IN THE COURT OF CRIMINAL APPEALS OF TENNESSEE
AT NASHVILLE
Assigned on Briefs at Jackson February 14, 2012

STATE OF TENNESSEE v. MARCIE LYNN PURSELL aka MARCIE PURSELL FRAZIER

Appeal from the Criminal Court for Davidson County
No. 2007-B-948 J. Randall Wyatt, Jr., Judge

No. M2011-00286-CCA-R3-CD - Filed March 28, 2013

The Defendant, Marcie Lynn Pursell, was found guilty by a Davidson County Criminal Court jury of three counts of aggravated child abuse, Class A felonies. See T.C.A. § 39-15-402 (2006) (amended 2009, 2011, 2012). She was sentenced as a Range I, standard offender to three concurrent terms of fifteen years' confinement. On appeal, she contends that the evidence is insufficient to support her convictions and that the trial court erred by not allowing her to present evidence that she consented to a polygraph examination. We affirm the judgments of the trial court.

Tenn. R. App. P. 3 Appeal as of Right; Judgments of the Criminal Court Affirmed

JOSEPH M. TIPTON, P.J., delivered the opinion of the court, in which JOHN EVERETT WILLIAMS and CAMILLE R. MCMULLEN, JJ., joined.

David M. Hopkins (on appeal), and Ron Pursell and Jodie Bell (at trial), Nashville, Tennessee, for the appellant, Marcie Lynn Pursell.

Robert E. Cooper, Jr., Attorney General and Reporter; Benjamin A. Ball, Assistant Attorney General; Victor S. (Torry) Johnson, III, District Attorney General; and Brian Keith Holmgren and Elizabeth Foy, Assistant District Attorneys General, for the appellee, State of Tennessee.

OPINION

This case relates to multiple bone fractures received by the Defendant's son in the five weeks following his birth. At the trial, Brenda Pursell, the Defendant's mother and the victim's grandmother, testified that the victim was born on November 16, 2006, without complications. The victim was the Defendant's first child. She said the Defendant's only difficulty during the pregnancy was bladder and kidney infections. She did not know what,

if any, nutritional supplements the Defendant took while pregnant or if the Defendant underwent treatment for nutritional deficiencies. She said that after the victim was born, the Defendant and the victim lived at her home for two and one-half to three weeks. She said that the Defendant and the victim had their own room while living there and that the Defendant only left the victim with her once for a couple of hours and never used a babysitter while living at her home.

Mrs. Pursell testified that she knew Daniel Smith before the victim was born and that Mr. Smith visited the Defendant while the Defendant lived with her. She said the Defendant and the victim moved into Mr. Smith's home the first week of December 2006. She denied visiting the Defendant at Mr. Smith's home and said Mr. Smith was "pretty good" with his children, who attended preschool in 2006. She did not know if anyone babysat the victim while the Defendant lived with Mr. Smith. She said that she saw Mr. Smith with the victim at the hospital three times and that Mr. Smith touched the victim "very gently" and showed a lot of concern for the victim's health.

Mrs. Pursell testified that the Defendant asked her for parenting advice and that the Defendant was concerned about the victim. She said the Defendant woke the victim to feed him during the night and agreed the Defendant awoke regularly while the victim was a newborn. She said that on December 14, 2006, the Defendant called and said she was taking the victim to Vanderbilt Hospital. She said the Defendant stated that the victim choked and had difficulty breathing.

Mrs. Pursell testified that she spoke to Metropolitan Police Officer Selene Julia at Vanderbilt on December 27, 2006. She agreed she was told that the victim had rib fractures that "were indicative" of being intentionally inflicted. She said she was shocked by the injuries and did not know the cause. She said the Defendant loved the victim and would not harm him. She said that she spoke to the police again on February 21, 2007, and that they told her the victim had more fractures. She said that to her knowledge, her family had no history of bone disease, although she was adopted and did not know her biological family's medical history. She said medical tests to determine if the victim had any medical conditions that might have caused the injuries were requested, but Vanderbilt did not perform them. She did not know if the victim's pediatrician performed the tests after the victim was released from Vanderbilt. She said that she requested the testing while the victim was at Vanderbilt, but she denied making other attempts to have the tests performed. She said that after the victim's release from the hospital, the victim saw a new pediatrician regularly, that the victim was "perfectly healthy now," that the victim lived with her, and that the victim had not received any new fractures.

On cross-examination, Mrs. Pursell testified that the Defendant was excited about her pregnancy and her being a mother. She said that although the delivery was routine, the Defendant had difficulty nursing the victim immediately. She said that the Defendant planned to breast-feed the victim but that the Defendant's milk formed slowly. She said that the hospital staff decided to supplement the victim's diet with formula milk and that the victim had difficulty drinking and "spit up" the formula.

Mrs. Pursell testified that after the Defendant and the victim came home, the Defendant stayed home with the victim while she worked. She said that she helped the Defendant as much as she could while they lived with her but that the Defendant was already awake with the victim when she woke to get ready for work. She said that she and the Defendant fed the victim formula and that the victim choked and vomited the formula. She said the victim could not keep food in his stomach. She said that the hospital staff changed the formula twice while the Defendant and the victim were in the hospital after the victim was born. She said that after they were released from the hospital, the Defendant called the pediatrician, who changed the formula and told the Defendant to feed the victim smaller amounts more frequently. She said that the Defendant followed the instructions but that the feeding problems continued.

Mrs. Pursell testified that Mr. Smith was the Defendant's boyfriend and that after the Defendant moved into Mr. Smith's home, she spoke to the Defendant daily. She said they discussed the victim's feeding problems. She said the Defendant continued to take the victim to the doctor, who referred the victim to Vanderbilt for a chest scan to determine the cause of the choking. She said the Defendant called her on December 14, 2006, and told her that the victim choked and had difficulty breathing. The Defendant took the victim to Summit Hospital in the early afternoon, and the victim was later transported to Vanderbilt. She said she left work to meet them at Vanderbilt around 6:30 p.m. She did not recall seeing Mr. Smith in the emergency room but recalled his being there that night.

Mrs. Pursell testified that the hospital staff attempted numerous times to put an IV needle into the victim's arm and that they "tried every place they could" on the victim's body, including his arms, wrists, ankles, and feet. She said that someone held down the victim by his chest while another person held the victim's legs and pelvis. She said a third person attempted to insert the needle into the victim's arm. She said that when the hospital staff attempted to insert the needle into the victim's feet, the staff twisted the victim's legs and restrained his body. She said that the staff were unsuccessful after thirty minutes and called a "special team" to do it. She said that the Defendant cried while the staff tried to put in the needle. She said that the special team restrained the victim again, that they used a light to find a vein, and that the needle was inserted.

Mrs. Pursell testified that the doctor told them the victim had pneumonia and that fluid from the victim's lungs was removed to confirm whether it was viral or bacterial. She was present for the procedure and said five or six people participated. She said two nurses held his arms, two nurses held his legs, and the doctor laid his arm across the victim's chest to keep the victim from moving. She said the victim was restrained for five to ten minutes and was not sedated. She said the victim screamed and tried to move, although he was only four or five weeks old at the time. She said the Defendant picked up the victim as soon as the doctors allowed her to do so and tried to comfort and calm him. She said that while the victim was hospitalized, the staff moved the location of the IV needle more than once.

Mrs. Pursell testified that the victim was catheterized to obtain a urine specimen and that two nurses held the victim down by his shoulders/chest and legs/pelvis areas during the procedure. She said that the doctor also performed a spinal tap to test for meningitis and that the doctor asked the family to leave the room because it was a painful test for the victim. She said the Defendant stayed with the victim daily in the hospital. She said the Defendant only left the victim for about thirty minutes to get food.

