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SJC-12702

COMMONWEALTH vs. KEITH WILLIAMS.

Suffolk. December 8, 2025. - September 22, 2026.

Present: Budd, C.J., Gaziano, Wendlandt, Dewar,
& Wolohojian, JJ.

Homicide. Firearms. Armed Assault with Intent to Murder.
Assault and Battery by Means of a Dangerous Weapon.
Evidence, Firearm, Scientific test, Expert opinion,
Presumptions and burden of proof, Inference, Argument by
prosecutor, Identification. Witness, Expert.
Identification. Practice, Criminal, Presumptions and
burden of proof, Argument by prosecutor, New trial, Capital
case.

Indictments found and returned in the Superior Court
Department on November 19, 2014.

The cases were tried before Christine M. Roach, J., and a
motion for a new trial, filed on March 31, 2023, was heard by
Katie Rayburn, J.

Robert F. Shaw, Jr., for the defendant.
Brooke Hartley, Assistant District Attorney (Mark T. Lee,
Assistant District Attorney, also present) for the Commonwealth.

DEWAR, J. In 2017, a jury convicted the defendant, Keith
Williams, of murder in the first degree and three other offenses

in connection with the shooting and death of Dawn Jaffier and the nonfatal shooting of Lealah Fulton amidst a parade in the Dorchester section of Boston. Although no witness identified the defendant as the shooter, he was seen nearby disposing of the murder weapon seconds after the shooting, accompanied by two other men whom witnesses did place at the scene of the shooting.

Before this court are the defendant's appeals from his convictions and from an order denying his motion for a new trial. Among other arguments, the defendant contends that the trial judge erred in admitting certain expert testimony regarding gunshot residue testing. The defendant and his two companions were tested for gunshot residue in the hours after the shooting, and all of the test results were negative. The Commonwealth's expert testified that, in order to account for the possibility of contamination and to ensure accurate interpretation, a positive test result requires the detection of at least three gunshot residue particles, and there is "nothing to be drawn" from a negative result. The Commonwealth nonetheless presented testimony from the expert that one gunshot residue particle was found on the defendant's hand and another on his T-shirt, whereas no particles were found on the other two men, as evidence that the defendant was the shooter.

We agree with the defendant that the Commonwealth failed to establish the reliability of using the subthreshold number of

gunshot residue particles detected in a negative test result as evidence that the defendant was the shooter. To the contrary, as stated, the Commonwealth's own expert testified that nothing could be drawn from the negative test results. Accordingly, on this record, the testimony about the subthreshold number of gunshot residue particles should not have been admitted for that purpose.

Because this error was prejudicial in the circumstances here, the defendant is entitled to a new trial on his convictions of murder in the first degree, armed assault with intent to murder, and assault and battery by means of a dangerous weapon. He may be tried again on the charge of murder in the first degree, as we reject his further argument that there was insufficient evidence presented at trial to prove that he acted with deliberate premeditation. We also vacate without need for further discussion the defendant's conviction of carrying a firearm without a license, because the jury were not instructed that the Commonwealth bore the burden of proving that he did not have a valid firearm license. See Commonwealth v. Carleton, 497 Mass. 11, 13 (2026), citing Commonwealth v. Guardado, 493 Mass. 1, 12 (2023), cert. denied, 144 S. Ct. 2683 (2024). We thus set aside all of the defendant's convictions and remand the case for further proceedings consistent with this opinion.

Background. 1. Commonwealth's case. We recite the facts the jury could have found, reserving some details for later discussion. See Commonwealth v. Latimore, 378 Mass. 671, 677 (1979).

On the morning of August 23, 2014, a crowd gathered to watch a parade on Blue Hill Avenue in Dorchester. As shown in security camera footage, at approximately 7:26 A.M., the defendant was with Jordan Reed and Brian Joyce outside a convenience store on Blue Hill Avenue between Charlotte and McLellan Streets.¹ The defendant entered the store, made a purchase, and left. About forty-five minutes later, Reed, Joyce, and two other young men approached and entered the store together. Shortly thereafter, Tevan Williams and Wesson Colas, the codefendant, also entered.² The interactions between the two groups were tense, and, although no words were exchanged, they "eyeball[ed]" each other.

Colas and Tevan left the store, followed less than one minute later by Reed, Joyce, and the other two men accompanying them. Colas walked away toward Charlotte Street for a brief

¹ There was testimony at trial that the time stamps on the security camera footage were seven minutes fast. We refer to the actual time, rather than the time stamp indicated on the footage.

² We refer to Tevan Williams by his first name to avoid confusion with Keith Williams, the defendant. There is no relation between them.

period after his exit from the store, and, while he was gone, a brief argument occurred between Tevan and Reed. Reed, Joyce, and their two companions then walked away from the store in the opposite direction, toward McLellan Street, followed seconds later by Tevan and Colas upon Colas's return.

