

**IN THE SUPREME COURT OF THE
STATE OF NEVADA**

DENISE DIANNA BUCHANAN, APPELLANT, v.
THE STATE OF NEVADA, RESPONDENT.

No. 34866

May 30, 2003

Appeal from a judgment of conviction, pursuant to a jury verdict, of two counts of first-degree murder. Second Judicial District Court, Washoe County; Peter I. Breen, Judge.

Affirmed.

Michael R. Specchio, Public Defender, *John Reese Petty*, Chief Deputy Public Defender, and *Kathleen M. O'Leary*, Deputy Public Defender, Washoe County, for Appellant.

Brian Sandoval, Attorney General, Carson City; *Richard A. Gammick*, District Attorney, and *Joseph R. Plater III*, Deputy District Attorney, Washoe County, for Respondent.

Before the Court EN BANC.

OPINION

By the Court, SHEARING, J.:

Appellant Denise Buchanan was charged with three counts of first-degree murder in the deaths of her three infant sons. After a four-week trial with 100 witnesses, Buchanan was convicted of two counts of first-degree murder, and sentenced to two consecutive terms of life in prison with the possibility of parole. Buchanan contends that her judgment of conviction should be overturned because: (1) there is insufficient evidence to support her judgment of conviction; (2) she was prejudiced by the State's failure to gather evidence and by the State's destruction of evidence; (3) the jury instructions regarding premeditation, deliberation, and reasonable doubt constituted reversible error; (4) the district court erred by allowing the State to present rebuttal evidence; and (5) the district court erred by failing to instruct the jury on an advisory verdict of acquittal. We find that Buchanan's allegations are without merit. Therefore, we affirm the judgment of conviction.

FACTS

In 1987, Denise Buchanan and Francisco Leal moved in together. Later that same year, Buchanan gave birth to her first

child, Joseph. Joseph was not Leal's child, but Leal raised him as his own son. Buchanan became pregnant again shortly after Joseph's birth. In 1988, Buchanan gave birth to Joshua, her second son, her first with Leal.

Leal testified that the couple experienced financial pressure to the point that they separated while Buchanan was pregnant with Joshua. Later, after Joshua was born, they moved back in together. Leal testified that he could see that Buchanan was disappointed with Joshua when he was brought to her in the hospital. She wanted a girl. Joshua was in the hospital several times during his infancy. Leal and many other witnesses testified that Buchanan had a close, loving relationship with Joseph, but she was very distant and always seemed irritated with Joshua. She favored Joseph in every way, even in providing food. Teachers testified that Joshua would come to school in first grade without having been provided any breakfast. Leal testified that Buchanan favored Joseph over Joshua such that "Jo[seph] could do no wrong, and Joshua could do no right."

Within weeks after Joshua's birth, Buchanan became pregnant again. Jeremiah, Buchanan's third son, was born in 1989. Jeremiah died at four months of age. The police officer who responded to the scene testified that Buchanan told him that she had found Jeremiah that morning in his crib with blankets over his head. Buchanan told the officer that Jeremiah normally awoke around 8 a.m. or 9 a.m. But the officer was not called to the scene until approximately 10:20 a.m. The officer testified that because of the condition of the body and the appearance of a brown and white substance around the mouth and nose, he suspected the child had vomited and aspirated.

Dr. Terrance Young, the pathologist who performed the autopsy on Jeremiah, attributed the cause of death to Sudden Infant Death Syndrome (SIDS). Dr. Young drew this conclusion because he could not "discern another reasonable cause of death." Dr. Young testified that he did not detect any outward physical signs that would help explain Jeremiah's death, nor did he see any evidence that Jeremiah's death was caused by another person.

Leal testified that Buchanan's pregnancies were extremely difficult, with constant sickness and vomiting. There were continuing financial pressures and Leal was, therefore, working long hours, sometimes at three jobs. He did not participate in the household or child care; Buchanan was responsible for that. Leal said he basically came home to eat and sleep. Leal testified that Buchanan said she was always tired and very stressed with always being pregnant. Within a twenty-four-month period, she had had three pregnancies.

Buchanan became pregnant with her fourth son, John, in 1990. Because Jeremiah's death had been ruled a SIDS death, John was

brought home with an apnea monitor.¹ John died at almost three months of age. Leal testified that on the morning John died, Buchanan told her she was awakened by the sound of the apnea monitor. She called Leal and he performed CPR on John. The paramedics were summoned, but attempts to revive John were futile. The police officer who responded to the call testified that Leal was distraught, but Buchanan was “very calm.” Buchanan told the police officer that the apnea monitor alarm had sounded around 5 a.m., and she found John breathing properly. She reset the monitor, checked John, and turned the monitor off. Buchanan said that as soon as she turned the monitor off, John stopped breathing. A paramedic testified that Buchanan told him, “My child is a victim of SIDS,” rather than the usual, “My child has stopped breathing.” The paramedic testified that it was unusual that someone would use medical terminology.

Dr. Ellen Clark, a board-certified anatomic, clinical, and forensic pathologist, conducted the autopsy on John. Dr. Clark testified that upon examination, John showed petechiae of the lungs, which are capillary bursts beneath the tissue surface of the lungs. Dr. Clark testified that although these commonly accompany an asphyxial injury or suffocation, they are not infrequently found in SIDS cases. Dr. Clark also testified that she found bleeding on the thymus, but that could have been caused by the vigorous attempts at resuscitation. A toxicology screen was done to test for drugs in John’s system. The results were negative. Dr. Clark testified that the bladder washings utilized in the toxicology test were completely consumed by that test. Dr. Clark listed the cause of John’s death as “undetermined.” Dr. Clark testified that this conclusion was based, in part, on her knowledge that a previous SIDS death had occurred in this same family.

In 1992, Buchanan became pregnant again. Leal testified that Buchanan stated she did not want to be pregnant, but she wished for a girl. Leal testified that Buchanan expressed her desire to join a SIDS group’s counseling session, but he discouraged her. Jacob, Buchanan’s fifth son, was born in July 1993. Leal testified that although Jacob was a healthy baby, Jacob was also placed on an apnea monitor. Leal testified that as time progressed, Jacob was hospitalized several times for various ailments, including apnea. Jacob died just a few days before his first birthday. Leal testified that this was significant because he and Buchanan had been told by Jacob’s pediatrician that if Jacob lived past his first birthday, he would no longer be at risk of succumbing to SIDS.