Mrs. Pursell testified that while the victim was hospitalized, she asked the staff to perform tests related to the victim's digestive problems and that the staff said they had to treat the pneumonia first. She said she was surprised the victim was released from the hospital because she thought the doctors were going to determine the cause of the victim's digestive problems. She said, though, the hospital released the victim on December 18, 2006. She said she did not see the victim take a bottle while he was hospitalized from December 14 to December 18. She said the victim's only food came from IV fluids.

Mrs. Pursell testified that when she saw the victim on December 14, 2006, it had been about one week since she last saw him and that the victim looked "tiny and frail." She said that because of the victim's feeding problems, the victim received no nourishment and gained only a few ounces above his birth weight. She said she did not understand why Vanderbilt released the victim without diagnosing the feeding problem.

Mrs. Pursell testified that the Defendant took the victim to Vanderbilt on December 22, 2006, that the hospital staff gave the victim IV fluids, and that the victim was discharged the next day. She said the hospital staff only provided follow-up care for the pneumonia. She said that the victim choked frequently and that fluid became caught in his throat, which required suctioning his throat. She said that the victim's throat and nose were suctioned during both hospital stays with a machine and that a "syringe bulb" was used at home, which did not clear all the mucous. She said the bulb was used immediately after the victim choked, vomited formula, or had difficulty breathing.

Mrs. Pursell testified that on Christmas morning, she, the Defendant, the victim, and her three other daughters went to the Defendant's father's home to celebrate Christmas. She said the Defendant arrived around 9:00 a.m. She said that everyone left to go to the Defendant's grandmother's home around noon but that she stayed behind. She said she received a telephone call telling her that the victim had choked badly and "turned blue." She said that the caller told her that the Defendant walked to her car to take the victim to the hospital, that the victim turned blue, and that the Defendant called an ambulance instead. She said that Vanderbilt treated the victim with IV fluids and that they had to restrain the victim. She said the family asked the staff to perform tests to determine the cause of the victim's feeding difficulty. She said it was during this hospital stay that the fractures were found.

Mrs. Pursell testified that she was present at the hospital when the police and a social worker questioned the Defendant, that the Defendant answered all their questions, and that the family tried to help determine the cause of the fractures. She said Vanderbilt agreed to test for bone density problems. She said that she asked them to perform the test several times previously and that they refused because the test was invasive. She said the victim looked weak and frail on December 25, 2006. She identified a photograph of the victim that she took while the victim was in the hospital, which showed the victim in a hospital bed with an IV in is right arm and a rash on his face caused by an allergic reaction from the hospital's laundry detergent. She agreed that the victim was taken to the hospital for the allergic reaction. She said that at no time during any of the hospital stays did the victim eat from a bottle.

Mrs. Pursell testified that on December 27, 2006, Vanderbilt performed a test to determine the cause of the victim's feeding difficulties and that the test showed the victim had "severe reflux" and a swallowing disorder. She said that based on the test results, a feeding tube was inserted through his nose. She identified a photograph of the victim with the feeding tube taken one week after he was admitted on Christmas Day. She said that the feeding tube remained in place for six or seven months and that the victim received feeding therapy until spring or early summer 2008.

Mrs. Pursell testified that on December 27, 2006, the Department of Children's Services (DCS) restricted the Defendant's access to the victim in the hospital and that the Defendant had only supervised visits after the victim was released from the hospital. She said that although the Defendant could not be alone with the victim, she came to the hospital daily. She agreed that DCS restricted her access to the victim initially and that DCS placed the victim in her custody when the victim was released from the hospital in January 2007. She said that the Defendant could only see the victim if she or the Defendant's father was present and that the Defendant visited the victim every day that both their work schedules

allowed. She said that the Defendant was always gentle with the victim and that she never saw the Defendant "do anything inappropriate."

On redirect examination, Mrs. Pursell testified that the Defendant was not sleep deprived after the victim was born because the victim slept at night and rarely cried. She said the Defendant woke the victim at night to feed him. She agreed that it did not take a lot of force to hold a four-week-old baby but said that the staff had to ensure the victim was "perfectly still" to insert the IV needle. She said that although the victim could not raise his head, crawl, or sit upright, the victim could move his arms and legs. When asked if the Defendant was angry because of the abuse allegations, Mrs. Pursell said that the Defendant was "hurt more than ang[ry]."

Mrs. Pursell testified that the victim removed the feeding tube on several occasions and that she took the victim to the hospital to have the tube reinserted. She said the hospital staff did not find any new fractures during these visits. She said the victim was three years old at the time of her testimony, was an active boy, and had no new fractures. She said, though, that the victim's digestive and swallowing disorders were diagnosed and that the victim now received nutrition. She said that before the diagnosis, the formula "aspirated into his lungs" and caused his pneumonia. She denied being present each time the Defendant fed the victim but said the victim coughed and vomited every time she fed the victim and every time she saw the Defendant feed the victim. On recross-examination, she stated that the feeding tube provided the victim with consistent food, which he had not received without the tube. She agreed that after the victim was released from Vanderbilt in February 2007, none of the victim's doctors performed a skeletal survey.

Daniel Smith testified that the Defendant was his former girlfriend and that he thought he was the victim's father, although paternity had not been established. He said the Defendant and the victim moved into his home on December 4, 2006. He said that he had two roommates in early December and that the Defendant and the victim slept in his room. He did not recall the victim's sleeping in the bed with them and said the victim had his own bed. He said that one of his roommates stayed with a girlfriend most of the time and that the other roommate stayed at the home during the day on most occasions. He said both roommates moved out around Christmas 2006. He said he had three children, two who lived with him and a third who lived down the street. He said the victim was the only child living in his home while the victim was there.

Mr. Smith testified that he and the Defendant cared for a newborn before the victim was born. He said that although his work hours varied, he left for work around 7:00 a.m. and returned home after 5:00 p.m. He said he fed, bathed, and cared for the victim. He said that the victim ate every two hours, that the victim had difficulty keeping down food, that the

victim swallowed formula sometimes, and that the victim cried when he could not keep down the formula. He said it helped to feed the victim slowly. He said the Defendant left him alone with the victim once or twice while the Defendant went to the store or took a shower.

Mr. Smith testified that on December 13, 2006, the Defendant called him at work because the victim had trouble eating. He said that the next day the victim did not feel well and that he left work to help the Defendant with the victim. He said that when he arrived home, the victim had problems breathing, had red eyes, and was vomiting mucous. He said the mucous in the victim's nose was thicker than usual and had a "yellowish tint" with a small amount of blood. He said that the victim was released from the hospital on December 18 but returned a few days later. He could not recall where he was that day but recalled going to the hospital with the Defendant and the victim. He said that on December 25, he went to his family's home to celebrate Christmas and that the Defendant went to her family's home. He said he, the Defendant, and the victim slept at his home on Christmas Eve.

Mr. Smith testified that on December 25, 2006, the Defendant called and told him that the victim had mucous and had vomited and that she was taking him back to the hospital. Although he denied using a babysitter for the victim while the Defendant lived at his home, he said friends stopped by his home frequently. He denied leaving the victim alone with his friends. He said that he and the Defendant did not know how the fractures were caused and that the Defendant had never accused him or his two roommates of hurting the victim.

Mr. Smith testified that he spoke with the police about the victim's injuries, that he cooperated with their investigation, and that he answered all their questions. He denied holding the victim in a manner that caused him to scream, squeezing the victim's ribs, jerking his legs, pushing on his pelvis, or yanking his arms. He admitted five convictions for burglary of an automobile but denied further criminal behavior.

On cross-examination, Mr. Smith testified that at the time the victim lived with the Defendant and Mrs. Pursell, the victim had feeding difficulties and could not keep down formula. He agreed he saw the victim's difficulties before the victim and the Defendant moved into his home. He said that he saw the victim vomit and that the victim had "projectile" vomiting regularly. He agreed every feeding was a struggle.

