PRESENT: Hassell, C.J., Lacy, Keenan, Koontz, Kinser, and Lemons, JJ., and Carrico,[1] S.J.

JAMES ALLEN SMITH, JR.

v. Record No. 021583 OPINION BY JUSTICE ELIZABETH B. LACY
February 28, 2003

COMMONWEALTH OF VIRGINIA

FROM THE COURT OF APPEALS OF VIRGINIA

In this appeal, James Allen Smith, Jr., argues that his convictions for first-degree murder and use of a firearm in the commission of first-degree murder should be reversed because the trial court erred in admitting expert opinion testimony on "blood spatter analysis."[2] Because we conclude that blood spatter analysis is a matter for expert testimony and that a sufficient evidentiary foundation for that opinion testimony was established in this case, we will affirm the convictions.

On February 7, 2000, Officer Mark Jones went to Smith's residence in Henrico County in response to a call. In a bedroom, Jones found Tracey L. Chandler lying on her back on the bed with her feet on the floor. There were six bullet entry wounds in her body: behind her right ear, in the right

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[1] Chief Justice Carrico presided and participated in the hearing and decision of this case prior to the effective date of his retirement on January 31, 2003.

[2] This analysis is alternately referred to as "blood stain pattern analysis" and "blood splatter analysis." We use the phrases interchangeably in this opinion.

side of her chest, in her mouth, in her right hand, and above her left and right knee caps.[3] Dr. Deborah Kay, the assistant medical examiner, testified that Chandler bled to death, although the wound behind her ear was potentially lethal.

Smith was subsequently indicted for the first-degree murder of Chandler and the use of a firearm in the commission of first-degree murder in violation of Code §§ 18.2-32, -53.1. At trial, Smith testified that he shot Chandler in self-defense when she attacked him with a needle during an argument over Chandler's drug use. Smith testified that Chandler was standing when he fired the first three shots and that she sat down and rose again before he fired again.

Over Smith's objections, Norman Tiller testified as an expert in blood stain pattern analysis. Tiller stated that, based on his analysis of the impact spatter blood stains on the victim's pants, Chandler was not standing when she was shot. The jury convicted Smith of the crimes charged, and the trial court sentenced him to a total of 28 years' imprisonment. The Court of Appeals refused Smith's petition for appeal by order. Smith v. Commonwealth, Record No. 2402-01-2, June 20, 2002.

[3] One bullet may have passed through Chandler's hand into her leg.

We awarded Smith an appeal limited to the assignments of error regarding the admission of the blood stain pattern analysis. Smith contends that blood spatter analysis is not a reliable science, and that the trial court should not have allowed "a purported expert" to offer opinion testimony on the subject. Smith also contends that, even if such analysis is reliable, the opinion testimony should not have been admitted in this case because the Commonwealth failed to establish a sufficient evidentiary basis or foundation for such opinion testimony. We consider these arguments in order.

I.

As explained by Tiller, blood stain pattern analysis is the analysis of the "shape, size and configuration of blood stains at a crime scene or on a piece of physical evidence." Depending on the type of stain and the circumstances, a number of different conclusions can be reached, such as the cause of the stain, its point of origin, and the direction in which the blood droplets were going at impact. The analysis involves the application of principles of physics, chemistry, biology, and mathematics. Many jurisdictions have held that blood spatter analysis is reliable because it is "clearly a well–recognized discipline, based upon the laws of physics, which undoubtedly assist[s] the jurors in understanding what occurred." State v. Rodgers, 812 P.2d 1208, 1212 (Idaho

1991). The Supreme Court of Minnesota stated that "the results of blood splatter analysis are generally accepted in the scientific as well as the judicial community" noting that because the techniques are based on "the well-settled sciences of chemistry and physics, the reliability of the technique may be appropriate for judicial notice." State v. Moore, 458 N.W.2d 90, 98 & n.6 (Minn. 1990). See also Danny R. Veilleux, Annotation, Admissibility, in Criminal Prosecution, of Expert Opinion Evidence as to "Blood Splatter" Interpretation, 9 A.L.R. 5th 369, §§ 1(a), 7(a)(1993).

Smith argues that this analysis and its attendant conclusions should not be accepted because no reliable and valid method exists to test it. The lack of validity of blood spatter analysis, according to Smith, rests on the fact that human beings cannot be used to conduct experiments testing theories of the "science." Shooting bullets into blood soaked sponges or other substances cannot accurately replicate the results of blood spatter from wounds to human beings, Smith asserts.