The circumstances surrounding Jacob’s death were described by Buchanan in various ways. Leal testified that Buchanan told

¹An apnea monitor is a device that monitors the child’s breathing and heart rate. An alarm is activated on the monitor when either the child’s heart rate or breathing falls below a certain level.

him that she had turned off Jacob's apnea monitor in order to give Jacob some medicine, that the dog had begun barking in the backyard, and she had left Jacob to determine why the dog was barking. When she returned, Jacob had stopped breathing and was turning blue. Leal testified that Buchanan had told him she sent Joseph next door to summon their neighbor. The police officer who responded to the scene of Jacob's death testified that Buchanan told him that around 7 a.m. she had turned Jacob's apnea monitor off to give him some medicine, and then had gone about her morning chores. Buchanan told the officer that she had lain down and had forgotten to turn the monitor back on. When Buchanan returned around 9 a.m. to check on Jacob, she found that he was not breathing.

A representative of the company that supplied the apnea monitor testified that he arrived at the house to retrieve the apnea monitor a few hours after Jacob had died. The representative testified that the internal memory of the monitor showed that it was turned off at 3:56 a.m. the morning Jacob died, not at 7 a.m., as Buchanan had told the police officer. The representative also said that Buchanan seemed "very unemotional."

Dr. Samuel Parks, a pathologist, conducted Jacob's autopsy. In the external examination, Dr. Parks noted that Jacob was both underweight and short for his age and that he had a linear-like bruise on his scalp. In the internal examination, he determined that both of Jacob's kidneys were smaller than normal. He found possible hemorrhagic areas in the right posterior lower lobe of the lung and a possible hemorrhagic area in the posterior right lobe of the liver. Further tests indicated that the kidneys had been functioning normally. Toxicology tests for blood alcohol, heavy metals, aspirin, Tylenol, and cyanide were negative. Phenobarbital was found in the blood at below a therapeutic level, but Dr. Parks knew that Jacob had been prescribed Phenobarbital. Dr. Parks did bacterial and viral cultures, all of which were negative.

Dr. Parks was not concerned with metabolic illnesses because when he looked at the liver under a microscope, there were no metabolic changes. After consultation with Dr. Ritzlin and Dr. Clark, both board-certified forensic pathologists, Dr. Parks concluded that the cause of death was "undetermined."

Vernon McCarty, the Washoe County Coroner, testified that his office issued the death certificates, in which the cause of death for Jeremiah is stated as SIDS; the cause of death for John is stated as "undetermined after autopsy and toxicology" and the manner of death is stated as "undetermined"; the cause of death for Jacob is stated as "undetermined due to third unexplained infant death in same family" and the manner of death is stated as "homicide." McCarty also included as the answer to the statement, "Describe How Injury Occurred, 'history consistent with suffocation.'"

After stating his education, training, and experience in death

investigations, McCarty testified that there is general agreement among the professionals in the forensic field that when you see three unexplained infant deaths in the same family, the first is recorded as “Sudden Infant Death Syndrome,” the second as “Undetermined” and the third or subsequent deaths as “Homicide.” McCarty testified that the incidence of a SIDS death is approximately 1 in 1,000 births, and that it is virtually a statistical impossibility that a second SIDS death would occur in the same family. McCarty testified that the certificate of death for Jacob was filed over a year after the death because he was trying to get all the information he could. He consulted with both the Reno and Sparks police departments to get all the information they had gathered as a result of their investigations. He consulted with the district attorney’s office and local doctors, as well as out-of-state medical experts, before filing the death certificate.

Dr. Clark testified that she was contacted after Jacob’s death by the coroner, coroner’s investigators, and detectives from the Reno and Sparks police departments. The reports included the records for all the Leal children, including the two living children. She reviewed all three cases, including the autopsy protocols, the microscopic slides for each case, the tests conducted and the autopsies, including the toxicology and bacterial cultures. She suggested that the case should be sent to other persons with particular expertise in looking at multiple, unexplained infant deaths in a family.

Dr. Clark contacted Dr. Janice Ophoven, an expert in pediatric pathology and forensic pathology in St. Paul, Minnesota. Dr. Ophoven referred her to her partner, Dr. Susan Roe, a forensic pathologist and assistant medical examiner in Minnesota. Dr. Clark sent Dr. Roe the autopsy and medical reports and the slides for the three children, as well as the police reports on the Leal family. Dr. Clark told Dr. Roe that she was “particularly interested in your opinions regarding the possibilities of occult inheritable fatal diseases.” Dr. Clark said she had found no evidence of such diseases, but wanted to have someone with specific expertise re-examine the cases and exclude those possibilities. After receiving a report from Dr. Roe, Dr. Clark also sent some of Jacob’s specimens to Dr. Michael Bennett at the Department of Pathology at the Children’s Medical Center of Dallas to conduct additional tests for potential metabolic disorders. Dr. Bennett is a specialist in evaluating infant tissues for metabolic or inheritable disorders. He reported that no abnormalities were detected.

Dr. Clark testified that the incidence of SIDS in this country, depending on the part of the country, is from 1 in 1,000 live births to 1 in 1,500 live births. She also stated that statistically, the probability of a second SIDS death in the same family would be 1,000 times 1,000 and the probability of a third SIDS death in the same family would be 1,000 times 1,000 times 1,000. However, her

conclusion that the deaths were a result of homicide was based on the physical findings and the surrounding circumstances, not on statistics. Her information regarding probabilities resulted in more intensive investigation of the deaths after the first death.

Dr. Clark stated that Jeremiah's death could fit into the category of SIDS. He was a healthy child with no apnea monitor, and there was no antecedent medical history or a preceding history of other infant death in the family. His death was a seemingly random event. Jacob's death could not fit into the category of SIDS. He barely fit within the age category as he was older than ninety-five to ninety-nine percent of SIDS cases. He did not appear to be a healthy child. Jeremiah and John had both been normal size and weight and apparently were well nourished at the time of their deaths. In contrast, when Jacob died, he was somewhat emaciated, grossly underweight, and did not have a healthy appearance. Twelve-month-old Jacob's weight was that of approximately a two-month-old child. He had two areas of skin-break injury on his head and a bruise at the top of his ear. SIDS, by definition, is only ascribed to seemingly healthy children.