Shortly after the two groups walked away from the store down Blue Hill Avenue toward McLellan Street, Colas pulled out a silver handgun from his waistband and pointed it toward the group that included Reed and Joyce, farther down the avenue toward McLellan Street. The defendant -- who inferably had rejoined Reed and Joyce by this time -- then fired at least five bullets in the direction of Colas and Tevan.³ The defendant, Reed, and Joyce ran away down McLellan Street.

The defendant's bullets did not hit Colas or Tevan but did strike two bystanders. One bullet fatally struck the head of Jaffier as she walked across the street with two friends. Another struck Fulton in the leg as she sat watching the parade from the avenue's median strip.

One witness to the shooting, Amanda Griffith, observed that the shooter was the largest of the three men running from the

³ Witnesses at the scene testified to hearing as many as five shots, and the recovered firearm contained six empty rounds. One of the bullets and fragments of a second were recovered.

scene after the shooting. The defendant was distinctly taller and larger around the waist than Reed or Joyce.

A second account of the shooting came from Brenda Robinson, who was walking with a three year old child on Blue Hill Avenue, had just crossed McLellan Street, and was proceeding along the avenue toward Charlotte Street. She saw a man farther down the block in front of a barbershop, inferably Tevan, start jumping up and down and yelling "blast, blast." As Robinson leaned down to pick up the child, she was pushed against a gate by a man, inferably the defendant, who felt "heavy." He leaned on her as he shot at Colas and Tevan.

Lashonda Osorio, who lived in a side-street apartment approximately 500 feet from the intersection of Blue Hill Avenue and McLellan Street, heard the gunshots. She went to her window and saw the defendant, Reed, and Joyce walking down the street acting "nervous." She heard Reed tell the defendant to "get rid of it." Osorio then watched as the defendant went to the house across the street from her apartment and disposed of a firearm. As the three left the area, Reed told the defendant to "[w]alk, don't run, walk."

Osorio alerted police to what she had seen. She gave descriptions of each of the three men matching the defendant, Reed, and Joyce. Shortly thereafter, police recovered a .357 revolver from under the porch of the house to which Osorio

directed them. The revolver contained six empty shell casings. Ballistic testing later revealed that the weapon fired the bullets that killed Jaffier and injured Fulton.

Police stopped and handcuffed the defendant, Reed, and Joyce a short distance away. Police eventually arrested them, brought them to police headquarters, and collected samples from their hands in order to test for gunshot residue particles. Later, the defendant's T-shirt also was tested.

As we shall discuss in greater detail, the results for the gunshot residue tests of the defendant, Reed, and Joyce all were negative; no sample had the minimum of three gunshot residue particles necessary to qualify as a positive test result. However, one gunshot residue particle was detected in one of the samples taken from the defendant's hands, and another particle was detected in a sample from his T-shirt. No gunshot residue particles were found in the samples from Reed and Joyce.

The defendant waived his rights under the Fifth Amendment to the United States Constitution and gave a statement to police. He admitted to having been dropped off near the location of the shooting about an hour before it occurred but denied possessing or disposing of a gun and also claimed he had not been to the convenience store that morning.

2. Defense. The defense at trial was that the defendant was not the shooter. Trial counsel emphasized that no witness

positively identified the defendant as the shooter, despite what counsel argued was a conspicuous appearance. The defendant was at least six feet tall and was described as "a big guy" and "heavy set." On the day of the shooting, he was wearing a bright blue T-shirt with green cartoon characters on the front, blue shorts, and bright blue and orange sneakers.

Among the witnesses who did not notice the defendant at the scene was off-duty Detective Arthur Hall-Brewster, who was waiting outside the barbershop at the scene of the shooting. He testified that working for decades as a detective had given him the habit of taking note of his surroundings, and he noticed the young men walking in and out of the convenience store, including Colas, Tevan, Reed, and Joyce. He testified that some of the men he saw, including Reed and Joyce, had their hands in their waistbands, which made him believe that they might be armed. He sensed tension between the groups outside the store, saw Colas with a gun, and heard gunshots. He did not see the defendant, however.

As described above, Robinson felt the "heavy" shooter lean over her, but she was not able to see or describe the shooter's appearance, and the Commonwealth's witnesses who did see the shooter gave varying descriptions that, the defendant argued, were inconsistent with his own appearance. Griffith, the witness who characterized the shooter as the largest of the

three men running from the scene, also described the shooter as about five feet, eight or nine inches tall, not heavy set, and wearing a green shirt and dark pants. Troy Souto, who lived on the block and also witnessed the shooting, described the shooter as having a "slinky stocky" build, which he defined as having muscular shoulders and a thin waist.

The sole witness called by the defense, Akeisha Lewis, gave a description of the shooter that was consistent with Reed, not the defendant. Lewis was walking along Blue Hill Avenue with her cousin after the parade and saw a group of men arguing at the corner of McLellan Street and Blue Hill Avenue. Thereafter, a man wearing black pants and a white shirt with black sleeves fired a gun. On the day of the shooting, Reed was wearing black pants and a white sleeveless tank top with a black shirt wrapped around his neck and shoulder area.

The defendant also argued that no forensic evidence tied him to the shooting. Tests conducted on the revolver for deoxyribonucleic acid (DNA) and fingerprints were inconclusive. And, as mentioned, the gunshot residue tests of the defendant's hands and shirt yielded negative results.