Mr. Smith testified that he and the Defendant were engaged when she and the victim moved into his home and that after they moved in, the victim continued to vomit and have problems keeping down food. He denied the victim's feeding problems improved over time. He said that the doctor changed the victim's formula at least four times and that the Defendant tried to determine the cause of the problem. He agreed that the Defendant stayed at home with the victim while he worked, that he and the Defendant cared for the victim

when they were both home, and that he had unlimited access to the victim. He said that Michael Burchett, one of his roommates, helped care for the victim when needed and that Mr. Burchett stayed at home most days. He agreed that the Defendant and Mr. Burchett were home during the day with the victim and that he did not now how often the Defendant left the room and allowed Mr. Burchett to care for the victim. He said the Defendant did not restrict Mr. Burchett's access to the victim and denied seeing the Defendant mistreat the victim. He said the Defendant was "a great parent."

Mr. Smith testified that on December 13 or 14, 2006, the Defendant came to his workplace with the victim because she was concerned about the victim's mucous getting thicker. He said that when he arrived home from work, the Defendant was getting the victim ready to go to the hospital. He agreed Mr. Burchett was home when he arrived. He said he and the Defendant suctioned the mucous multiple times daily. He said that the victim vomited daily and that he and the Defendant placed a towel around their chests when feeding the victim in anticipation of the victim's vomiting. He said the victim consistently vomited from the time he lived with Mrs. Pursell to the time the victim's fractures were found.

Mr. Smith testified that on December 14, 2006, the staff at Summit suctioned mucous from the victim's throat, took x-rays, and concluded the victim had pneumonia. He said the hospital used a suctioning machine and a plastic bulb to extract the mucous. He said that the Vanderbilt staff restrained the victim when suctioning the mucous and tried three or four methods to insert an IV needle before being successful. He said three or four people restrained the victim's arms, legs, feet, chest, and head while another person tried to insert the needle. He said the doctor removed fluid from the victim's lungs. He said that they were asked to leave the room while the fluid was removed and that it seemed as though the staff did more than withdraw fluid. He agreed the Defendant was concerned about the victim and stayed with the victim until he was released.

Mr. Smith testified that after the victim was released from the hospital on December 18, 2006, the victim and the Defendant stayed at his home. He said the victim continued to have problems feedings and "looked . . . a little bit more drained than usual." He said the victim did not appear to develop like his other children because the victim's weight did not increase and he looked fragile and small. He said the Defendant continued to take the victim to the doctor, who sent the victim to Vanderbilt on December 21 or 22. He said the victim had difficulty breathing and developed a rash on his face from an allergic reaction. He said the victim was last hospitalized on December 25. He said that the Defendant was "tore up" about the victim's being sick, that it appeared the victim was getting worse, and the Vanderbilt staff found chest fractures.

Mr. Smith testified that he and the Defendant cooperated with the police and answered their questions. He said that although their access to the victim was restricted, the Defendant saw the victim as often as allowed. He said the hospital staff tried to feed the victim with a bottle but that a feeding tube was required. He said the Defendant was as "gentle as possible" with the victim and did not have postpartum depression.

On redirect examination, Mr. Smith testified that the victim sometimes cried at night. He said the victim weighed about six pounds, eight ounces and could lift his head, though he "wobble[d] back and forth." He said the victim could move around "a little." He denied he was angry at the medical staff for restraining the victim and said he did not know if the doctors caused the fractures. He said the Defendant was more concerned than angry. On recross-examination, he stated that if the victim cried at night, he and the Defendant both cared for the victim or took turns. He said that at times, the Defendant fed the victim while he sat beside the Defendant. He agreed he was a suspect during the investigation and said he never accused the Defendant of abusing the victim because she was a good mother and cared for his other children.

Melanie Adams-O'Neal testified that she worked as an emergency room nurse at Summit on December 14, 2006, and that she treated the victim. She said the Defendant sat by the victim's bed while she treated the victim for coughing up blood, or something that looked like blood, and a "slight, little" cut on the roof of his mouth, which was unusual for the victim's age. She said she suctioned the mucous with a bulb six times. She said the mucous was "coffee-colored," which usually indicated old blood. She said the victim coughed brown mucous for two or three days.

On cross-examination, Ms. Adams-O'Neal testified that the victim arrived at the hospital at 4:27 p.m. and that the triage form showed the victim's treatment before arriving was suctioning mucous with a bulb syringe. She agreed that the bulb could have rubbed the roof of the victim's mouth. She said a chest x-ray, an oxygen saturation test, and an RSV test were performed. She agreed the victim's throat was suctioned six times over a ninety-minute period, which showed the victim's parents needed to suction often. She said that the diagnosis was respiratory distress, atelectasis, and mucous plugs. The medical records did not show the amount of blood from the cut on the roof of the victim's mouth. She said the chest x-ray results would have been sent to Vanderbilt when the victim was transferred. She said the records did not show the victim suffered pain, was prescribed medication, or was treated with IV fluids. On redirect examination, Ms. Adams-O'Neal stated that a bulb syringe was made of "very soft plastic" and that she had not seen a syringe cut the roof of the mouth.

Dr. Laurie MacPherson testified that she treated the victim on December 22, 2006, in Vanderbilt's emergency room and that the victim was referred because of his lack of weight gain. She recalled the Defendant stated that the Defendant believed the victim fed "fairly well" before being admitted to the hospital. She did not recall if the Defendant said the victim vomited that day and said the medical records did not note the victim's vomiting. She said that the victim's weight had not changed since December 17 and that an infant gained a few ounces per week normally. She said the only physician to whom she spoke was the victim's pediatrician, who wanted to determine if the victim was feeding. She did not speak to the treating physician after the victim was admitted. She said that when the victim was admitted, the Defendant seemed "a little bit disappointed."

On cross-examination, Dr. MacPherson testified that she and a medical resident took the victim's medical history but that she did not recall taking the history. She said that according to the pediatrician's scales, the victim had lost five ounces. She agreed the records showed the Defendant stated that the victim ate four ounces of formula while at the hospital. She said that the victim was released on December 23, 2006. On redirect examination, Dr. MacPherson stated that although the records showed the victim ate four ounces of formula, there was no notation he vomited. On recross-examination, she stated that nothing in her records showed she discussed whether the victim vomited.

Michael Burchett testified that at the time of his testimony, he was confined to the Tennessee Department of Correction for a burglary conviction and that he had a long criminal history for burglary. He denied having convictions for violent offenses and receiving anything in exchange for his testimony. He said that Mr. Smith was his cousin, that he lived with Mr. Smith in November and December 2006, and that he met the Defendant through Mr. Smith. He said that while he lived with Mr. Smith, he worked 9:00 a.m. to 5:00 p.m. as a carpet installer, except on the weekends. He said he worked fewer hours around Christmas and stayed home.

Mr. Burchett testified that he fed the victim once while the Defendant took a bath, that the victim ate the formula, and that the victim did not vomit. He said that when he lived at the home, only his aunt and uncle visited him. He said he never saw the Defendant leave the victim with anyone for an extended period of time. He said Mr. Smith helped the Defendant with the victim. He said that the victim cried a lot and that he thought it was the formula. He said the Defendant was a good mother, cared for the victim, and acted like a "typical" mother of a newborn baby. He said he thought the Defendant was sleep deprived "now and then," had "some postpartum," and seemed "a little stressed out" at times. He said the victim awoke crying at night.

Mr. Burchett testified that he did not watch the victim because the Defendant was home. He denied getting frustrated with the victim, holding the victim in a manner that caused the victim to scream or cry, and squeezing the victim's ribs and jerking his legs. He said the Defendant did not hurt the victim. He said that the Defendant became frustrated like any new mother but that she was a good mother.

On cross-examination, Mr. Burchett testified that he told the police he helped the Defendant with the victim if she needed when he was home. He agreed that he changed the victim's diaper once or twice and that the Defendant may have left the victim with him while she left the room. He agreed they worked as a team in caring for the victim. He agreed he told the police that he had been left alone with the victim twice and that the victim had feeding problems. He agreed he told the police the victim vomited formula, which had been changed multiple times. He said the victim vomited the entire time he lived with Mr. Smith.