Dr. Roe also testified at the trial. She is board certified as an anatomic, clinical, and forensic pathologist with special training and interest in pediatric pathology. She testified regarding her consultation with Dr. Clark on the Leal children. She reviewed the records provided to her and consulted with Dr. Ophoven regarding pediatric pathology and with Dr. Michael Coleman, a neonatologist at St. Paul's Children's Hospital, regarding the apnea monitor records. After reviewing the records and the consultation reports, Dr. Roe concluded that the deaths of the three children were not natural deaths, but were caused by another person, most likely by asphyxiation.

She cited evidence of child abuse in that both Joshua and Jacob were failure-to-thrive children. They suffered from hypernatremic dehydration, which indicates child abuse. Both children had various hospitalizations and had a normal growth curve while in the hospital. While in the hospital, they had good appetites and gained weight. But when they had been home awhile and then returned to the hospital, they were underweight. In addition, Jacob had no apnea episodes with any medical or other personnel; only Buchanan reported any such episodes. While in the hospital, Jacob's encephalogram, sleep study, and pneumatogram results were normal, and no cardiac arrhythmias were noted. Dr. Roe testified that apnea monitor alarms sound often for many reasons, but that does not mean there is an episode of apnea. The neonatologist consulted by Dr. Roe concluded that the apnea monitor records available in this case showed no evidence of apnea, just periodic or irregular breathing, which is normal in a baby.

Dr. Ophoven has specialized training and experience in the area of serial deaths of children less than five years of age within a sin-

gle family. She has lectured on the subject and testified many times in criminal cases for both the prosecution and defense. She reviewed the material that Dr. Roe had regarding the Leal baby deaths and her conclusions were included in Dr. Roe's report. Subsequently, the Washoe County District Attorney's Office was provided with additional materials involving the investigation and the Leal family medical records, all of which she reviewed to render an opinion.

Dr. Ophoven outlined her background, training, and experience with SIDS. She handled all of the examinations of SIDS deaths that came into the office during her forensic training. She kept informed of SIDS research and current thinking. She was asked to author a book chapter summarizing the world's literature at the time on SIDS and has been keeping up with SIDS literature. She serves as a consultant to the Minnesota SIDS Center located at the Minnesota Children's Hospital and has served for many years on the Minnesota state mortality review panel, which reviews all the deaths of children in the state. She has performed hundreds of autopsies on children who have died suddenly and unexpectedly at less than one year of age. She has reviewed many cases of serial deaths in the same family, including the case involving the Hoyt children, who were the first to go home with apnea monitors.

Dr. Ophoven testified that two of the Hoyt children were patients of Dr. Alfred Steinschneider, and he developed the theory that hereditary apnea was the cause of SIDS and reported this in a 1972 article in *The Journal of Pediatrics*. Until 1996, this theory that hereditary apnea caused SIDS was strongly held and was the basis for many articles supporting the theory. It was also the basis for the widespread use of apnea monitors. In 1996, the editor of *The Journal of Pediatrics* retracted the 1972 article and apologized for having published it. The evidence on which the 1972 article was based was refuted when the mother confessed to killing her five children. Dr. Ophoven testified that, at the time, it was considered almost incomprehensible that mothers would kill their children. Therefore, many earlier deaths had been considered SIDS cases based on incomplete or no exams and poor death investigation wherever investigators did not even consider the possibility of murder by a parent. Accordingly, there needs to be a high degree of skepticism about reports before 1996 of a recurrence of SIDS deaths in a single family.

Dr. Ophoven also described how easy it is to asphyxiate a very young infant, most of the time leaving no sign. She testified that it takes two full minutes to smother a child to unconsciousness and after that another four to five minutes for death to occur.

Dr. Ophoven concluded that the deaths of Jeremiah, John, and Jacob resulted from homicide. The basis for that opinion was as follows:

There is no underlying disease present in the three children identified. There is clear evidence of physical neglect, emotional neglect, emotional abuse in the children. There is evidence of injuries to the head of Jacob that, in my opinion, are suggestive of physical abuse as well.

There is [sic] remarkable inconsistencies in the story rendered by the mother in the history of specifically Joshua and Jacob. And there's many, many inconsistencies to the point where, with Joshua alone, I would have considered him to be at risk of potential death.

The striking recurrence of sudden and unexplained death in three children that clearly cannot be Sudden Infant Death Syndrome, reasonable evaluation of the children fails to demonstrate a plausible explanation for all of the facts in this case. Substantial failure to thrive of Joshua and Jacob to the point of, in a reasonable person's mind, they were at significant risk of death or debility.

Presence of pulmonary hemorrhage in Jeremiah, which the people in England are now suggesting is a risk factor for children who may be being suffocated.

. . . .

The fact that no apnea was ever observed of any significance by anyone but the mother. The fact that the monitors were turned off at the time that the deaths occurred. And to bring that all to a close, and the fact that none of the deaths are consistent with Sudden Infant Death Syndrome or with any other known disorder.

The absence of microscopic findings in any of the children that suggests an underlying metabolic disease, specifically in the brain, the heart, the liver and the muscle. The presence of petechiae in the liver of Jeremiah. The life-threatening event that Joshua presented with that clearly was inconsistent with the mother's story.

When you put all of those things together, there is only one diagnosis that explains them all.

. . . .
 . . . [T]hey were killed.

When asked about possible metabolic disease, Dr. Ophoven testified that metabolic disease does not account for all the problems, and it typically "demonstrates abnormalities in tissue." Typically, there are abnormalities in either the liver, heart, skeletal muscle, or brain. Dr. Ophoven testified that in the Leal case, each of the three children would have had to have the autosomal recessive gene from both parents. The chances of each child's getting the recessive gene would be one in four. Furthermore, the fact that the children entered the hospital in desperate shape and recovered as soon as they were provided food and water is not consistent

with metabolic disease. Dr. Ophoven testified that while the petechiae in the lungs could be found in SIDS deaths, she had never seen petechiae in the liver in a SIDS death.