We held that blood spatter evidence was admissible expert testimony in Compton v. Commonwealth, 219 Va. 716, 727, 250 S.E.2d 749, 756 (1979), and Stewart v. Commonwealth, 245 Va. 222, 240, 427 S.E.2d 394, 406 (1993). In Stewart, we rejected the defendant's contention that blood spatter evidence was not

reliable. Id. To the extent that the ability to test a method of analysis is relevant in assessing whether expert opinion based on that discipline is admissible, we note that many of the specific physical elements of blood spatter analysis are capable of being tested using the laws of physics and chemistry, and by employing principles of gravity, inertia, and viscosity. In accordance with other jurisdictions, we adhere to the view that this form of scientific analysis can form a basis for admissible proof upon an appropriate foundation. Accordingly, we conclude that the trial court did not err in concluding that blood spatter analysis was a reliable science based on our prior decisions affirming the admission of such evidence.

II.

Smith also asserts that, even if blood spatter analysis is a reliable science, Tiller's testimony in this case should not have been admitted because the Commonwealth failed to provide an adequate foundation.

At trial, Tiller testified about the characteristics of the shapes and patterns of blood stains depending on the source of the blood and other factors. Tiller explained that when a bullet enters the body and blood leaves the body through the entry wound, the type of blood stain is known as "impact spatter." The blood under these conditions, following

"the path of least resistance," exits the entry wound in a conical pattern, and eventually falls to the ground. The greater the force of the impact, the smaller the droplets of blood that are expelled from the wound. Tiller testified that when these droplets strike a surface at a perpendicular angle, the resulting blood stain is circular. If the resulting blood stain is elliptical in shape, it may be concluded that the blood droplet struck the surface at an angle.

Tiller assumed that the 18 blood spots found on the leg of Chandlers' pants were her blood. All but two of the blood spots on the pants were circular in shape, which is consistent with the blood striking the pants at a perpendicular angle. Furthermore, Tiller found almost no impact spatter blood on the pants below the knees, on the back of the pants, or on Chandler's shirt. Based on these facts, Tiller concluded that Chandler was not standing at the time she was shot.

Tiller also testified that, most commonly, the source of impact spatter is a head wound because of the great amount of blood in the head and because the head is not generally covered with clothing which could deflect or block the direct travel of the blood. Therefore, in Tiller's opinion, the wound to Chandler's mouth was the most likely source of the spots of blood found on Chandler's pants.

Tiller testified that he could not rule out Chandler's hand as a source of the blood spatter on the pants, but that, in his opinion, her hand was not a likely source. Chandler's hand showed a bullet entry wound on the back and the exit wound made by that bullet was on her right palm. Exit wounds, according to Tiller, cause more blood spatter than entry wounds. If the hand wound had been the source of the blood on Chandler's pants, Tiller testified that he would have also expected to see blood spatter below the knees of her pants and above the waistline on her shirt. There was no such blood.

Smith argues that no adequate foundation was laid for Tiller's opinion testimony because only three of the 18 blood spots on the pant's legs had been proven to be Chandler's blood, because Tiller could not rule out the wound to Chandler's hand as the source of the blood spots, and because there was no evidence that stains on the bedclothes were blood or how long the blood stains had been on the pants.

Determining whether an adequate foundation has been laid for the admission of an expert opinion is an exercise of the trial court's discretion, to be made in light of all the testimony produced. See Brown v. Corbin, 244 Va. 528, 531, 423 S.E.2d 176, 178 (1992). In this case, the trial court held that the evidence provided a sufficient basis for the expert's opinion testimony because (1) the victim's blood had

been identified by DNA testing within the same area on each of the two legs of the pants allowing the jury to "reasonably conclude that the other spots were also the victim's blood;" and (2) there was sufficient basis to allow the expert to opine on which wound most likely caused the blood spatter on the pants. The trial court concluded that the objections made by Smith went to the weight of the evidence, not its admissibility. We cannot say, based on the record in this case, that the trial court abused its discretion in determining that the Commonwealth produced an adequate factual foundation for the introduction of Tiller's expert opinion testimony.

Accordingly, for the reasons stated, we will affirm the judgment of the Court of Appeals.

Affirmed.