3. Prior proceedings. On November 19, 2014, a grand jury indicted the defendant for murder, G. L. c. 265, § 1; armed assault with intent to murder, G. L. c. 265, § 18 (b); assault and battery by means of a dangerous weapon, G. L. c. 265,

§ 15A (b); and carrying a firearm without a license, G. L. c. 269, § 10 (a).

Prior to trial, the Commonwealth moved to admit in evidence expert testimony that one gunshot residue particle was detected in a sample taken from the defendant's hands and another particle in a sample from his T-shirt. The Commonwealth acknowledged that its expert would testify that the test results were negative due to the failure to detect the minimum of three particles. Nonetheless, citing Commonwealth v. Johnson, 463 Mass. 95, 108 (2012), the Commonwealth sought admission of testimony regarding the one particle in each sample in order to argue to the jury that they should infer from the detection of the particles that the defendant was the shooter.

The defendant opposed the Commonwealth's motion. The defendant argued that the Commonwealth in essence was attempting to use the evidence regarding the one gunshot residue particle in each sample as a positive test result despite the fact that, under the applicable laboratory guidelines, the results were negative. The defendant further argued that detection of the particles could have been the result of contamination, and that any probative value of this evidence was substantially outweighed by the risk of unfair prejudice.

In support of these arguments, the defendant submitted various materials. A copy of the negative test results for his

shirt stated that "no conclusions can be made as to whether [the shirt] may have been in the vicinity of a firearm when it was discharged, or may have come into contact with an item with [g]unshot [p]rimer [r]esidue on it." A Boston police department policy on gunshot residue testing stated, among other things, that although gunshot residue particles may be reliably identified, "it is not yet possible to assess scientifically the significance of such an identification"; that the department had a policy not to perform such testing; and that, if an investigator nonetheless wished to collect such evidence, crime laboratory personnel could collect it, with testing to be performed by another facility.⁴ Collection guidelines provided that "[s]ampling on hands must be performed within [four] hours of the shooting incident," with the "best practice" being collection "at the scene or as expeditiously as possible" and "before the subject is placed into handcuffs or . . . a police vehicle." A published summary of a Federal Bureau of Investigation symposium on gunshot residue described, among other things, experts' views and research showing that gunshot residue particles may be transferred onto a test subject through

⁴ After oral argument in this court, the Commonwealth submitted a letter reporting that, since the time of trial, the Boston police department has changed its policy, and its crime laboratory now conducts gunshot residue testing.

contact with armed law enforcement officers, handcuffs, and police vehicles. And an affidavit from the defendant described the timing of the gunshot residue testing, more than three and one-half hours after he was stopped by police, and where and how he had been detained and transported in the intervening hours.

After taking the matter under advisement, the judge allowed the Commonwealth's motion to admit the expert testimony, subject to the Commonwealth laying an "appropriately detailed foundation" regarding gunshot residue. Citing Johnson, 465 Mass. at 108-109, the judge concluded that the risk of unfair prejudice from the evidence was not outweighed by its "potential probative value"; that the defendant's arguments went to the weight of the evidence and could be explored on cross-examination; and that the jury would decide what inferences, if any, to draw from the evidence. The disputed expert testimony then was admitted in evidence at trial, and the Commonwealth relied on it in closing argument to argue that the defendant was the shooter.

On December 28, 2017, the jury found the defendant guilty of murder in the first degree on the theory of deliberate premeditation and also guilty on the other offenses with which he was charged.⁵ The defendant's direct appeal was stayed while

⁵ The jury also found the codefendant Colas guilty of deliberately premeditated murder in the first degree and other

he filed a motion for a new trial. The motion sought relief on grounds including error in the admission in evidence of the number of gunshot residue particles detected in the negative test results; various claimed improprieties in the prosecutor's opening statement and closing argument; and insufficient evidence of deliberate premeditation. The motion judge, who was not the trial judge, ultimately denied the motion without an evidentiary hearing.⁶ We consolidated the defendant's appeal from that order with his direct appeal.

offenses. See Commonwealth v. Colas, 486 Mass. 831, 832 (2021). We vacated Colas's convictions of murder and armed assault with intent to murder for insufficient evidence of intent to kill and remanded the case for a new trial on so much of the indictment as alleged murder in the second degree. See id. at 846.

⁶ The motion judge initially granted an evidentiary hearing on a claim in the defendant's motion for a new trial that testimony from a percipient witness, Damon Stallings, was newly discovered evidence that would have been a real factor in the jury's deliberations. Stallings, who did not testify at trial, stated in an affidavit that he was one of the individuals depicted in the convenience store security footage with Reed and Jordan on the morning of the shooting; that Reed, not the defendant, brought a gun to the parade and fired it; and that Stallings previously had been too afraid to give police this information. After the evidentiary hearing was scheduled, the defendant gave notice that Stallings had become uncooperative and the defendant no longer intended to present evidence at the hearing, and the hearing was canceled. The defendant does not argue on appeal that his motion should have been allowed on this ground. He does continue to press on appeal the additional claim raised in his motion that he received ineffective assistance of counsel at trial because counsel failed to pursue a self-defense theory or any mitigation defense. He also argues for the first time on appeal that the prosecutor elicited inadmissible testimony from two witnesses. Deciding this case as we do, we need not address these claims.