Dr. Ophoven agreed that John's death, in isolation, is not totally inconsistent with SIDS. But other factors are significant, such as the fact that he was found by the same person as the others, and he was off the monitor when he died. The only person who reported that the children changed color several times was the mother. Dr. Ophoven testified that when a parent reported this information, either she is fabricating or is causing the symptoms, and the failure of any other person to see these symptoms is almost diagnostic. The autopsy report also showed hemorrhage in the lungs and an absence of thymic petachiae, which are present in eighty to eighty-five percent of SIDS deaths.

Dr. Ophoven testified that at the Minnesota Apnea Center, with which she has worked for years, the diagnostic criteria for pathological apnea requires that there be cyanosis, limp muscle tone, lethargy or absence of cry, bradycardia of a significant degree, and cessation of breathing long enough to cause profound symptoms or a life-threatening event. Pauses in breathing are normal in infants. No one other than the mother had reported any symptoms of apnea in the children.

Dr. Ophoven testified that it is standard operating procedure in a death investigation to review social service records, referrals to child protective services, and any contacts that individuals have made with the family. Investigators have noted that a perpetrator will resist contact with social services. The medical records reflect that the Leal children were quite filthy and physically neglected and were, therefore, referred to social services, but the Leals did not follow up. Dr. Ophoven testified that a pediatric pathologist must consider not only the physical findings, but other factors that reflect potential risk, such as attachment and concern on the part of the parent.

Dr. Ophoven was asked about the statistical probability of three SIDS deaths in the same family. She testified that the diagnosis of SIDS is not relevant here because of the reasons she had stated. The diagnosis of SIDS requires that you exclude all other causes of death before you can call a death a SIDS death and, here, other causes of death could not be excluded. She testified that, even without considering the other deaths, she believes that the medical and autopsy reports show that Jacob was murdered. At six months of age, he weighed about the same as he did at birth. His death was clearly a case of failure to thrive because of starvation and physical neglect.

Dr. Ophoven testified that she is familiar with the forensic approach of labeling the first unexplained infant death in a family SIDS, the second as undetermined, and the third as homicide. It is an approach to the handling of cases like this by coroners and

is standard practice within the forensic community, but not in her practice.

Dr. Patrick Colletti, Jacob's pediatrician, testified that upon reviewing the autopsy report, he determined that Jacob was a "failure to thrive" child, but that Jacob did not suffer from starvation prior to his death. Upon a review of the medical and autopsy records of all three children, Dr. Colletti testified that he did not have an alternative cause of death for Jeremiah other than SIDS. He believed that Jacob suffered from renal hypoplasia, meaning that the kidneys do not grow. Dr. Colletti testified that a child of Jacob's age should have had kidneys weighing approximately seventy-two grams, and that a newborn would have kidneys weighing approximately twenty-two grams. At Jacob's death, his kidneys weighed fourteen and eighteen grams, respectively, a total of thirty-two grams. Dr. Colletti believes that this condition could be hereditary, that it could be vascular, meaning the blood supply had not developed properly, or that it could be inflammatory or degenerative. Dr. Colletti stated that he believed Jacob died as a result of this condition.

Dr. Colletti further testified that he believed that John suffered from an "obstruction uropathy," meaning that the tube that helps the bladder empty properly had not developed. He believed that John died as a result of an obstruction uropathy, and that it was this condition that predisposed John to an infection. He further testified that John's infection was probably sepsis, which is an infection of the bloodstream. Dr. Colletti testified that he noted this condition from John's autopsy report where one of the kidneys was described as being small and having a "kink[ed] and convoluted ureter." Although Dr. Clark, who conducted the autopsy of John, testified that she found no evidence that John's kidneys caused an infection that contributed to his death, Dr. Colletti stated that he was not surprised that the infection was not discovered during the autopsy because the infection would be very difficult to detect. He testified that kidney disease could be hereditary, and that an infant with a kidney disorder would easily become dehydrated.

The defense called Dr. Cyril Wecht of Pittsburgh, a board-certified anatomic, clinical, and forensic pathologist. He founded the Infant Survival Alliance and is on its Board of Directors. Dr. Wecht testified that although he was aware of the practice of classifying the first unexplained death in a family as SIDS, the second as undetermined, and the third as homicide, he did not subscribe to the theory. He stated that such a theory was not based on science. Dr. Wecht further testified that it is possible for SIDS to occur more than once in the same family, and that all risk factors, including a short duration between pregnancies, must be taken into account.

Dr. Wecht stated his opinion that the investigation conducted to

determine how these children died was “not extensive.” As to John’s death, Dr. Wecht testified that since John was the second child within this family to die, a careful and thorough investigation should have been conducted at that time to determine the cause of death. Dr. Wecht testified that extensive testing was not conducted to determine whether the children died as a result of some metabolic or genetic cause.

As to Jeremiah, Dr. Wecht testified that there was nothing in the autopsy report to indicate that Jeremiah died from anything other than SIDS. Additionally, Dr. Wecht testified that there was no evidence of suffocation. In fact, Dr. Wecht did not find any evidence of suffocation in any of the children. In regard to the “liver petechiae” found during the autopsy of Jeremiah, Dr. Wecht concluded that the liver petechiae did not indicate any cause of death. In conclusion, Dr. Wecht testified that it was his belief that Jeremiah died as a result of SIDS.

In regard to John, Dr. Wecht testified that it was very significant that one of John’s kidneys was smaller than the other. Because of the abnormal kidney, Dr. Wecht testified that he would have initially listed John’s death as undetermined. He also testified that the condition of John’s kidneys would have caused him to order additional tests, and that if these tests had come back negative, he would have listed the cause of death as SIDS.

As to Jacob, Dr. Wecht testified that he would have initially listed the cause of death as undetermined, and then he would have ordered additional tests. After more tests were done, and if the results had come back negative, Dr. Wecht testified that he would have listed the cause of death as SIDS. Dr. Wecht conceded that statistically it would be very unlikely that a second SIDS death would occur in the same family, but he stated that he could not base a cause of death on statistics. Dr. Wecht also testified that once homicide was suspected in John’s death, all evidence should have been retained.

