had at work.

Compensation Hearing

At trial, Employee and a representative of Employer were the only witnesses to testify in person. Employer's representative testified that Employer is required to conduct air sampling whenever there are environmental changes due to equipment movement and that Employer requires air sampling every five years. He testified that air sampling is conducted by an independent company and that random employees are selected to wear air sampling kits for an eight-hour shift. Further, he testified that the sampling kits test for antimony, beryllium, cadmium, chromium, cobalt, copper, iron oxide, lead, manganese, molybdenum, nickel, vanadium, and zinc oxide.

No evidence was offered at trial of any OSHA or TOSHA violations concerning air quality or excessive heavy metal exposure at Employer's facility. Records for an August 10, 2018 OSHA inspection of Employer's facility were introduced. Employer was cited for not determining the eight-hour time-weighted average exposure for each employee exposed to chromium and for the lack of signage identifying hazardous chemicals, both of which were corrected during the inspection. Employer was also cited for not including chromium in its hazard communication program and for not providing appropriate information or training for all employees exposed to chromium. During the 2018 inspection, air sampling reflected that chromium exposure was below detectable limits. In 2019, an exposure monitoring survey was conducted with particulate exposure testing for antimony, beryllium, cadmium, chromium, cobalt, copper, iron oxide, lead, manganese, molybdenum, nickel, vanadium, and zinc oxide. Testing results revealed no operations that created exposure hazards above the permissible exposure limits.[6]

After the trial, the court issued an order concluding that "the causation opinions of Drs. Workman and Lee give the more probable explanation for the development of [Employee's] liver, cardiac, and kidney conditions" and finding that Employee had proven by a preponderance of the evidence that his liver, cardiac, and kidney conditions arose primarily out of and in the course and scope of his employment. The trial court further concluded that Employee "sustained a single occupational disease from his exposure to heavy-metal contaminants . . . that manifested in his development of liver, cardiac, and kidney conditions." The court ordered Employer to provide reasonable and necessary medical benefits for "treatment of [Employee's] liver, cardiac, and kidney conditions," as well as permanent partial disability benefits in the amount of $172, 832.00, representing a fifty-nine percent disability. Employer has appealed.

[6] Employer produced other ventilation studies and air-sampling results from 2002 and 2006 that revealed no heavy metal exposures beyond OSHA's permissible exposure limits.

Standard of Review

The standard we apply in reviewing a trial court's decision presumes that the court's factual findings are correct unless the preponderance of the evidence is otherwise. *See* Tenn. Code Ann. § 50-6-239(c)(7) (2019). When the trial judge has had the opportunity to observe a witness's demeanor and to hear in-court testimony, we give considerable deference to factual findings made by the trial court. *Madden v. Holland Grp. of Tenn., Inc.*, 277 S.W.3d 896, 898 (Tenn. 2009). However, "[n]o similar deference need be afforded the trial court's findings based upon documentary evidence." *Goodman v. Schwarz Paper Co.*, No. W2016-02594-SC-R3-WC, 2018 Tenn. LEXIS 8, at *6 (Tenn. Workers' Comp. Panel Jan. 18, 2018). Similarly, the interpretation and application of statutes and regulations are questions of law that are reviewed *de novo* with no presumption of correctness afforded the trial court's conclusions. *See Mansell v. Bridgestone Firestone N. Am. Tire, LLC*, 417 S.W.3d 393, 399 (Tenn. 2013). We are also mindful of our obligation to construe the workers' compensation statutes "fairly, impartially, and in accordance with basic principles of statutory construction" and in a way that does not favor either the employee or the employer. Tenn. Code Ann. § 50-6-116 (2019).

Analysis

Employer raises two issues on appeal, which we combine and restate as a single issue: whether the trial court erred in finding Employee's medical experts established by a preponderance of the evidence that he suffered a compensable occupational disease arising primarily out of his employment, considering all causes. We conclude the trial court erred in assessing the relative weight to be afforded the parties' experts and in finding Employee met his burden of proof in establishing he suffers from an occupational disease.