Mr. Burchett testified that the home was small and that it was easy to hear the Defendant if she and the victim were in another room. He said he never heard the Defendant act frustrated with the victim or scream at the victim. He said he never saw the Defendant squeeze the victim or yank the victim's legs or arms. He said the Defendant was gentle with the victim. He said that the Defendant and Mr. Smith were concerned parents and that he never saw anything inappropriate from them.

On redirect examination, Mr. Burchett testified that he worked the day shift when he was working and that Mr. Smith worked the day shift at his job. On recross-examination, he stated that Mr. Smith cared for the victim when he came home from work, which allowed the Defendant to sleep and do things around the home.

Dr. Roderick Bahner testified that he was the victim's pediatrician after the victim was born, that his medical and family histories showed no metabolic diseases, and that there were no signs that a difficult delivery caused bone fractures to the victim. He said he treated the victim four to six times for feeding difficulties, formula intolerance, and vomiting. At two weeks old, the only issue was formula intolerance. He said that on December 13, 2006, the victim was four weeks old, that he continued to have formula intolerance, and that the formula was changed.

Dr. Bahner testified that he treated the victim on December 19, 2006, and that the victim had lost weight since December 13. He said the victim was diagnosed with pneumonia, which could have explained the weight loss, but the victim had lost "a large amount of weight." He said the victim was "fussy" and had "subconjunctival hemorrages" caused by coughing related to the pneumonia, which was not unusual and looked like a bloodshot eye. He denied seeing evidence of "osteogenesis imperfecta" (OI), brittle bone

disease, or evidence of rickets or metabolic issues impacting the victim's bones. He agreed feeding difficulties during the first five to six weeks of life did not impact bone density. He said formula was not usually supplemented with other vitamins unless there was an absorption problem. He said infants were tested for some metabolic diseases at birth but others required specific blood tests. He said x-rays were performed only when there was a suspicion of a serious bone problem. He agreed he was no longer the victim's pediatrician and said he last treated the victim in early 2007.

On cross-examination, Dr. Bahner testified that if the victim's father was unknown, a complete family history could not be obtained. He agreed he did not have the victim's father's family history and did not know if the father's family had a metabolic disease or OI. He agreed that he saw the victim on November 30, December 13, and December 16, and that another doctor in his practice saw the victim on December 5. He said that on November 30, the victim looked "slightly frail" and weighed six pounds, six ounces and that he noted the victim had a wet nasal passage. He agreed that two weeks earlier, the victim weighed six pounds, seven ounces. He said the victim had a fungal infection in his mouth and agreed the infection "contributed" to his feeding difficulties. He said his records showed the Defendant "loved" being a new mother. He said he saw nothing that led him to conclude the victim was being abused. He said the victim had no bruises, scrapes, or cuts.

Dr. Bahner testified that on December 5, 2006, Dr. Goodwin treated the victim, noted the victim was "fussy" and had continued feeding difficulty, and changed the victim's formula. He agreed the records showed that the victim had zero sucking motion, but he did not think Vanderbilt received the records. He said that at the December 15 visit, an abdominal ultrasound was scheduled at Vanderbilt to look for pyloric stenosis. He said that the victim had gained five ounces since November 30, although the feeding difficulty continued.

Dr. Bahner testified that on December 13, 2006, he treated the victim for continued feeding difficulty. He said that the victim had tried seven different formulas, that the ultrasound was negative, and that his diagnosis was formula intolerance. He said that on December 19, the victim weighed six pounds, six ounces at the hospital, one ounce less his birth weight. He said the victim's weight would have alerted him to feeding difficulties. He said he prescribed Pediasure. He agreed the victim did not have cuts, scrapes, or bruises. He said that he examined the victim's stomach, arms, legs, and feet and that the victim did not act as though he was injured. He said the only sign something was wrong internally was the victim's vomiting, which he determined was caused by formula intolerance.

Dr. Bahner testified that a mild form of OI or metabolic bone disease could not be diagnosed by looking at a newborn. He agreed that a sick newborn with continued vomiting, gagging, and respiratory issues warranted a complete differential diagnosis to determine the cause. He agreed that in addition to the office visits, the Defendant called his office and that the Defendant acted like a typical new mother who was concerned about the victim. He said that the victim was first diagnosed with a feeding problem on November 30, 2006, and that the victim had difficulty tolerating formula two days after his birth.

On redirect examination, Dr. Bahner clarified that between November 30 and December 5, the victim gained "a few ounces" and another "few ounces" between December 5 and December 13. He agreed the victim lost weight by December 19. He said OI was a genetic disease and did not disappear with age. He said a metabolic bone disease, such as rickets, was diagnosed by a calcium test and by x-rays.

On recross-examination, Dr. Bahner testified that scurvy was also a metabolic disease. He said rickets did not manifest in an x-ray initially, although a child might lose bone mineralization. He agreed that lost bone mineralization made children susceptible to bone fractures. He agreed that OI was not always visible on an x-ray. He agreed that a fiberglass test analyzing the skin and DNA genetic tests determined the presence of OI. Although he did not know the statistics, he accepted counsel's statistic that the tests were between eighty and eighty-five percent accurate.

Dr. Richard Heller, an expert in pediatric radiology, testified that the victim underwent skeletal surveys on December 27, 2006, and January 12, 2007, that a skeletal survey was an x-ray of all the bones in the body, including the skull, chest, spine, pelvis, arms, and legs, and that the survey was used for children under the age of one. He said the December 27 survey showed a healing bone fracture on the right femur, a second small "fragment" on the femur, and a fracture on the right tibia. He said that these fractures were only caused by jerking, twisting, or holding down a child and that these fractures were only caused by child abuse. He said that the January 12 survey showed that one of the fractures on the femur had healed completely and that the second femur fracture and the tibia fracture had begun to heal. He concluded that based on the different stages of healing, the fractures occurred at different times and that the victim's right leg was jerked multiple times. He said that broken bones healed at different rates and that the healed fracture on the right femur probably took three to four weeks to heal, although he conceded that determining healing time was imprecise.

Dr. Heller testified that based on the December 27 survey, the victim had two fractures on his left femur caused by pulling, twisting, or shaking the victim. He could not determine when the fractures occurred. He said that the January 12 survey showed that the fractures on the femur had healed and that the irregularity on the tibia was not a fracture. He

said the fracture on the lower end of the femur probably occurred three to four weeks earlier.

Dr. Heller testified that the December 27 survey showed a pelvic fracture at the hip joint and that the injury could only have been caused by a "direct blow." He could not determine when the fracture occurred but said it was possible the fracture occurred two weeks before the December 27 x-ray. He said the January 12 survey showed the same fracture in the healing process. He said that the pelvic fracture was caused by child abuse because there was no history of a car accident or something falling on the victim's pelvis.

Dr. Heller testified that the December 27 survey of the victim's right humerus, or upper arm, showed no fractures and a normal bone density and that the January 12 survey showed a healing fracture. He could not determine if the fracture occurred after the December 27 survey or if the fracture was simply not visible on the x-ray. He said he thought "nonaccidental trauma" caused the fracture, such as a "direct blow." He concluded that all the fractures fit the theory of child abuse and that the fracture was two to four weeks old. When asked if it was possible the victim received the fracture in the hospital as a result of treatment on December 25, he stated that babies have IV needles inserted frequently and that the procedure did not result in bone fractures.

Dr. Heller testified that based on the x-rays from December 14 to January 12, he concluded that the victim's bones were normal and not susceptible to fractures. He excluded OI as the cause of the victim's fractures because the victim did not fit the profile for the disease. He stated that the disease persisted throughout life and that the victim would have continued to suffer broken bones. He said the victim did not have a metabolic bone disorder, such as rickets or scurvy, related to malnutrition. He agreed rickets and scurvy were related to calcium, vitamin C, and vitamin D deficiencies. He said the victim's fractures were indicative of child abuse, not malnutrition or brittle bones. He said it was easy to diagnose rickets based on fracture shapes and the thickness of the cartilage plate. He concluded that feeding intolerance dating from the victim's birth did not cause the fractures.