The defense also called Dr. Berkley Powell, a board-certified pediatrician and geneticist and associate professor at the John A. Burns School of Medicine at the University of Hawaii. He works with other professionals in the field in identifying children and adults who have genetic and/or metabolic disorders. He reviewed the autopsy and medical reports of the Leal children and the transcripts of the grand jury testimony. Later, he reviewed the testimony of the pathologists, Dr. Roe, Dr. Hart, Dr. Ophoven, Dr. David Zucker, and Dr. Colletti. Dr. Powell had also been a treating physician for Jacob when he practiced in Reno. He had been covering for Dr. Colletti at the time of Jacob’s birth. At that time, he requested metabolic screening and organic acid screening, and received a report from Dr. Bennett in Dallas, Texas. Dr. Bennett’s report stated that no abnormalities were detected. Dr. Powell testified at trial that he was concerned with the lactic acid and pyrog-

lutamic acid peaks. However, in 1993, he signed off on the report that concluded: “not abnormal for age, no need to repeat.”

Dr. Powell testified that he believes that Jacob suffered from renal tubular acidosis. He could not agree with Dr. Colletti’s conclusion that Jacob suffered from renal failure without a creatinine test. A creatinine test had been performed on Joshua and was normal. Dr. Powell described a number of genetic or metabolic disorders, which could have been present and would have been consistent with the kidney findings on John and Joshua. After reviewing the reports before trial, Dr. Powell was immediately suspicious that there was an inherent genetic disorder that was overlooked.

The defense called Dr. Enid Gilbert-Barness, a professor of pathology and laboratory medicine, pathology of pediatrics, and obstetrics and gynecology in Tampa, Florida. She is board certified in pediatrics, anatomic pathology, clinical pathology, and pediatric pathology. Dr. Gilbert-Barness testified that although many pathologists subscribe to the “first death is SIDS, the second death is unexplained and the third death is homicide” theory, she believes that the use of the theory is a “disgrace.” She described SIDS as a “waste basket group,” which she would prefer to call Sudden Infant Death—cause undetermined. She also described the use of apnea monitors as “a disgrace.” She testified that the pathological changes that you see in asphyxiation and SIDS are frequently indistinguishable. After a review of the reports, Dr. Gilbert-Barness testified that she believes that all four Leal children suffered from hereditary renal adysplasia that pre-disposed the children to death.

Dr. Gilbert-Barness testified that it is well documented that recurrence of SIDS in the same family is up to ten times the normal risk factor which is 1 in 1,000—in subsequent siblings it would be 1 in 100. She disagrees with the opinion expressed in *The Pathology of Child Abuse* by the Kemp Center, well known to Dr. Gilbert-Barness as a leader in the area of child abuse, that the risk of three SIDS deaths in one family would be approximately 1 in 10 million. However, she had expressed a different opinion in an article titled *Sudden Deaths in Infants*:

“ ‘Because it now appears that SIDS is probably not genetically controlled, medical examiners should be cautious in attributing the second or third apparent crib death in the family to SIDS, and should instead initiate an investigation into the likelihood of filicide’, homicide by a parent, ‘or metabolic disease.’ ”

Dr. Gilbert-Barness disagreed with Dr. Colletti’s conclusion that an overwhelming septic infection caused John’s death. She believes that many more tests should have been done with respect to the Leal children.

The defense called Lewis Barnes, a professor of pediatrics at the University of South Florida College of Medicine. He reviewed the medical and autopsy records of the Leal children and, like Dr. Gilbert-Barnes, concluded that the children had a renal disorder. He testified that Jacob's failure to thrive could have been a result of a metabolic disease that had an effect on the kidney. He testified that he wrote a paper in which he concluded that if you eliminate anatomical difficulties, ninety percent of failure-to-thrive cases are due to feeding difficulties. Either there is a failure to know what to feed, or a failure to give the child the proper food, or the child is neglected.

The defense called Dr. Robert Steiner from the Oregon Health Sciences University, who is in charge of the division of metabolism in the department of pediatrics. He is board certified in pediatrics, clinical genetics, and clinical biochemical genetics. He is a metabolic disease consultant to the Northwest Regional Newborn Screening Program. Every newborn in the United States is tested for several metabolic and other diseases. He was asked to review the medical records of four of the Leal children, transcripts from the grand jury investigation, and some summaries regarding the family members.

Dr. Steiner testified that he is suspicious that Jacob died from a kidney disease or a genetic or metabolic disease. He testified that the testing of the Leal children's tissues was inadequate and many more metabolic tests should have been made. However, he admitted that even if all the tests he recommended had been performed, he still could not rule out all metabolic disorders.

As a rebuttal witness, the State called Dr. Vincent DiMaio, chief medical examiner in San Antonio, Texas, professor in the department of pathology at the medical school in San Antonio, the editor of *The American Journal of Forensic Medicine and Pathology*, and coauthor of the treatise *Forensic Pathology*. Dr. DiMaio testified that he coined the forensic axiom regarding multiple, unexplained infant deaths in the same family. Dr. DiMaio explained the axiom by stating:

[T]he way it's applied is when you get a first case that appears to be SIDS, you always treat it as SIDS. And you assume that this is a natural death. That's the way you should do it. You should not be suspicious of the parents and such, and you know, be insulting, essentially.

In the second case, we know that in all probability it's not a SIDS. It's a homicide. But still, you always give them the benefit of the doubt. So, in the second case you always give them the benefit of the doubt, rather than be — you would rather give too much away than to falsely accuse them. It's only when — you get suspicious and you have the police investigate a second one. Do a lot more. It's when you get

to the third one, then you've gone beyond reasonable doubts and you have to call it a homicide.

The prosecutor showed Dr. DiMaio an article by Dr. Guntheroth in which he cites a number of SIDS cases in the same family. Dr. DiMaio stated that the problem with the data is that they are based on death certificates and the article was published in 1990. He testified that it is estimated that approximately forty percent of death certificates are incorrectly filled out. Furthermore, any statistics before 1995 are not reliable because they were including homicides as SIDS cases. The Hoyt case, involving the deaths of five children, had been reported in the pediatric literature. It was thought that some hereditary disease was causing repetitive SIDS. In his 1989 treatise, Dr. DiMaio expressed his opinion that SIDS as the cause of death of the Hoyt children was wrong; the deaths were homicides. Subsequently, the mother confessed that she killed her children. Other cases that are classified as SIDS have also been found to be homicide when the killer confesses. Dr. DiMaio testified that, in his opinion, he does not believe that SIDS recurs in a single family. His opinion is based on his experience and the experience of other forensic pathologists in evaluating cases.