Discussion. We first address the defendant's argument regarding the gunshot residue evidence and then turn to his sufficiency argument.

1. Gunshot residue particles. The defendant argues that the expert testimony regarding the detection of two gunshot residue particles in his negative test results should not have been admitted as evidence that he was the shooter.⁷

a. Evidence. At trial, the Commonwealth presented its gunshot residue evidence through the testimony of Jacqueline Massua, the Boston police department criminalist who collected the gunshot residue evidence from the hands of the defendant, Reed, and Joyce on the day of the shooting, and John Drugan of the State police crime laboratory, who performed the gunshot residue testing and testified as an expert regarding such testing. We summarize their testimony.

Gunshot residue particles are released in a vapor cloud when a firearm is fired. A particle of gunshot residue consists of three components not generally found together as one particle in nature: barium nitrate, lead styphnate, and antimony

⁷ In connection with his motion for a new trial, the defendant submitted, among other things, an expert affidavit in support of his argument that this testimony should not have been admitted. Because we conclude, based on the record as it stood at trial, that it was error to admit this testimony and that the error was prejudicial, we need not consider the additional arguments and materials presented in the posttrial motion.

sulfide. A person may have gunshot residue on his or her hands if the person "recently fired a gun, handled a firearm, [was] in the presence of a gunshot, [was] handcuffed by someone who has recently handled a firearm, . . . [or] touched an area where firearms are routinely found."

To test for the presence of gunshot residue particles, a stub -- essentially, an adhesive tape -- is applied to a surface such as a hand or piece of clothing, and the stub then is examined for gunshot residue particles using a scanning electron microscope. Under scientific standards established by the Federal Bureau of Investigation and the Massachusetts State Police, a positive gunshot residue test requires the detection of three or more gunshot residue particles, a threshold Drugan referred to as the "three-component, three-particle threshold." Individual particles found in separate tests cannot be "added up" to meet this three-particle threshold.

In this case, Massua stubbed the hands of the defendant at 11:53 A.M. on the morning of the shooting, which had occurred at approximately 8:16 A.M., and also stubbed the hands of Reed and Joyce. A police officer collected the defendant's T-shirt the following day for testing, and a different criminalist stubbed it for gunshot residue thirteen months later. Drugan subsequently tested the stubs for the presence of gunshot residue. Each stub tested negative.

Drugan further testified regarding the number of gunshot residue particles underlying the negative test results for the defendant, Reed, and Joyce. No particles of gunshot residue were found on the stubs taken from the hands of either Reed or Joyce. One gunshot residue particle was found on one stub from the defendant's hands, and another was found on the stub from his T-shirt. Drugan explained that, despite the single gunshot residue particle found on each of these stubs from the defendant, both tests nonetheless were negative results because the number of gunshot residue particles fell below the "three-component, three-particle threshold."

On cross-examination, Drugan agreed that there was "nothing to be drawn from" the negative test results. Drugan's reports of the results of his analyses, which were admitted in evidence over the Commonwealth's objection, similarly stated that, because the test results for the defendant, Reed, and Joyce each were negative, "no conclusions can be made as to whether these individuals may have discharged a firearm, may have been in the vicinity of a firearm when it was discharged, or may have come into contact with an item with [gunshot residue] on it." Drugan agreed that the three-particle threshold is in place in part to account for the possibility of contamination and to assure accurate interpretation of test results. He further testified that microscopic particles of gunshot residue are resilient and

transferable and are known to persist on handcuffs and surfaces inside of police cruisers and stations.

b. Standard of review. "We review a judge's determination to admit or exclude expert testimony . . . for an abuse of discretion." Commonwealth v. Rintala, 488 Mass. 421, 425 (2021), quoting Commonwealth v. DiCicco, 470 Mass. 720, 729 (2015). "The defendant must therefore demonstrate that the judge 'made a clear error of judgment in weighing the factors relevant to the decision, such that the decision falls outside the range of reasonable alternatives.'" Rintala, supra at 425-426, quoting L.L. v. Commonwealth, 470 Mass. 169, 185 n.27 (2014). "Although 'our review under this standard is deferential and limited, it is not perfunctory. A judge's findings must apply the correct legal standard to the facts of the case and must be supported by an examination of the record.'" Commonwealth v. Hinds, 487 Mass. 212, 218 (2021), S.C., 494 Mass. 681 (2024), quoting Commonwealth v. Patterson, 445 Mass. 626, 639 (2005).

Where a defendant has preserved at trial the evidentiary error claimed on appeal, the defendant "need only demonstrate that any error was prejudicial to warrant reversal." Rintala, 488 Mass. at 426. An error is prejudicial unless we can say that it "did not influence the jury, or had but a slight effect." Hinds, 487 Mass. at 229, quoting Commonwealth v.