As we have previously observed, an injured worker has the burden of proof on every essential element of his or her claim by a preponderance of the evidence. Tenn. Code Ann. § 50-6-239(c)(6); *see also Buchanan v. Carlex Glass Co.*, No. 2015-01-0012, 2015 TN Wrk. Comp. App. Bd. LEXIS 39, at *5 (Tenn. Workers' Comp. App. Bd. Sept. 29, 2015). Tennessee Code Annotated section 50-6-102(14) (2019) defines "injury" and "personal injury" to mean an "injury by accident, a mental injury, occupational disease including diseases of the heart, lung and hypertension, or cumulative trauma conditions . . . arising primarily out of and in the course and scope of employment, that causes . . . disablement or the need for medical treatment." Moreover, an injury arises primarily out of and in the course and scope of employment "if it has been shown by a preponderance of the evidence that the employment contributed more than fifty percent (50%) in causing the injury, considering all causes." Tenn. Code Ann. § 50-6-102(14)(B). "An injury causes death, disablement or the need for medical treatment only if it has been shown to a reasonable degree of medical certainty that it contributed more

than fifty percent (50%) in causing the death, disablement or need for medical treatment, considering all causes." Tenn. Code Ann. § 50-6-102(14)(C). "'Shown to a reasonable degree of medical certainty' means that, in the opinion of the physician, it is more likely than not considering all causes, as opposed to speculation or possibility." Tenn. Code Ann. § 50-6-102(14)(D).

Moreover, a trial court "has the discretion to determine which testimony to accept when presented with conflicting expert opinions." *Payne v. UPS*, No. M2013-02363-SC-R3-WC, 2014 Tenn. LEXIS 1112, at *18 (Tenn. Workers' Comp. Panel Dec. 30, 2014). When such opinions conflict, a trial court may consider, among other things, "the qualifications of the experts, the circumstances of their examination, the information available to them, and the evaluation of the importance of that information by other experts." *Bass v. The Home Depot U.S.A., Inc.*, No. 2016-06-1038, 2017 TN Wrk. Comp. App. Bd. LEXIS 36, at *9 (Tenn. Workers' Comp. App. Bd. May 26, 2017). We will review any such determination under an abuse of discretion standard. *Sanker v. Nacarato Trucks, Inc.*, No. 2016-06-0101, 2016 TN Wrk. Comp. App. Bd. LEXIS 27, at *12 (Tenn. Workers' Comp. App. Bd. July 6, 2016). A trial court abuses its discretion when it causes an injustice to the party challenging the decision by (1) applying an incorrect legal standard, (2) reaching an illogical or unreasonable decision, or (3) basing its decision on a clearly erroneous assessment of the evidence. *See State v. Ostein*, 293 S.W.3d 519, 526 (Tenn. 2009); *Konvalinka v. Chattanooga-Hamilton Cnty. Hosp. Auth.*, 249 S.W.3d 348, 358 (Tenn. 2008); *Doe 1 ex rel. Doe 1 v. Roman Catholic Diocese of Nashville*, 154 S.W.3d 22, 42 (Tenn. 2005).

In addition, we are charged with reviewing deposition testimony and documentary evidence *de novo*. *See Brees v. Escape Day Spa & Salon*, No. 2014-06-0072, 2015 TN Wrk. Comp. App. Bd. LEXIS 5, at *16 (Tenn. Workers' Comp. App. Bd. Mar. 12, 2015) ("[T]he trial court occupies no better position than this Appeals Board in reviewing and interpreting documentary evidence."). When the trial court's determination is challenged on appeal, we must determine where the preponderance of the evidence lies. *See* Tenn. Code Ann. § 50-6-239(c)(7).

In the present case, Employee contends he suffered occupational diseases of his heart, liver, and kidney as a result of his workplace exposure to heavy metals. The trial court relied on Employee's experts' testimony suggesting that Employee's history of occupational exposure to heavy metals supported the reliability of the Genova Screen results, which measures the presence of heavy metals in a hair sample. Dr. Workman and Dr. Lee opined that hair test screens were more helpful than blood and urine testing in detecting the long-term presence of heavy metal contaminants because hair testing measures accumulated contaminant levels. However, despite the admonition on the test report indicating it was a screening tool and not a diagnostic tool, Dr. Workman and Dr. Lee relied heavily on the Genova Screen to provide causation opinions addressing Employee's liver, kidney, and heart diseases. As explained below, we conclude the

preponderance of the evidence supports a finding that the Genova Screen was an insufficient basis to support a finding of medical causation based upon the entirety of the expert testimony presented at trial. In addition, we conclude the trial court erred in its consideration of the relative qualifications of the experts. Finally, we conclude that the trial court erred in assigning greater weight to the causation opinions of Drs. Workman and Lee. Accordingly, we find the trial court abused its discretion in accepting the opinions of Drs. Workman and Lee over those of Drs. Linfert, Schneider, and Fleet.