Dr. DiMaio was asked about the reports on Jacob and John. He testified that the size of kidneys varies widely, and small kidneys do not mean there is a disease process or that they are abnormal. John's left kidney was abnormal and shows evidence of some fibrosis and scar tissue, which probably happened in utero based on his young age. A doctor evaluates whether the organ works and, if it does, size does not matter. Even John's abnormal kidney was fine microscopically. John had a normal right kidney and all anyone needs is half of one kidney to function without any problems. Jacob's kidneys were small, but so was the rest of his body.

Dr. DiMaio testified that when you have significant starvation, one of the organs that decreases in size is the kidney, while other organs may or may not decrease in size. His information on variable tissue wasting is based on studies in the early 1940s in the Warsaw ghetto. There were many doctors in the ghetto, and as people starved to death, the doctors reported medically what was happening. The doctors performed autopsies on the dead and recorded their results. The resulting medical documents were hidden and were recovered from the ruins after the war and translated and published.

Dr. DiMaio also saw no evidence of metabolic disorders in the Leal children, and even if they had such a disorder, there is no evidence that it would have killed them. Most of the metabolic diseases show some evidence in the liver, and there was no such evidence in these children. Therefore, he did not see the need for

additional metabolic tests. Neither did he see the need for genetic tests because there is nothing specific for which to test.

In addition to the medical experts, numerous other witnesses testified regarding their experience with the family members. That testimony revealed inconsistent stories by Buchanan. Joshua's teacher testified that Joshua was not fed and was emotionally neglected and abused. Buchanan refused to allow Joshua to meet with the school counselor despite requests from the counselor because of Joshua's apparent, severe emotional problems. There was also testimony regarding physical abuse of Joshua.

A grocery store clerk testified that she heard an apnea alarm sound when Buchanan was in the store with a baby, but she saw that the baby looked normal and healthy. Later, when Buchanan told Leal about the episode at the grocery store, she said that Jacob had a drastic color change. But Buchanan had also told a nurse that Jacob's monitor never went off.

A number of witnesses testified that Buchanan showed little or no emotion regarding the deaths of her three sons. At Jacob's funeral, the priest mistook Leal's sister, who was crying, for Jacob's mother. Buchanan showed no emotion at any of the funerals. A woman from a support group testified that she talked to Buchanan over the telephone about SIDS. She did not remember Buchanan's exact words because she was distracted by Buchanan's casual tone. She testified that when Buchanan talked about her child's death and about SIDS running in the family, "I felt at the time it was like somebody was asking me to pass them the salt at the dinner table."

Based on this evidence, the jury convicted Buchanan of two counts of first-degree murder in the deaths of John and Jacob. The jury acquitted Buchanan of murder in connection with the death of Jeremiah. Buchanan was sentenced to two consecutive terms of life in prison with the possibility of parole.

DISCUSSION

Sufficiency of the evidence

Buchanan's principal argument is that insufficient evidence was presented at trial to convict her of the murder of her two sons. She focuses specifically on proof regarding the *corpus delicti*. At trial in a murder case, the State is required to prove (1) the fact of death, and (2) the criminal agency of another as the cause of the death.² The fact of death is not in dispute, but there was a great deal of conflicting evidence regarding the cause of the deaths of the two boys. Buchanan argues that the evidence that either she or someone else caused the deaths was not proven beyond a reasonable doubt. She contends that, on the contrary, the evidence established that the two boys died of natural causes.

²*Fruhiger v. State*, 111 Nev. 1385, 1389, 907 P.2d 158, 160 (1995).

The relevant inquiry for this court is “whether, after viewing the evidence in the light most favorable to the prosecution, *any* rational trier of fact could have concluded beyond a reasonable doubt that [the decedent’s] death was caused by a criminal agency.”³ “[I]t is for the jury to determine what weight and credibility to give various testimony.”⁴ Circumstantial evidence alone can certainly sustain a criminal conviction.⁵ However, to be sufficient, all the circumstances taken together must exclude to a moral certainty every hypothesis but the single one of guilt.⁶

There is little disagreement about the physical evidence, only the interpretation of that evidence. The trial became a battle of the medical experts, since most of the testimony regarding the cause of death was presented by medical experts who had not actually examined the bodies, but only reviewed the autopsy reports, the medical reports, the other reports of the investigation, as well as the testimony of the other medical experts.

Despite the fact that most of the doctors testifying had excellent medical credentials, there was little agreement as to the cause of death of the three children. The Washoe County forensic pathologist and the two forensic pathologists with whom Dr. Clark consulted agreed that Buchanan caused the deaths. However, there was even disagreement among the other doctors about whether the autopsy photograph of Jacob depicted a normal or an emaciated failure-to-thrive child. The jurors had an opportunity to hear the opinion of all the medical experts and could look at the photograph for themselves and make their own determination.

Even though the defense experts did not agree on a cause of death and disagreed with the conclusions reached by others, they seemed to agree that additional tests should have been conducted to rule out metabolic, kidney or other inherited diseases. However, other experts testified that there was no indication of any metabolic diseases when the organs were examined, and therefore, no further tests were warranted. Also, the metabolic tests that were conducted showed no abnormalities. Furthermore, the defense could still have tested for any inherited disease in the surviving Leal family members. There were abnormalities in the size and shape of Jacob’s kidneys, but tests showed they functioned normally. There was expert testimony that only half a kidney is necessary for survival. The jurors were free to judge the credibility of the various experts and make their own determination as to whom they should believe. Based on the medical experts alone, there was substantial evidence from which the jury could conclude that Buchanan killed her children.

³*Id.* at 1391, 907 P.2d at 161.

⁴*Hutchins v. State*, 110 Nev. 103, 107, 867 P.2d 1136, 1139 (1994).

⁵*Walker v. State*, 113 Nev. 853, 861, 944 P.2d 762, 768 (1997).

⁶*Kinna v. State*, 84 Nev. 642, 646, 447 P.2d 32, 34 (1968).