Pfeiffer, 482 Mass. 110, 129, cert. denied, 589 U.S. 1061 (2019). See Rintala, supra at 444 (Commonwealth must show "with fair assurance . . . that the judgment was not substantially swayed" by error [citation omitted]).

c. Admissibility. "The role of expert testimony is to assist jurors in interpreting evidence that lies outside of their common experience." Hinds, 487 Mass. at 217, quoting Commonwealth v. Shanley, 455 Mass. 752, 761 (2010). See Commonwealth v. Torres, 469 Mass. 398, 406 (2014), quoting Mass. G. Evid. § 702 (2014) (expert testimony must "assist the trier of fact to understand the evidence or to determine a fact in issue"). Admission of expert testimony is governed by the standard under Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593-594 (1993), as adopted by this court in Commonwealth v. Lanigan, 419 Mass. 15, 26 (1994).⁸ See Commonwealth v. Davis, 487 Mass. 448, 453 (2021), S.C., 491 Mass. 1011 (2023). "Under the Daubert-Lanigan standard, 'the touchstone of admissibility

⁸ Expert testimony also may be admitted under the standard set forth in Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923). See Davis, 487 Mass. at 453-454, and cases cited (Frye standard requires expert's theory and methodology to be generally accepted by relevant scientific community). Here, the Commonwealth did not attempt to establish that the number of particles detected in negative gunshot residue tests has gained general acceptance in a relevant scientific community as evidence that the tested person fired a weapon -- a proposition contrary to the testimony of the Commonwealth's own expert that nothing could be drawn from the negative test results.

is reliability.'" Hinds, supra at 220, quoting DiCicco, 470 Mass. at 729. Accordingly, the judge, as gatekeeper of the evidence, "must make a threshold determination that the testimony is both relevant and 'sufficiently reliable to go before the jury.'" Hinds, supra at 218, quoting Commonwealth v. Hoose, 467 Mass. 395, 417 (2014).

The proponent of expert testimony therefore must lay a foundation from which the judge can make this threshold determination as to the reliability of the testimony. See Davis, 487 Mass. at 453. The proponent "must establish, among other factors, that the testimony is . . . based on a reliable methodology, and that the methodology 'is applied to the particular facts of the case in a reliable manner.'" Hinds, 487 Mass. at 220, quoting Commonwealth v. Barbosa, 457 Mass. 773, 783 (2010), cert. denied, 563 U.S. 990 (2011), and citing Mass. G. Evid. § 702 (2021).⁹ "Because different subject matters allow for varying degrees of certainty, the metrics used to assess reliability understandably vary across areas of expertise."

⁹ In assessing the reliability of the methodology underlying the expert testimony under the Daubert-Lanagan standard, "[t]he five nonexclusive factors are whether the scientific theory or process (1) has been generally accepted in the relevant scientific community; (2) has been, or can be, subjected to testing; (3) has been subjected to peer review and publication; (4) has an unacceptably high known or potential rate of error; and (5) is governed by recognized standards" (quotation omitted). Rintala, 488 Mass. at 437 n.30, quoting Davis, 487 Mass. at 454.

Hinds, supra at 221. See, e.g., Commonwealth v. Pytou Heang, 458 Mass. 827, 848-849 (2011), and cases cited (admission of ballisticians' opinion "to a 'reasonable degree of ballistic certainty'").

"An evidentiary Daubert-Lanigan hearing is generally not required where we have previously admitted expert testimony of the same type, where the testimony is offered for the same purpose, and where there is no factual issue as to whether the expert is qualified, whether the appropriate methodology has been followed, or whether the quality of the evidence is sufficient to permit an opinion." Pytou Heang, 458 Mass. at 845. However, we have not foreclosed challenges to "any particular theories or methods for all time, especially in areas where knowledge is evolving, and new understandings may be expected as more studies and tests are conducted." Shanley, 455 Mass. at 763 n.15, citing Lanigan, 419 Mass. at 26-27.

Moreover, as already mentioned, "evidence can only be admitted if, in addition to the reliability of the theory and process in general, the process is reliable when applied to the specific issue about which the expert is proposing to testify." Patterson, 445 Mass. at 645, citing Kumho Tire Co. v. Carmichael, 526 U.S. 137, 153-154 (1999). See Kumho Tire Co., supra ("specific issue before the court was not the reasonableness in general" of expert's method but instead

"reasonableness of using such an approach . . . to draw a conclusion regarding the particular matter to which the expert testimony was directly relevant"). See also Commonwealth v. Honsch, 493 Mass. 436, 450 (2024) ("The Commonwealth must show not only that the methodology is reliable, but also that the particular application of that process is reliable"). "Judges . . . need not admit . . . every application of a testing method -- no matter how dubious -- merely because another application of the method has been deemed reliable. Otherwise, the traditional role of judges as gatekeepers -- protecting juries from evidence that had little chance of being reliable -- would be significantly and needlessly diminished." (Citations omitted.) Patterson, supra at 648.