Dr. Heller testified that the x-ray surveys showed fractures to nine of the victim's right ribs and fractures to five left ribs. He said the fractures on the right ribs were caused by squeezing the rib cage. He said the fractures were near the backbone and close to the spine, which showed the injuries were intentionally inflicted and specific for child abuse because the victim was not old enough to walk and bump into objects. He concluded that the fractures occurred three to four weeks earlier. He concluded that the fractures occurred after December 14, 15 and 18, but before the December 25 x-ray. He said the January 12 x-ray showed the rib fractures in different stages of healing.

Dr. Heller testified that he concluded there were three different age groups of rib fractures based on his review of the x-rays. He concluded that the rib fractures were the result of nonaccidental trauma and could not have been inflicted by a lumbar puncture or by inserting an IV needle. He stated that infant bones were more pliable than adult bones and moved when struck. He said cardiopulmonary resuscitation (CPR) did not cause the rib fractures.

On cross-examination, Dr. Heller testified that although past research showed a concern for CPR causing rib fractures in infants, more recent research showed this was false. He agreed that one study on the impact of CPR on infant bones showed that eight out of seventy infants had rib fractures. The article stated that of the eight cases showing rib fractures, the number of fractures were as many as ten per infant. The article showed that the "parietal pleura" of the rib cage was removed during the autopsies and that without such removal, the fractures might not have been identified. Dr. Heller stated that rib fractures associated with child abuse were found in different locations than found in the article. He conceded, though, that the victim had healing rib fractures consistent with the fractures in the article on four right ribs and three left ribs.

Dr. Heller testified that he did not review the victim's medical records and that he would dispute any test results showing the victim suffered from OI or vitamin D or C deficiencies. He said the laboratory tests were "wasteful" because the x-rays spoke for themselves. He said that rickets showed a progressive change in x-rays during the early development stage. He denied OI could be detected by an x-ray at any time and said rickets was visible on an x-ray twenty-eight days after birth. He concluded that the victim did not have OI and stated that he did not know the amount of pressure required to cause the rib fractures near the victim's spine. He said, though, that symmetrical pressure applied to the front and the back by the thumbs and fingers caused the victim's rib fractures near the spine. He agreed that failure to perform x-rays before and after a medical procedure prevented determining if the procedure caused fractures.

Dr. Heller testified that he did not know who inflicted the blow causing the right arm fracture. He said that he did not know if a bruise would appear from a direct blow causing the arm or rib fractures. He agreed that the right arm fracture could have occurred on December 14, 15, 16, 17, or 18 and that he could not determine if the callus marking on the left arm was a fracture. He agreed the left and right femur fractures, the tibia fracture, and the left rib fractures could have occurred on December 14, 15, 16, 17, or 18. He did not know of any genetic disorders that caused pubic bone fractures. On redirect examination, Dr. Heller testified that for an infant the victim's size and age, it took about six to eight weeks for a rib fracture to heal. On recross-examination, Dr. Heller stated that the six-to-

eight-week range was a generalization and that it was possible that the victim's fractures took four to five weeks to heal.

Dr. Christopher Greeley, an expert in the field of pediatrics and child abuse, testified that he consulted with the victim's attending physician and Dr. Heller on December 28, 2006. He said that he reviewed the victim's chart and x-rays, examined the victim, and concluded that the victim had multiple fractures that were inflicted by child abuse. He said that the January 12 x-rays showed three new rib fractures and a fracture to the victim's arm. He said the new fractures did not change his conclusion that the fractures resulted from abuse. He said that the victim's not receiving new fractures since his release from the hospital supported his conclusion of abuse and that the victim did not have a genetic bone disease.

Dr. Greeley testified that he considered genetic bone diseases and that the fracture patterns and the number of fractures did not support a conclusion of a bone disease or warrant genetic testing. He said the victim did not have symptoms of genetic bone disorders or nutritional bone disorders, such as scurvy, OI, or rickets. He said that the victim's x-rays were inconsistent with rickets and that the victim's feeding difficulties did not contribute to the fractures. He said that although the victim had difficulty feeding and keeping down food, the victim's body still absorbed enough calcium and vitamin D to heal the fractures.

Dr. Greeley testified that the medical procedures performed on December 14 and 18 did not contribute to the bone fractures and that although there were a couple of studies showing CPR caused rib fractures close to the spine, there were no studies showing CPR caused those fractures in infants. He said that pelvic bone fractures in children were rare because they resulted solely from trauma and that the victim had not received trauma to the pelvis, which led him to conclude that the victim's pelvic fracture was caused by child abuse. He said the arm fracture was most likely caused by abuse because the victim was not mobile at the time. He stated that rib fractures generally showed signs of healing within five to ten days and that "definite healing" was seen within two to three weeks. He agreed rib fractures healed completely within six to eight weeks and said visible bruising on infants was uncommon, even in cases of abuse.

Dr. Greeley testified that the victim felt pain as a result of the fractures and that as a result of the pain, the victim cried, was fussy, was hard to feed, did not sleep well, and could have been erroneously diagnosed with colic or formula intolerance. He stated that although the treating physician at Vanderbilt concluded that the victim had pneumonia on December 14, he believed that the blood in the mucous came from a buildup of blood in the victim's chest. He said that the blood could have resulted from squeezing the victim, which caused a bleeding rib or a bleeding lung caused by injury.

On cross-examination, Dr. Greeley testified that he could not state to a reasonable degree of medical certainty when the rib fractures occurred. He denied, though, that the fractures could have been inflicted after the victim was admitted to the hospital. He said that although the fractures were not visible on the x-ray, this did not mean the fractures had not occurred. He said he could not state to a reasonable degree of medical certainty that the victim's right arm was fractured on December 27, 2006. He said that although the amount of force required to inflict the victim's fractures was unknown, more than "routine care" was required. He said that the medical procedures performed on the victim, including a thoracentesis, a lumbar puncture, and a catheterization, were not routine handling. He said that one method to determine if these procedures resulted in bone fractures was to take a series of x-rays dating from birth to two weeks after the procedures. He said that without a series of x-rays, it was impossible for a parent to establish they did not abuse the child.

Dr. Greeley testified that he excluded OI as a cause for the fractures because there was no bowing of the leg bones, "wormian bones," or blueness of the sclera, although he agreed these symptoms were not always visible on an x-ray. He agreed OI was not always visible on an x-ray. He said that a vitamin D deficiency was a symptom of rickets, that rickets progressed over time, and that rickets made bones weak. He said Vanderbilt did not perform a vitamin D test. He said that a vitamin C deficiency was associated with scurvy and that Vanderbilt did not test for it. He said that a calcium test was performed on January 10, 2007. He said that bones needed calcium, phosphorous, and vitamin D to stay healthy and that without these minerals bones lost density. He stated that if the victim had lost twenty percent of his mineral bone density, the victim might be more susceptible to bone fractures and that it was unknown at which point the bone loss became visible.

Dr. Greeley testified that the healed rib fractures and the healing leg fractures could have occurred at the same time and that the healing rib and leg fractures could have occurred at the same time. He concluded to a reasonable degree of medical certainty that all the victim's fractures occurred on three occasions. He said the strength of an adult was required to cause the victim's rib fractures but that a child could inflict the injuries depending on his or her size, strength, and coordination.

Dr. Greeley testified that a small cut on the victim's mouth would not be unusual with having to suction the victim's mouth due to feeding difficulties and mucous formation. He agreed that although the bone fractures caused pain, they were not serious injuries that jeopardized the victim's life. He said the medical records showed that after the December 15, 2006 medical procedures, the victim had a "relatively high" pain level. He said that about two hours later, the victim showed no signs of pain and that the victim showed no signs of pain on December 16, 17, 18, 22, 23, 26, or 27. He did not recall the medical records

showing that the victim was in discomfort when he was admitted on December 14, 22, and 25.