In view of the physical findings and the widely varying medical opinions, the circumstances surrounding the deaths become important. The State presented evidence that Buchanan was unemotional about the deaths of her children, that she had been physically and emotionally unavailable to the children, and that she abused her children. Buchanan told contradictory stories of the events leading to the death of Jacob, both of which were inconsistent with the physical record on the apnea monitor. Buchanan was the only person who reported seeing a life-threatening episode, and one episode that she reported as life threatening was contradicted by a witness to the episode. The children had medical problems when in her care, but none when they were in the care of others.

Buchanan argues that the only evidence presented at trial showing that the infants died as a result of a crime was the testimony of Dr. DiMaio and other pathologists who testified that statistical probabilities mandated that these infants could not have died from natural causes. She is incorrect. The forensic pathologists set forth their reasons for concluding that the deaths were caused by asphyxiation, and those reasons were not based on statistical probabilities.

The coroner and several of the medical experts cited statistical probabilities, but they did not agree on those either. The Washoe County coroner testified that there is general agreement among the professionals in the forensic field that the first unexplained death of an infant is recorded as SIDS, the second as undetermined, and the third and subsequent deaths as homicide, based on the statistical impossibility of subsequent deaths in the same family being SIDS. Dr. DiMaio testified that he developed this “axiom” based on his experience and the experience of other pathologists in evaluating cases. He explained that basically, the first unexplained death is treated as a natural death since you should not want to be suspicious of the parents or insult them by investigating them when they are grieving. At the second death, you are suspicious, but you still give the parents the benefit of the doubt because you do not want to falsely accuse them. When you get to the third death, you have gone beyond “reasonable doubt” and you treat it as a homicide.

It is clear that neither Dr. DiMaio nor the Washoe County coroner would automatically list the third death as homicide. Dr. DiMaio stated that he would *treat it as a homicide*. In other words, a criminal investigation is warranted, including interrogation of family members and consideration of all of the surrounding circumstances. It is apparent that the coroner in this case did not automatically find the cause of the third death to be homicide based on the “axiom” either. Instead, he conducted an intensive investigation and reviewed the entire case with both the Sparks and Reno police departments and medical experts. He did not file

the death certificate until over a year after Jacob's death because of the extensive investigation. The so-called "axiom" appears to be simply a guide to coroners or medical examiners to focus their future investigations.

There was also considerable testimony attacking the statistical probabilities and approach mentioned by the coroner and Dr. DiMaio, even though they all recognized that the approach was commonly used by coroners and forensic pathologists. Dr. Gilbert-Barness called the "theory" "a disgrace." She also testified that it is "well-documented" that the risk of the recurrence of SIDS in the same family is up to ten times the normal risk factor. Dr. Wecht also does not subscribe to Dr. DiMaio's theory. He testified that the "theory" was not based on science. In fact, Dr. Wecht is of the opinion that it is possible for SIDS to occur more than once in the same family. All the medical experts agreed that the generally accepted risk for a SIDS death is about 1 in 1,000 live births. However, they clearly disagreed as to whether the likelihood of a subsequent SIDS death in the same family goes up or down. The jurors heard these opinions and were free to accept or reject any or all of them.

Lost or destroyed evidence

Buchanan claims that she was "irretrievably crippled and a fair trial became impossible" because the State discarded, consumed or failed to gather various tissues of the three infants, thus, impermissibly shifting the burden of proof to the defense. In *Williams v. State*,⁷ this court quoted the following passage from *Leonard v. State*:⁸

The State's loss or destruction of evidence constitutes a due process violation only if the defendant shows either that the State acted in bad faith or that the defendant suffered undue prejudice and the exculpatory value of the evidence was apparent before it was lost or destroyed. Where there is no bad faith, the defendant has the burden of showing prejudice. The defendant must show that "it could be reasonably anticipated that the evidence sought would be exculpatory and material to [the] defense.'" It is not sufficient to show "'merely a hoped-for conclusion'" or "'that examination of the evidence would be helpful in preparing [a] defense.'"

There was no evidence of bad faith on the part of law enforcement. The murder investigation did not start until the third death, so any exculpatory value from any tissue from the first two vic-

⁷118 Nev. ____, ____, 50 P.3d 1116, 1126 (2002), *cert. denied*, ____ U.S. ____, 123 S. Ct. 569 (2002).

⁸117 Nev. 53, 68, 17 P.3d 397, 407 (2001) (citations omitted).

tims would not have been apparent to law enforcement. Also, medical experts testified that because of the small size of infants, frequently the tissues are consumed in the testing.

The burden of proving prejudice lies with the defendant.⁹ It is not sufficient that the defendant shows merely a hoped-for conclusion from examination of the lost evidence or that it would be helpful in preparing a defense.¹⁰ Buchanan claims she hoped to prove either metabolic or hereditary kidney disease. Some defense experts indicated that the potential diseases that the defense was postulating were hereditary. Other medical experts testified that hereditary disease could still be shown by testing the living members of the family. One of Buchanan's medical experts who testified that inadequate metabolic testing was done, had signed off on the results of the metabolic tests on Jacob when he practiced as a pediatrician in Reno as "not abnormal for age, no need to repeat." Another defense metabolic disease expert testified that even if all the tests he recommended had been done, metabolic disease still could not be ruled out. Many other experts testified that there was no indication of a metabolic or hereditary disease in any of the children or in their test results. Buchanan has not shown that the "lost" evidence would have been exculpatory. Also, hereditary tests could have been performed by the defense on the surviving Leal family members if Buchanan really thought it likely that exculpatory evidence would have been produced.

Buchanan also alleges that she was prejudiced because the bedding and pajamas were not collected at the scenes of the deaths and because photographs were not taken at the scenes. Buchanan has failed to show how these items would be material to her defense.

Premeditation and deliberation instruction

Buchanan argues that the instructions given to the jury regarding premeditation and deliberation were improper. The jury was given the standard instruction at the time, known as the *Kazalyn*¹¹ instruction. In 2000, after the conclusion of this trial, this court disapproved of that instruction in *Byford v. State*¹² because the instruction blurs the distinction between premeditation and deliberation. However, that does not mean that any prior conviction using the *Kazalyn* instruction must be overturned. This court reviews the evidence in cases in which the *Kazalyn* instruction was given to determine if sufficient evidence was presented to establish premeditation and deliberation. In this case, we have the tes-

⁹*Sheriff v. Warner*, 112 Nev. 1234, 1240, 926 P.2d 775, 778 (1996).