In Davis, 487 Mass. at 456, for example, which concerned a particular application of global positioning system (GPS) technology, it was "clear from both the record and our case law that GPS technology is generally accepted as reliable" for purposes of establishing location. Rather than just using the GPS technology to establish location, however, the expert in Davis testified that data from a GPS monitoring device worn by the defendant showed that the defendant's speed matched the speed of the person who shot the victim. Id. at 449. We held that admission of this evidence was error where the Commonwealth made no showing that the device reliably measured the

defendant's speed; the Commonwealth had not shown, for example, that the device had been tested or peer reviewed, nor that the device applied the same methodology as some other device previously found to be reliable. Id. at 457.

Here, the defendant does not dispute the admissibility of gunshot residue evidence generally. Cf. Pytou Heang, 458 Mass. at 850-851 (upholding admission of gunshot residue evidence). Nor does he challenge the testimony at trial that the tests of the defendant, Reed, and Joyce returned negative results. Rather, the defendant solely challenges the admission in evidence of expert testimony regarding the number of gunshot residue particles detected in his negative test results as proof that he was the shooter. Among other arguments, the defendant contends, citing Barbosa, 457 Mass. at 783, and Mass. G. Evid. § 702 (2025), that contrary to the requirement that expert testimony be the product of a reliable methodology that has been reliably applied to the facts of the case, the Commonwealth's offer in evidence of the underlying gunshot residue particles as proof that the defendant was the shooter was not supported by the scientific standards that informed that expert's testimony. The Commonwealth's brief does not address reliability, instead arguing more generally, as the Commonwealth did at trial, that the jury were entitled to infer culpability based on detection of one particle in each of two samples taken from the defendant

under Johnson, 463 Mass. at 108-109, and that the defendant's objections to the evidence "are subjects for cross-examination that bear on the weight of the evidence" rather than its admissibility, Commonwealth v. Sicari, 434 Mass. 732, 751 (2001), cert. denied, 534 U.S. 1142 (2002).

We agree with the defendant that, on this record, the Commonwealth did not meet its threshold burden, as the proponent of the evidence, to establish that the detection of one gunshot residue particle in each of two negative test results for the defendant was reliable evidence that the defendant fired the murder weapon -- the contested issue with respect to which the Commonwealth offered the evidence -- or of any other material issue at trial. See Davis, 487 Mass. at 453. The Commonwealth's expert opined at trial, consistent with his statement on the negative test results that were before the judge at the hearing on the Commonwealth's motion to admit the evidence, that nothing could be drawn from the results. The expert also testified, again consistent with materials the defendant submitted at the hearing on the Commonwealth's motion, that the three-particle threshold for a positive test result exists in part due to the risk of contamination and the need to ensure accurate interpretation of the results. The Commonwealth did not offer any evidence that, notwithstanding the view of its own expert, the detection of one particle in each of the

negative test results reliably tended to prove that the defendant had fired the gun, or any other material issue at trial. While "the metrics used to assess reliability understandably vary across areas of expertise," Hinds, 487 Mass. at 221, here the Commonwealth offered no metric for assessing the reliability of the expert's testimony about the gunshot residue particles as proof of a material fact in this case.¹⁰

The Commonwealth was not relieved of its burden to establish the reliability of its expert's testimony by our decision in Johnson, 463 Mass. at 108-109. There, the Commonwealth's expert testified without objection that a glove associated with the defendant tested positive for gunshot residue and that, although the test results for a sweatshirt also associated with the defendant were negative, two particles were detected on the sweatshirt. Id. at 106-107. On appeal,

¹⁰ In this regard, the Commonwealth's evidence differed from the evidence in cases in which other States' highest courts have found no error in the admission of test results falling short in some respect from a positive result for three-component gunshot residue particles. See, e.g., State v. Williams, 350 Conn. 363, 384-392 (2024) (no error in admission of test results showing presence of particles containing only one or two of the three elements of gunshot residue, where expert testified results were "commonly associated with" or "consistent with" gunshot residue); Mills v. State, 476 So. 2d 172, 176 (Fla. 1985) (no error in admission of testimony that defendant's test "was positive in that it revealed the presence of antimony in an amount not to be expected on a person who had not fired a gun, although it was not enough to prove conclusively that he had done so").

the defendant in Johnson newly raised two arguments against admission of this evidence. First, he argued that gunshot residue analysis in general was "'junk' science," a claim we rejected on the ground that he had not provided evidence to undermine our conclusion in Pytou Heang, 458 Mass. at 850-851, that gunshot residue testing can serve as probative evidence. Johnson, supra at 107. Second, he argued that the testimony about the two gunshot residue particles detected on his sweatshirt was false testimony in violation of his due process rights. See id. at 107. We rejected this argument because the expert's testimony in fact was not false; two particles had been detected. Id. at 107-108. We further stated, based on the limited record, that the jury were entitled to infer a greater likelihood of culpability from the presence of the two particles. See id. at 108-109. We said nothing, however, to the effect that such evidence of a number of particles that fails to clear the scientific threshold required for a positive test result has been generally accepted as reliable proof that a person fired a gun, cf. Shanley, 455 Mass. at 763 n.15, let alone to foreclose future challenges based on advances in science or simply a more developed record, see Johnson, supra at 107-109. Johnson thus did not establish that the detection of particles below the scientific threshold for a positive result, standing alone and without any showing as to its reliability to

prove as much, necessarily supports an inference that the tested person fired a gun. To the extent Johnson may be read to suggest otherwise, we disavow that suggestion.