The Genova Screen

Dr. Workman and Dr. Lee relied on the results of the Genova Screen to provide causation opinions for Employee's liver, kidney, and heart diseases. We previously set out the following guidance from Genova Diagnostics concerning the Genova Screen when addressing Dr. Lee's testimony. We find the guidance significant and worthy of reiteration here:

> NOTE: Commentary is provided to the practitioner for educational purposes, and should not be interpreted as diagnostic or treatment recommendations. Comments regarding clinical significance for the various elements are based on endogenous concentrations. Hair Analysis is always a reflection of both endogenous levels and external contamination (elements on the hair surface), thus is *considered a screen rather than a definitive diagnostic assessment of body burden*.

(Emphasis added.) Put simply, the test itself cautions against making any diagnostic or treatment recommendations based solely on the results. Moreover, the test recognizes that, due to potential contamination of the hair sample being tested, definitive diagnosis of exposure to heavy metals should be confirmed by additional methods. Although Dr. Lee stated that hair testing protocol includes washing the hair sample, the Genova Screen report is silent as to sample washing, and Dr. Lee provided no testimony regarding personal knowledge of Genova Diagnostics' testing procedures.

The Genova Screen also instructs:

> [t]he following comments regarding clinical significance for the elements tested in this profile are based on endogenous concentrations. It should be noted that Hair Analysis is a reflection of both endogenous levels *and* external contamination (elements on hair surface), thus this is considered a screen rather than a definitive diagnostic assessment of tissue levels. Confirmation of toxicity may be accomplished via blood or urine testing.

(Emphasis added.) Again, the developers of the test emphasize that the Genova Screen is just that – a screen, and it does not provide a definitive assessment of the levels of heavy

metals found in tissue. Because of this, the test explicitly provides that confirmation of toxicity may be accomplished by blood or urine testing. In the present case, no confirmation testing was performed. As a result, the validity and reliability of the evidence used to establish the presence and extent of heavy metal contaminants accumulated in Employee's system is suspect at best. In our view, Employee did not establish by a preponderance of the evidence that he was injuriously exposed to heavy metal contaminates or, if he was, that any such contaminates accumulated in toxic levels in his body sufficient to cause the medical conditions he identified as the bases of his claims. As a result, he failed to meet his burden of proving by a preponderance of the evidence that his liver, kidney, and cardiac diseases were primarily caused by his employment. Accordingly, we conclude the Genova Screen, in and of itself, was an insufficient basis upon which to determine medical causation.

Weight of Expert Testimony

In weighing the expert testimony, the trial court focused on the methodologies each expert used in forming their causation opinions. After reviewing the expert opinions and other evidence, the trial court determined that the causation opinions of Drs. Workman and Lee gave the more probable explanation for the development of Employee's liver, cardiac, and kidney conditions. In reaching this conclusion, the trial court emphasized the length of time Employee worked at Employer's facility without respiratory protective equipment and the "improbability of [Employee] developing non-alcoholic cirrhosis of the liver [and] respiratory issues without smoking, and cardiac and kidney conditions without the intervention of [Employee's] exposure to heavy metals[.]" Based upon our review of the record, and taking into consideration the issues concerning the Genova Screen as discussed above, we conclude the trial court erred in determining that the opinions expressed by Drs. Workman and Lee outweighed the testimony of Drs. Linfert, Schneider, and Fleet with respect to causation of Employee's kidney, liver, and heart diseases.

Considering the qualifications of each expert, we note that Dr. Lee is a primary care physician with a master's degree in pharmacology and toxicology. He is not board certified in toxicology and is not licensed to practice medicine in Tennessee. Dr. Lee testified to working as a pharmacist and medical examiner and to overseeing occupational drug screens for two facilities in his capacity as a Medical Review Officer. In addition, Dr. Lee has a medical practice where he sees adult patients with general medical issues, including issues related to environmental conditions. Although he has published no articles in the field of heavy metal exposure and could not recall ever testifying in a heavy metal exposure case, Dr. Lee testified he ordered heavy metal testing when necessary in his practice.

Employee's other expert, Dr. Workman, is a neuropsychiatrist who is board certified in psychiatry, neurology, and forensic medicine. He testified that he "pretty

much practiced neuropsychiatric pain medicine for the past 25 years." He stated that he is basically a "clinical neuroscience doctor," although he is board certified in the fields identified above. Dr. Workman testified that he is certified to do evaluations with the United States Department of Labor to determine the psychiatric impact of injuries. In addition, Dr. Workman noted that he is a master psychopharmacologist, which he said involved urine drug screens, measuring drug levels, and liver processes. In sum, although both Dr. Workman and Dr. Lee are practicing physicians qualified to offer expert testimony in their respective fields, neither is an expert in the areas of liver, kidney, or heart disease nor does their testimony indicate they have experience treating these complex conditions and determining their underlying causes on a regular basis.