¹⁰*Id.* (citing *Boggs v. State*, 95 Nev. 911, 913, 604 P.2d 107, 108 (1979)).

¹¹*Kazalyn v. State*, 108 Nev. 67, 75, 825 P.2d 578, 583 (1992).

¹²116 Nev. 215, 235, 994 P.2d 700, 713 (2000).

timony regarding how long it takes to suffocate an infant, which is sufficient evidence of deliberation, and two children being killed years apart is sufficient evidence to infer premeditation.

Beyond a reasonable doubt instruction

Buchanan challenges the reasonable doubt instruction codified in NRS 175.211. This court has repeatedly reaffirmed the constitutionality of Nevada's reasonable doubt instruction.¹³ In *Ramirez v. Hatcher*, the United States Court of Appeals for the Ninth Circuit agreed that Nevada's reasonable doubt instruction is constitutional.¹⁴

Other claims

Buchanan's claims that the district court erred in allowing rebuttal testimony and in not issuing an advisory verdict are without merit. The district court was within its discretion in admitting rebuttal evidence¹⁵ and in not issuing an advisory verdict.¹⁶

For the foregoing reasons, Buchanan's judgment of conviction is affirmed.

AGOSTI, C. J., BECKER and MAUPIN, JJ., and YOUNG,¹⁷ Sr. J., concur.

ROSE, J., with whom LEAVITT, J., agrees, concurring:

I agree with the majority's analysis and conclusion, but concur to express my concern about the use of statistical evidence in criminal trials.

In this case, several experts testified about the probability of three infants in one family being stricken with SIDS. This testimony was based on the experts' own investigations of unexplained infant deaths as well as literature discussing the subject. The experts explained that years of research and current thinking on the subject establish the statistical improbability of SIDS occurring three times in the same family.

The admission of statistical evidence to show the probability of an event occurring has long concerned courts throughout the

¹³See, e.g., *Noonan v. State*, 115 Nev. 184, 189, 980 P.2d 637, 640 (1999).

¹⁴136 F.3d 1209 (9th Cir.), cert. denied, 525 U.S. 967 (1998).

¹⁵*Petrocelli v. State*, 101 Nev. 46, 52, 692 P.2d 503, 508 (1985).

¹⁶*Milton v. State*, 111 Nev. 1487, 1494, 908 P.2d 684, 688 (1995); NRS 175.381(1).

¹⁷THE HONORABLE CLIFF YOUNG, Senior Justice, having participated in the oral argument and deliberations of this matter as a Justice of the Nevada Supreme Court, was assigned to participate in the determination of this appeal following his retirement. Nev. Const. art. 6, § 19; SCR 10. THE HONORABLE MARK GIBBONS, Justice, did not participate in the decision of this matter.

United States. In *State v. Sneed*,¹ the Supreme Court of New Mexico stated that “mathematical odds are not admissible as evidence to identify a defendant in a criminal proceeding so long as the odds are based on estimates, the validity of which have not been demonstrated.” In *Sneed*, a mathematics professor testified that the chances of the defendant committing the crime as opposed to some other person were 1 in 240 billion.² The professor used the product rule to determine the probability that certain independent events would occur jointly.³ The product rule provides that the “probability of the joint occurrence of a number of mutually independent events is equal to the product of the individual probabilities that each of the events will occur.”⁴ The court determined that the factors used by the professor were unsubstantiated estimates and, thus, reversed the conviction and remanded the case for a new trial.⁵

In the landmark case of *People v. Collins*,⁶ the California Supreme Court concluded that testimony by a college mathematics professor on the probability of persons with the same distinctive characteristics as the defendants committing the crime was inadmissible. The court determined that the expert testimony lacked an adequate evidentiary foundation for the probability estimates and also lacked adequate proof of the statistical independence of the six factors used by the State’s witness when calculating the probabilities.⁷ On the other hand, other courts have concluded that statistics are admissible when based on objective, substantiated evidence and the number of variables is controlled.⁸

In cases dealing with multiple occurrences of SIDS, testimony of statistical probabilities has been received with caution. For example, in *Johnson v. State*,⁹ the Georgia Supreme Court concluded that evidence of the probability of multiple occurrences of SIDS was inadmissible due to the lack of information upon which it was based. Other courts, however, have upheld the admission of

¹414 P.2d 858, 862 (N.M. 1966).

²*Id.* at 861.

³*Id.*

⁴*People v. Collins*, 438 P.2d 33, 36 (Cal. 1968).

⁵*Sneed*, 414 P.2d at 861-62.

⁶438 P.2d at 33.

⁷*Id.* at 38-39.

⁸*See Rachals v. State*, 361 S.E.2d 671, 675 (Ga. Ct. App. 1987) (admitting statistical evidence where the variables were controlled and the “statistics were not derived from a random sampling”); *State v. Briggs*, 776 P.2d 1347, 1358 (Wash. Ct. App. 1989) (noting that “[t]here is no prohibition against using well-founded statistics to establish some fact that will be useful to the trier of fact”).

⁹405 S.E.2d 686, 688 (Ga. 1991).

statistical evidence on the rarity of multiple occurrences of SIDS in a single household when a sufficient foundation is established.¹⁰

Here, there was substantial evidence, which the majority amply identifies, to establish that John and Jacob died of asphyxiation and not SIDS. It was the expert opinion of Dr. Clark and Dr. Ophoven that at least the second and third deaths were not caused by SIDS. Had there been no evidence other than the statistics, I would be very reluctant to affirm this conviction because a defendant should be convicted by the evidence, not exclusively by the numbers and probabilities. In this case, however, that did not happen.

Therefore, I respectfully concur.

¹⁰*See, e.g., State v. Pankow*, 422 N.W.2d 913, 918-19 (Wis. Ct. App. 1988) (admitting statistical probability analysis because proper foundation was laid, and the State did not argue that the probability could be used to determine the defendant's guilt).

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JANETTE BLOOM, *Clerk*.