Thus, the Commonwealth here was obliged to establish that the detection of one gunshot residue particle in each of two negative test results was reliable evidence to support the inference that the defendant, rather than his companions, fired the weapon. See Hinds, 487 Mass. at 220. Because the Commonwealth failed to provide that foundation, the expert testimony regarding the underlying gunshot residue particles should not have been admitted for that purpose. See Davis, 487 Mass. at 457. To be sure, we do not hold that expert testimony regarding the detection of a below-threshold number of gunshot residue particles necessarily is categorically inadmissible in all cases. Rather, the admissibility of expert testimony regarding matters outside jurors' common experience depends on the foundation offered and the inference for which the evidence is introduced, see Hinds, supra at 217-218, citing Daubert, 509 U.S. at 597, and here the Commonwealth failed to establish a sufficient foundation in support of the inference it asked the jury to draw.

In so holding, we emphasize that this is not a case where the Commonwealth offered evidence shown to be reliable even if "not definitive." Torres, 469 Mass. at 407. In appropriate

circumstances, expert testimony may be admissible even where not definitive. See, e.g., id. at 407-408 (while expert gave only qualified opinion that defendant's shoe "'could have' made" bloody shoeprint, "the expert led the jury through the factors he applied in his analysis," and there was "no suggestion in the record that a proper analysis require[d] a particular 'score' among the four factors"). See also Commonwealth v. Linton, 483 Mass. 227, 241-242 (2019) (proponent of DNA result falling short of minimum threshold sufficiently demonstrated through expert testimony that below-threshold result nonetheless "provide[d] relevant data, and [could] be used to support an exclusion," unlike in DiCicco, 470 Mass. at 731, where proponent proffered no evidence to establish reliability of below-threshold result). In Commonwealth v. McNickles, 434 Mass. 839, 854-855 (2001), for example, we held that certain DNA evidence was properly admitted where, although "not presented to the jury as a complete identification or as a 'match,'" the evidence "provided at least some reliable information about the perpetrator that was admittedly consistent with the defendant and that excluded two other possible suspects." Here, although the Commonwealth somewhat analogously sought to use the subthreshold gunshot residue particles detected in the negative test results as evidence that the defendant, rather than his two companions, was the shooter, the Commonwealth failed to meet its initial burden

to show that detection of these particles reliably supported that inference. Indeed, the only evidence on this point was the contrary statement by the Commonwealth's own expert that no inference at all could be drawn.

d. Prejudice. The Commonwealth has not argued that, even if the testimony regarding the subthreshold number of gunshot residue particles was admitted in error, the defendant is not entitled to a new trial. Indeed, a new trial is required.

The disputed gunshot residue testimony figured prominently in the Commonwealth's case. In the Commonwealth's opening statement, the prosecutor explained that gunshot residue particles were found on the defendant, without mentioning that the particles did not amount to a positive test result. In closing argument, the prosecutor acknowledged that the test results were negative, but told the jury that the threshold for a positive result was "not [their] protocol," and that they could "interpret [the evidence] however [they] want," because "[t]hat's not a jury standard of practice, that's a Massachusetts State Police standard of practice." The prosecutor then highlighted that gunshot residue particles were found only in the samples taken from the defendant, not Reed or Joyce, and urged the jury to rely on this evidence to conclude that the defendant was the shooter. The prosecutor's closing also undercut the defendant's attempt to minimize this evidence

-- through an argument, based on cross-examination of the Commonwealth's witnesses, that the particles could be the result of contamination -- by pointing out that Reed and Joyce too had been handcuffed, transported in police vehicles, and detained for hours prior to the testing, and yet no particles were found in their negative test results. This thus is not a case where, although evidence was admitted in error, the Commonwealth refrained in its closing argument from arguing that the jury should rely on it. Contrast, e.g., Commonwealth v. Nesbitt, 452 Mass. 236, 255 (2008).¹¹

¹¹ The defendant also points out that the Commonwealth's closing argument contained a misstatement regarding the gunshot residue evidence. The prosecutor stated that, under the Massachusetts State police testing protocols, "to call it positive we need two particles." The testimony instead was that three particles from a single sample were required. Deciding the case as we do, we need not address this issue nor most of the other claimed improprieties in the prosecutor's opening statement and closing argument, all of which went without objection by the defendant at trial, and we assume that any impropriety will not be repeated in a second trial.