In contrast, Employer's experts, Drs. Linfert, Schneider, and Fleet, are all board-certified practitioners licensed to practice medicine in Tennessee with many years of experience in their respective fields of liver, kidney, and heart disease. Each testified that part of their practice involves addressing multiple risk factors associated with complex health conditions and includes determining the underlying causes of those conditions. Dr. Linfert testified that sixty percent of his work is performed in the hospital setting, with remaining time split between his clinical practice, seeing patients in his office and a dialysis clinic, and heading the research group in his department. Dr. Linfert testified that he sees individuals with renal failure daily. Dr. Schneider is board certified in gastroenterology, a specialty that entails treatment of the gastrointestinal tract and its associated organs, which include the liver. As part of his practice, Dr. Schneider treats patients with liver disease and testified that one-third of his practice deals with liver related issues. Dr. Fleet is board certified in cardiology, interventional cardiology, and internal medicine. He has been a practicing cardiologist since 1994 and testified he treats heart disease in all its forms. In addition, Dr. Fleet has testified as a cardiovascular expert in medical malpractice claims.

Based on the evidence presented at trial of the relative qualifications of all the testifying experts, we conclude the trial court erred in determining all experts were equally qualified to offer causation opinions as to kidney, liver, and heart diseases. Instead, we conclude the preponderance of the evidence favors the causation opinions of Dr. Linfert with respect to renal disease, the causation opinions of Dr. Schneider with respect to kidney disease, and the causation opinions of Dr. Fleet with respect to cardiac disease and Employee's heart attack.

The trial court also considered the manner in which each expert addressed causation in weighing the experts' causation opinions. The trial court determined that Dr. Workman's and Dr. Lee's opinions were supported by the research and literature each specifically identified. The court also noted that, in formulating their opinions, Employee's experts first "concluded that [Employee] had elevated levels of heavy-metal contaminants in his system and then researched the medical literature to determine if scientifically-documented links exist between liver, cardiac, and kidney conditions and

those metals." Finally, the trial court noted that both testified as to the specific sources used in their causation analysis and supported their opinions with the literature they identified. However, Dr. Workman's and Dr. Lee's assessments of heavy metal contaminants were based in large part on results obtained from the Genova Screen. For the reasons previously expressed, the Genova Screen, standing alone, was not sufficient to establish medical causation. We conclude the preponderance of the evidence supports a finding that the opinions of Drs. Workman and Lee were less persuasive than those of Employer's experts. In addition, the testimony of Employer's experts casts doubt on the scientific studies upon which Drs. Workman and Lee relied, as well as on the accuracy of the conclusions drawn from those studies by Drs. Workman and Lee.

The trial court stated that "[Employer's] experts focused on [Employee's] diagnoses of diabetes, coronary artery disease, hypertension, and family history of heart disease" in determining the primary cause of Employee's conditions. The court characterized the heavy metal research of Employer's experts as "vaguely-described literature research for links between heavy-metal exposure and liver, cardiac, and kidney conditions based on human testing." The court concluded that Employer's experts "minimalized the [Genova Screen] results and relied on the negative blood testing" in concluding that even if elevated heavy-metal exposure occurred, it would only result in a slight increase in contributing to the overall cause of Employee's liver, kidney, and heart conditions. We respectfully disagree with the trial court's reasoning on this issue.

The record reveals that Dr. Linfert performed independent research regarding heavy metal exposure in relation to Employee's kidney condition before concluding that Employee's work exposure did not primarily cause his chronic kidney disease. Dr. Linfert testified about his research results and opined that, "[c]onsidering all the possible etiologies of [Employee's] renal disease, I believe his chronic kidney disease resulted from his underlying hypertension, diabetes and vascular disease." As a board-certified nephrologist, Dr. Linfert expressed concern with many of the articles Employee's experts relied upon to support their opinions linking heavy metal exposure to Employee's kidney condition, given that his own research did not reach the same conclusions. He also testified to conducting research regarding the potential impact of exposure to antimony, cadmium, and lead on the kidneys.