On redirect examination, Dr. Greeley testified that if the fractures had occurred while the victim was in the hospital, he expected to see the victim experiencing pain. He said the blood and fluid in the lungs could have been caused by "compressive forces" that caused the rib fractures. He said the medical records showed the victim gained about 2.2 pounds while in the hospital from December 25 to January 12. On recross-examination, Dr. Greeley testified that he could not state to a reasonable degree of medical certainty that the fluid and blood in the victim's lungs were caused by the rib fractures. He said that the victim gained weight while in the hospital because of the feeding tube.

Dr. Amy McMaster, an expert in forensic pathology, testified that she concluded the victim's bone fractures were caused by nonaccidental trauma. She concluded that the rib fractures were caused by "adult size hands" squeezing the victim's chest and torso area. She said she had no information supporting a conclusion that the fractures were accidental. She concluded that the victim received fractures on three occasions because of the various stages of healing. She said the fractures to the victim's leg could have been inflicted by shaking or jerking the victim's leg. She did not know what caused the pelvic bone fracture and said the arm fracture could have been caused by a "direct blow" or by jerking the arm. She said that she had only seen one infant rib fracture caused by CPR and that in her experience, lumbar punctures, thoracentesis, IV needles, and catheters did not cause bone fractures. She said that she saw no evidence of a bone disorder and that the victim's inability to gain weight did not support a conclusion that he was susceptible to fractures.

On cross-examination, Dr. McMaster testified that the right arm fracture could have occurred between December 14 and 18 and that interpretation of the healing stage was subjective. She agreed that an x-ray taken immediately after a medical procedure that did not show a fracture did not mean a fracture did not occur. She said that it was "not impossible" for CPR to cause the type of rib fractures received by the victim and that the victim's feeding problems did not cause the fractures.

Metropolitan Police Detective Selene Julia testified that she worked in the youth services division and that she had received training related to injury types and their causes. She said that on December 27, 2006, she went to Vanderbilt and spoke to the victim's nurse, who said the victim had about ten healing rib fractures. She said that she talked to the Defendant on December 27 and that the Defendant told her the victim did not attend daycare. The Defendant told her that she did not use a babysitter and that she only left the victim alone with Mr. Smith for five minutes to go to the grocery store. She said this was the only time

the Defendant left the victim with someone in December. The Defendant told her that she and Mr. Smith lived together but did not mentioned Mr. Smith's roommates.

Detective Julia testified that she asked the Defendant about the victim's medical history. The Defendant said that the victim had difficulty feeding since birth and that she took the victim to the pediatrician several times and to the hospital for breathing problems before she moved into Mr. Smith's home. She said the Defendant did not mention any other trips to the hospital. The Defendant stated that she did not know how the victim's injuries occurred but that the doctors held down the victim. She said that Mrs. Pursell was in the room when she talked to the Defendant on December 27 and that Mrs. Pursell asked if a bone density test had been performed. She said the Defendant did not disagree with her mother.

Detective Julia testified that the Defendant told her that Mr. Smith handled the victim with care and that the Defendant did not blame anyone for the victim's injuries. She said the Defendant demonstrated that she picked up the victim "cradling" him. She said that the Defendant and Mrs. Pursell mentioned the hospital staff's lying on top of the victim to draw blood. The Defendant did not mention the lumbar puncture, the thoracentesis, or the medical staff's mistreating the victim. She said that the Defendant told her that she did not breast-feed the victim and that the victim's formula had been changed multiple times. She said that although the Defendant did not cry during the December 27 interview, she answered her questions.

Detective Julia testified that she interviewed Mr. Smith on December 27, 2006, at his home and that Mr. Smith stated that the Defendant was the victim's primary caregiver. Mr. Smith stated that he had two roommates previously, whom Detective Julia interviewed. She said that she interviewed Mrs. Pursell, who gave no information suggesting that anyone other than the Defendant was the victim's primary caregiver.

On cross-examination, Detective Julia testified that although this was not her first child abuse investigation, she had been assigned to the youth services division for only three or four months. She agreed she received her training over time, rather than before being assigned to the division. She said that she spoke to a nurse at Vanderbilt based on the Defendant's stating the fractures might have been caused by the medical staff but that she did not know if the nurse treated the victim. She stated that when she arrived at Vanderbilt on December 27, 2006, she spoke to the victim's treating nurse, Jennie Massey Holt, who stated that the doctors thought the victim had pneumonia, that a chest x-ray was ordered to confirm pneumonia, that the x-ray showed rib fractures, and that a full skeletal survey was ordered.

Detective Julia testified that when she spoke to the Defendant on December 27, 2006, the Defendant welcomed her presence and questions and gave direct answers to every question. She did not ask the Defendant if anyone other than the Defendant and Mr. Smith lived in Mr. Smith's home. She agreed she ended the interview and asked all the questions she wanted the Defendant to answer. She agreed she did not ask the Defendant about Mr. Smith's caregiving responsibilities. She agreed she only asked the Defendant about leaving the victim with someone else while she left the home, not while the Defendant was in another part of the home or taking a shower. She said that Mr. Smith cared for the victim while the Defendant slept at night and that other people were around the victim without the Defendant's being present. She denied investigating how long it took to cause the fractures.

Detective Julia testified that although the victim had been treated at Vanderbilt five times, she did not speak to any medical staff who treated the victim before December 27. She agreed that while the Defendant was in the room, the Defendant's father mentioned the possibility that lying on top of the victim during medical treatment and the victim's formula intolerance caused the fractures. She did not ask the treating medical staff about their handling the victim.

Detective Julia testified that she sent Metropolitan Police Sergeant Robert Norton an email expressing concern that the victim's injuries might have been related to a medical condition because she was told the victim had more fractures. She denied talking to the radiologist who found the fractures or any of the victim's treating physicians. She agreed that the Defendant had the most access to the victim and said that the Defendant "should have known if something happened in her house while she was there" regardless if she slept, took a shower, or used the bathroom.

On redirect examination, Detective Julia testified that during her second interview of the Defendant, the Defendant was told additional leg fractures were found and that the Defendant had no reaction. She said that she had never investigated a case which involved an infant's bone fracture caused by medical procedures. On recross-examination, she stated that although the Defendant would have known the victim had these injuries, she agreed the Defendant was a new mother, took the victim to the hospital six times, and contacted the victim's pediatrician several times.

DCS Case Manager Jeanea Cochron Norman testified that she investigated the victim's case, that she interviewed the Defendant with Detective Julia on December 27, 2006, and that after the interview, she restricted the Defendant's access to the victim. She identified a juvenile court order that allowed the Defendant access to the victim because it was in the victim's best interest. On cross-examination, Ms. Norman testified that although

she filed a petition in juvenile court alleging the victim suffered serious physical abuse by the Defendant, the DCS attorney terminated the proceedings.

Tom Pursell, the Defendant's father, testified for the defense that the victim had difficulty eating from birth. He described the victim's inability to keep down formula and said the Defendant continuously called the pediatrician, who changed the formula several times. He said the Defendant followed the doctor's instructions and was protective of the victim.

Mr. Pursell testified that after the Defendant and the victim moved into Mr. Smith's home, he saw the Defendant and victim regularly. He said he noticed that the victim lost weight because of the feeding problems and that the Defendant cried and called the doctor. He said the Defendant became frustrated that the doctors did not find a solution. He testified similarly to other witnesses about the medical staff's holding down the victim to insert IV needles and during other medical procedures. He said that the Defendant stood at the edge of the bed while the medical staff inserted the IV needle and catheter and that she cried.