Because one issue raised by the defendant is likely to reoccur at any retrial, however, we address it briefly. The defendant argues that the prosecutor impermissibly used gang innuendo in his opening statement by referring to the group of men associated with the defendant who walked into the convenience store together as "team Williams." The prosecutor noted for the jury that this descriptor was "[f]or purposes of this opening statement"; otherwise, the prosecutor would have had to repeat the names or descriptions of multiple individuals in narrating how the events unfolded. There was no error in these references. See Commonwealth v. Brown, 477 Mass. 805, 818 (2017) (no error in describing defendant as part of team to help jury understand Commonwealth's theory).

Moreover, the Commonwealth's evidence identifying the defendant as the shooter was not overwhelming. The Commonwealth did introduce evidence that the defendant was with Reed and Joyce mere seconds after the shooting, holding the murder weapon; that the defendant then disposed of the murder weapon; that one witness described the shooter as being the largest of the three men fleeing the scene, as was true of the defendant by comparison with Reed and Joyce; that another witness described physical contact with a "heavy" shooter; and that, on being detained shortly after the shooting, the defendant made two statements from which the jury could infer consciousness of guilt, because the statements were contradicted by other evidence. However, the defendant was not seen in the area immediately before the shooting and was not present with Reed and Joyce during the tense encounter in the convenience store or the argument outside the store; no witness or forensic test positively identified him as the shooter; and the witness whose description of the shooter was the strongest for the Commonwealth's case -- because she testified that the shooter was the largest of the three men fleeing the scene -- also described several other details of the shooter's appearance that were not consistent with the defendant. Additionally, another witness's description of the shooter matched Reed's appearance; one witness had made observations prior to the shooting leading

the witness to believe Reed was armed; and the witness who saw the defendant dispose of the gun heard Reed in command, directing the defendant's actions.

In these circumstances, we cannot conclude that the error "did not influence the jury, or had but a slight effect" (citation omitted). Hinds, 487 Mass. at 229. The defendant therefore is entitled to a new trial on the charges of murder in the first degree, armed assault with intent to murder, and assault and battery by means of a dangerous weapon.

2. Sufficiency of evidence. We next address the defendant's argument that there was insufficient evidence that he acted with deliberate premeditation, such that he may not be retried for murder in the first degree. "Because the defendant challenges the sufficiency of the evidence as to one element only -- deliberate premeditation -- we examine the sufficiency of evidence relevant to that element alone."¹² Commonwealth v. Gambora, 457 Mass. 715, 732 (2010), quoting Commonwealth v. Coleman, 434 Mass. 165, 167 (2001). We thus must determine whether, "viewing the evidence in the light most favorable to the Commonwealth, any rational jury could have found deliberate

¹² At trial, the defendant argued that the evidence was not sufficient to identify him as the shooter. He does not press this argument on appeal, and, having reviewed the full record of the case pursuant to our duty under G. L. c. 278, § 33E, we discern no substantial likelihood of a miscarriage of justice on this ground.

premeditation beyond a reasonable doubt." Gambora, supra. "[C]ircumstantial evidence is sufficient to establish guilt beyond a reasonable doubt, and inferences drawn from such evidence need only be reasonable and possible; [they] need not be necessary or inescapable" (quotation and citations omitted). Commonwealth v. Gonzalez, 475 Mass. 396, 407 (2016). However, "[n]o[] . . . conviction [may] rest upon the piling of inference upon inference or conjecture and speculation." Id., quoting Commonwealth v. Swafford, 441 Mass. 329, 343 (2004).

"In order to prove deliberate premeditation, the Commonwealth must show that the plan to kill was formed after deliberation and reflection" (quotation and citation omitted). Commonwealth v. Bolling, 462 Mass. 440, 446 (2012). "[N]o particular length of time is required in order for deliberate premeditation to be found," however, as "a decision to kill may be formed in a few seconds" (citations omitted). Id. Accordingly, "it is the sequence of the thought process rather than the time which is taken to think that is the key to determining whether someone acted with deliberate premeditation." Commonwealth v. Fernandez, 480 Mass. 334, 345 (2018), quoting Commonwealth v. Chipman, 418 Mass. 262, 269 (1994).

The evidence here would allow a rational jury to find beyond a reasonable doubt that the defendant acted with

deliberate premeditation based on the defendant's conduct at the scene of the shooting. As already described, the defendant was captured on surveillance footage outside the store with Reed and Joyce less than an hour before the shooting, and then was seen running from the scene with Reed and Joyce, holding the murder weapon, mere seconds after the shooting. From eyewitness accounts of the shooting, the jury could find that, after Colas displayed and pointed a firearm toward the defendant and his companions, the defendant made the decision to fire his own weapon repeatedly at Colas. The defendant then fired at least five rounds. Although the interval was brief, deliberate premeditation may be formed in seconds, and the sequence of conduct here permitted the jury to infer that the defendant formed a decision to kill Colas before carrying it out by repeatedly firing at him. See Bolling, 462 Mass. at 446. See also Commonwealth v. Williams, 422 Mass. 111, 122-123 (1996), and cited cases. The evidence of deliberate premeditation thus was sufficient.

Conclusion. For the foregoing reasons, the defendant's convictions are vacated and set aside, and this case is remanded to the Superior Court for further proceedings consistent with this opinion.

So ordered.