With regard to Employee's liver disease, Dr. Schneider also researched whether there is a documented causal link between heavy metal exposure and Employee's condition, testifying that his research revealed no such causal link. Dr. Schneider testified in detail about specific research he conducted pertaining to the effect of heavy metal exposure on the liver. Dr. Schneider also read and disagreed with portions of Dr. Workman's testimony, including characterizations and conclusions drawn from some of the studies Dr. Workman cited in relation to heavy metal exposure and its impact on the liver. Dr. Fleet testified that he considered heavy metal exposure as a potential cause of Employee's cardiac condition but concluded that any such exposure would be deemed an

"honorable mention" in a hierarchy of risks, following secondary risk factors such as untreated sleep apnea and anxiety disorder.

Drs. Linfert, Schneider, and Fleet all testified that preventative medicine is part of their practice, which they indicated includes trying to determine the cause of their patients' underlying conditions. Employer's experts unequivocally testified that Employee's diseases were not primarily caused by workplace exposure to heavy metal contaminants. In addition, each expert testified that Employee's comorbidities were not caused by Employee's alleged exposures.

In addition, we note that Dr. Workman's causation testimony included phrases such as "a primary cause among others." The Tennessee Workers' Compensation Law defines the phrase "arises primarily out of and in the course and scope of employment" as requiring evidence that the employment "contributed more than fifty percent (50%) in causing the death, disablement or need for medical treatment, considering all causes." Tenn. Code Ann. § 50-6-102(14)(B). Thus, in the context of an alleged occupational disease, the evidence must indicate that the occupational exposure was the primary cause of the disease, contributing more than 50% to the death, disablement or need for medical treatment, considering all causes. In short, it is mathematically impossible to have two or more "primary" causes, each contributing more than 50% to the cause of the death, disablement or need for medical treatment, as was suggested by Dr. Workman. As we have indicated before, a physician need not use "particular words or phrases included in the statutory definition of 'injury' to establish the requisite medical proof to succeed at trial . . . [and] a physician may render an opinion that meets the legal standard espoused in section 50-6-102(14) without couching the opinion in a rigid recitation of the statutory definition." *Panzarella v. Amazon*, No. 2015-01-0383, 2017 TN Wrk. Comp. App. Bd. LEXIS 30, at *14 (Tenn. Workers' Comp. App. Bd. May 15, 2017). However, "[w]hat *is* necessary," we explained, "is sufficient proof from which the trial court can conclude that the statutory requirements of an injury as defined in section 50-6-102(14) are satisfied." *Id.* (emphasis in original).

Based on the foregoing, we conclude that the preponderance of the evidence does not support the trial court's decision to accredit the causation opinions of Dr. Workman and Dr. Lee over those of Dr. Schneider, Dr. Fleet, and Dr. Linfert. Given their areas of expertise, their credentials, their experience, and their evaluation of the available information, we conclude the preponderance of the evidence establishes that Drs. Linfert, Schneider, and Fleet offered the more probable explanations of medical causation in their respective fields of expertise. Further, we conclude the trial court's assessment of the expert evidence was clearly erroneous and constituted an abuse of discretion causing an injustice to Employer.

Finally, we note Employee has challenged the constitutionality of Tennessee Code Annotated section 50-6-102(14) as applied to occupational diseases. We, like the trial

court, conclude we do not have the authority to address a facial challenge to the constitutionality of the statute. *See, e.g.*, *Richardson v. Board of Dentistry*, 913 S.W.2d 446, 454 (Tenn.1995).

Conclusion

For the foregoing reasons, we conclude the trial court erroneously assessed the medical evidence, causing an injustice to Employer that constituted an abuse of the trial court's discretion. Accordingly, we disagree with the trial court's conclusion that Employee suffered a single occupational disease that arose primarily out of his employment, and we reverse the trial court's order, dismiss Employee's claim, and certify the reversed order as final for purposes of further appeal. Costs on appeal are taxed to Employee.

TENNESSEE BUREAU OF WORKERS' COMPENSATION
WORKERS' COMPENSATION APPEALS BOARD

Johnny Johnston	)	Docket Nos. 2015-01-0023, 2018-01-0003 & 2018-01-0008
v.	)	
Siskin Steel & Supply Co./Reliance Steel & Aluminum Co., et al.	)	State File Nos. 9602-2015, 266-2018 & 1326-2018
Appeal from the Court of Workers' Compensation Claims Thomas L. Wyatt, Judge	)	Heard March 24, 2020, at Knoxville

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the Appeals Board's decision in the referenced case was sent to the following recipients by the following methods of service on this the 8th day of May, 2020.

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