Mr. Pursell testified that he learned of the fractures from the Defendant and that she cried as she told him the news. He recalled speaking to Detective Julia shortly after learning of the fractures and said he could not follow the conversation because he was shocked that the victim had broken bones. He said he never saw the Defendant act inappropriately with the victim or cuts and bruises on the victim. He said that the family was asked to leave the room before the fluid was removed from the victim's lungs and that the Defendant "was close to hysterical."

On cross-examination, Mr. Pursell testified that the conversation with Detective Julia at the hospital was pleasant and that she was polite and did not accuse anyone of child abuse. He recalled that although the Defendant did not cry during the conversation with Detective Julia, the Defendant was upset. He stated that although Dr. Hughes said the fractures were intentionally inflicted, he did not know if Dr. Hughes accused the Defendant. He said Dr. Hughes only asked if the Defendant knew how the fractures occurred. He said that although he knew the Defendant took the victim to Summit on December 14, 2006, because of his vomiting, he did not know the vomit had coffee-colored phlegm. He said that he did not believe the victim was abused by the Defendant or any other family member and that he believed Vanderbilt staff caused the injuries.

On redirect examination, Mr. Pursell testified that he told Detective Julia that if he thought the Defendant had abused the victim, he would have reported the Defendant to the police. He said he had daily contact with the victim since the victim's birth and regular contact with the Defendant in November and December 2006. He said he would have known

if the Defendant abused the victim. He said that the victim received a lot of attention from the Defendant and various family members.

Dr. Suzanne Tropez-Sims, an expert in pediatrics and child abuse, testified for the defense that restraining an infant to perform a thoracentesis and to insert an IV needle or a catheter was common because infants were not sedated for these procedures. With regard to the thoracentesis, the victim's records did not note whether he was restrained. She said the victim's severe gastroesophageal reflux disease caused the victim's vomiting. She said that because a vitamin D test was not performed on the victim, she could not determine whether the victim had rickets. She said that a lack of vitamin D made bones susceptible to fractures and that once adequate levels of vitamin D were reached, the susceptibility to fractures disappeared. With regard to OI, she said that not all infants had all symptoms. She said that wormian bones and blueness of the sclera did not always appear in OI patients, that OI did not always show on an x-ray, and that no single definitive test existed to diagnose OI.

Dr. Tropez-Sims testified that because the victim's January 12, 2007 x-ray showed fractures not seen on the December 27, 2006 x-ray, she considered causes other than abuse. She said that although she had not seen bone fractures caused by medical procedures, they were possible. She said that to determine if a procedure caused a bone fracture, a series of x-rays needed to be taken before and after a procedure but that the level of radiation exposure prevented the x-ray series. She said studies showed that some children suffer broken ribs at birth.

On cross-examination, Dr. Tropez-Sims testified that she did not review the victim's x-rays. She said that the victim's fractures had two possible causes, abuse and trauma, and that she disagreed the fractures were caused exclusively by abuse. She agreed that in the absence of trauma, the inability to explain how a fracture occurred usually resulted in a diagnosis of abuse. She said mild cases of OI disappeared after one year. She agreed this was called temporary brittle bone disease. She said that because Vanderbilt did not perform the test to confirm or exclude OI, she could not conclude that the victim did not have OI at the time the fractures occurred. She said that the rib fractures found on the December 25 x-ray could not have been inflicted by the medical procedures performed between December 14 and 18. She agreed that without an explanation about how the fractures occurred, the number of fractures alone supported a diagnosis of nonaccidental injury. She agreed the caregiver should have known how the injuries occurred.

On redirect examination, Dr. Tropez-Sims testified that if one person in a household was the abuser, another person living there did not always know of the abuse. She said that it was possible the symptoms of the fractures could have been mistaken for something else if a child vomited frequently, did not cry excessively, was taken to the hospital several times,

and showed no signs of pain. She agreed a sick infant who vomited frequently might respond differently to fractures as compared to a healthy infant. She said that if the victim had been shaken, she would have expected to see a significant amount of retinal hemorrhaging based on the number of fractured bones.

On recross-examination, Dr. Tropez-Sims testified that she had interviewed individuals suspected of child abuse and that most denied knowing how the injuries occurred. On further redirect examination, she stated that if a suspected abuser stated he or she did not know how the injuries occurred, the question of abuse depended on whether the suspected abuser was believed. She said there was no way to prove the person truly did not know about the injuries.

Dr. David Watts, a radiologist at Summit, testified for the defense that he reviewed the victim's December 14, 2006 x-ray taken at Summit and that he concluded the victim had pneumonia. He did not find any fractures. On cross-examination, he stated that he only reviewed the December 14 x-ray from Summit. He said it was possible a fracture was there but not visible. He said the fluid in the victim's lungs could have been caused by trauma. He said that the December 25 x-ray showed rib fractures.

Dr. Daniel Starnes, an expert in radiology, testified for the defense that it was common for radiologists to have differences of opinions in the interpretations of x-rays. He said that based on his interpretation, the arm fracture occurred sometime between December 27, 2006, and January 12, 2007, and that the tibia x-rays were inconclusive. He said that the amount of force necessary to fracture an infant bone varied and that his training taught him to pay attention to an infant's pelvis during a physical exam because a dislocation of the pelvic bone could occur.

Dr. Starnes testified that a thoracentesis could cause posterior rib fractures because an infant must be held upright during the procedure and because pressure was applied from the front to the back of the chest. He said recent studies showed that applying pressure from the front to back, such as during CPR, caused microfractures. He agreed that applying pressure from the back and downward to an infant who is lying on his or her side could cause rib fractures. He stated that the victim's pelvic fracture could have resulted from a direct blow or from holding the victim to insert a catheter. He said x-rays did not show the intent or the manner in which the fractures were inflicted. He disagreed that child abuse was the only explanation for the victim's fractures.

On cross-examination, Dr. Starnes testified that bones with a significant amount of bone density loss might look normal on an x-ray and that he could not conclude the victim did not have OI. He said that although the x-ray did not show definitive evidence of OI,

malnourishment made the victim predisposed to OI and to having fragile bones. He believed fragile bones were a likely cause of the victim's fractures. He denied speaking with any of the treating physicians. Although he agreed the medical literature did not report a link between medical procedures and bone fractures, he said the literature showed fractures occurring in the "healthcare environment." He denied that fractures caused by hospital staff presumed the presence of fragile bones because some studies showed generally patients with pneumonia received rib fractures under routine care and handling. He agreed he did not know of any medical study lending support to temporary brittle bone disease.

Upon this evidence, the jury found the Defendant guilty of three counts of aggravated child abuse. The trial court sentenced the Defendant to three concurrent terms of fifteen years' confinement in the Tennessee Department of Correction. This appeal followed.

I

The Defendant contends that the evidence is insufficient to support her convictions because the evidence did not establish that the victim was abused or that she inflicted the victim's injuries. The State contends that the evidence is sufficient. We agree with the State.

Our standard of review when the sufficiency of the evidence is questioned on appeal is "whether, after viewing the evidence in the light most favorable to the prosecution, any rational trier of fact could have found the essential elements of the crime beyond a reasonable doubt." Jackson v. Virginia, 443 U.S. 307, 319 (1979). This means that we may not reweigh the evidence but must presume that the trier of fact has resolved all conflicts in the testimony and drawn all reasonable inferences from the evidence in favor of the State. See State v. Sheffield, 676 S.W.2d 542, 547 (Tenn. 1984); State v. Cabbage, 571 S.W.2d 832, 835 (Tenn. 1978). Any questions about the credibility of the witnesses were resolved by the jury. See State v. Bland, 958 S.W.2d 651, 659 (Tenn. 1997).

"A crime may be established by direct evidence, circumstantial evidence, or a combination of the two." State v. Hall, 976 S.W.2d 121, 140 (Tenn. 1998). "The standard of review 'is the same whether the conviction is based upon direct or circumstantial evidence.'" State v. Dorantes, 331 S.W.3d 370, 379 (Tenn. 2011) (quoting State v. Hanson, 379 S.W.3d 265, 275 (Tenn. 2009)). "[I]dentity of the perpetrator is an essential element of any crime" and may be "established through circumstantial evidence alone." State v. Rice, 184 S.W.3d 646, 662 (Tenn. 2006) (citing State v. Thompson, 519 S.W.2d 789, 793 (Tenn. 1975)).

In relevant part,

> [a] person commits the offense of aggravated child abuse . . . who commits the offense of child abuse, as defined in § 39-15-401(a) . . . and:
>
> (1) The act of abuse . . . results in serious bodily injury to the child;
>
> . . .
>
> (b) A violation of this section is a Class B felony; provided, however, that, if the abused . . . child is eight (8) years of age or less, . . . the penalty is a Class A felony.

T.C.A. § 39-15-402(a)(1), (b) (2006) (amended 2009, 2011, 2012).

"Any person who knowingly, other than by accidental means, treats a child under eighteen (18) years of age in such a manner as to inflict injury" commits a form of child abuse. Id. § 39-15-401(a) (2010) (amended 2012). A person acts "knowingly"

> with respect to the conduct or to circumstances surrounding the conduct when the person is aware of the nature of the conduct or that the circumstances exist. A person acts knowingly with respect to a result of the person's conduct when the person is aware that the conduct is reasonably certain to cause the result.

Id. §§ 39-11-106(a)(20); -302(b) (2010) (amended 2012).

The jury's verdict shows that it rejected the defendant's expert witnesses' conclusions and credited the State's expert witnesses' conclusions that the victim's bone fractures were the result of nonaccidental injury and child abuse. Although the defendant's experts were unable to state with a reasonable degree of medical certainty that the injuries were not caused by the medical procedures performed on the victim at Vanderbilt, Drs. Heller, Greeley, and McMaster concluded otherwise. Each doctor stated that the procedures performed on the victim were conducted daily on infants across the country and that no medical evidence showed the procedures resulted in bone fractures. Dr. Heller testified that the victim's bones were normal and not susceptible to fractures and that the victim did not have a genetic bone disease, such as rickets or OI, that would render the victim's bones brittle.

Dr. Heller stated that the type, location, and various rates of healing led him to conclude that the fractures were caused by direct blows and squeezing of the ribs on at least three occasions. Dr. Greeley and Dr. McMaster concluded the fractures were inflicted on three different occasions. Dr. Greeley concluded that the victim's fractures were the result of child abuse and that the victim's lack of new fractures after being released from the hospital in January 2007 supported that conclusion. Dr. Greeley considered and excluded genetic bone disorders and vitamin deficiencies and concluded the victim's feeding difficulties did not contribute to the fractures. Dr. McMaster concluded that the victim's rib fractures were caused by squeezing the victim's chest and torso with adult-size hands and that his extremity fractures were caused by jerking or shaking. Dr. Heller gave similar testimony. Although the evidence showed that dating the victim's fracture was an approximation rather than an exact mathematical calculation, Dr. Greeley testified that the fractures could not have been inflicted after the victim's December 27, 2006 hospital admission. The evidence showed that bone fractures might be present but invisible on an x-ray.

The record shows that although none of the State's witnesses saw the Defendant inflict the victim's injuries or otherwise mistreat the victim, the Defendant was the victim's primary caregiver and did not use the services of a babysitter. Although the Defendant left the victim in Mrs. Pursell's care once in the two weeks after the victim's birth, Mrs. Pursell denied harming the victim. The expert medical testimony dated the victim's fractures as occurring after the Defendant and the victim moved into Mr. Smith's home in early December 2006.

After the Defendant and the victim moved into Mr. Smith's home, the Defendant continued to be the victim's primary caregiver while Mr. Smith worked during the day. Although Mr. Smith helped the Defendant care for the victim while he was home, Mr. Smith denied inflicting the victim's injuries. Mr. Burchett, Mr. Smith's roommate, testified that he was home during the day, that he helped care for the victim when his help was needed, and that the Defendant did not use babysitters. Although Mr. Burchett fed the victim once while the Defendant took a shower, he denied inflicting the victim's injuries. We conclude that a rational jury could conclude beyond a reasonable doubt that the Defendant inflicted the victim's injuries.

At the time of the offenses were committed, serious bodily injury was defined as bodily injury involving a substantial risk of death, protracted unconsciousness, extreme physical pain, protracted or obvious disfigurement, or protracted loss or substantial impairment of a function of a bodily member, organ, or mental faculty. T.C.A. § 39-11-106(34)(A)-(E) (2006) (amended 2009). In 2009, the Tennessee General Assembly amended the definition of serious bodily injury to include a broken bone of child who is eights years

old or younger. Id. § 39-11-106(34)(F) (2010). Likewise, the legislature amended the aggravated child abuse and aggravated child neglect or endangerment statute to define serious bodily injury to a child. Id. § 39-15-402(d) (2010). Serious bodily injury against a child is now defined, in relevant part, as "a fracture of any bone." Id. Although the amended statute defines serious bodily injury against a child to include any bone fracture, we do not conclude that the previous law precluded a finding of serious bodily injury on the basis of bone fractures.

The victim suffered bone fractures to his femurs, tibia, pelvis, upper right arm, and ribs over the course of three or four weeks. The victim suffered approximately fourteen rib fractures. These injuries were inflicted during the first six weeks of the victim's life. The expert testimony established that the fractures were caused by direct blows or some form of trauma to the victim's pelvis; jerking, yanking, or twisting the victim's arms and legs; and squeezing or shaking the victim's abdominal area. Although no evidence existed that the injuries jeopardized the victim's life, the injuries caused the victim extensive and protracted pain for the first few weeks of his life. The victim was born in November and suffered bone fractures the following month. We conclude that the victim suffered serious bodily injury and that the evidence is sufficient to sustain the Defendant's convictions. The Defendant is not entitled to relief.

II

The Defendant contends that the trial court erred by not allowing her to present evidence that she consented to a polygraph examination. She argues that her right to present a complete defense was denied because she was prevented from establishing that she "was not evasive" during the police investigation. The State contends that the trial court did not err and argues that the Defendant was not denied the right to present a defense. We agree with the State.

Before the trial, the Defendant requested that she be allowed to present evidence that during the police interview, she was asked if she was willing to "take a polygraph." Counsel argued that the police's request and the Defendant's willingness to take the examination were part of the Defendant's statement and should be introduced in its entirety. Counsel also argued that the Defendant's willingness to take the examination after the police requested one showed that the Defendant did not make a "self-serving request." The trial court denied the request, finding evidence of polygraph examinations inadmissible. The court ordered the references to the polygraph examination redacted from the Defendant's statement and prohibited any mentioning of it.

Our supreme court has stated that polygraph evidence is inadmissible. State v. Sexton, 368 S.W.3d 371, 409 (Tenn. 2012) (citing State v. Damron, 151 S.W.3d 510, 515-16 (Tenn. 2004)). Polygraph examination results are "inherently unreliable and not admissible to establish the defendant's guilt . . . [or] to establish residual doubt about the defendant's guilt." State v. Hartman, 42 S.W.3d 44, 60 (Tenn. 2001). Likewise, "'testimony regarding a [d]efendant's willingness or refusal to submit to a polygraph examination is not admissible.'" Sexton, 368 S.W.3d at 409 (quoting State v. Stephenson, 195 S.W.3d 574, 599 (Tenn. 2006) (appendix) (quoting State v. Pierce, 138 S.W.3d 820, 826 (Tenn. 2004))); see State v. Campbell, 904 S.W.2d 608, 615 (Tenn. Crim. App. 1995) ("The fact that an accused either offered to take, took or refused to take a polygraph examination cannot be admitted as evidence."). We conclude that the trial court did not err by excluding evidence that the police requested and the Defendant consented to undergo a polygraph examination.

In consideration of the foregoing and the record as a whole, we affirm the judgments of the trial court.

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JOSEPH M. TIPTON, PRESIDING JUDGE