The Sheku Bayoh Public Inquiry

Witness Statement

Dr Paul Rice

Taken by [redacted]

Via MS Teams

on Tuesday 13th December 2022

Witness details

1. My full name is Paul Rice. My date of birth is in 1959. My contact details are known to the Inquiry.

2. I am a retired Pathologist and Toxicologist. My qualifications are OBE BM FRCPath FRCP FRSB.

Witness Statement and PIRC Engagement

3. I have had sight of the statement (PIRC-00287) I prepared dated 15 June 2015. This is the only statement I prepared for this case.

4. The statement I prepared is a true and accurate account to the best of my knowledge and recollection.

5. On 8 June 2015, I was contacted by telephone call and email (PIRC-04432) by Keith Harrower, who was the Deputy Senior Investigator for the Police Investigations & Review Commissioner (PIRC). I was informed that there had been

a death in custody on 3 May 2015, where during the course of the subject's arrest, he had been exposed to CS and PAVA spray.

6. I was informed that there were various samples taken from Mr Bayoh which were being stored in a refrigerated condition. There were blood samples taken from Mr Bayoh on 3 May 2015 at the hospital. There was also blood, lung tissue and urine samples which had been taken during the post-mortem examination performed on 4 May 2015.

7. I was asked to comment on whether it would be possible to determine if there was evidence of CS and/or PAVA spray in Mr Bayoh's system, and in what estimated quantities.

8. I responded to Mr Harrower by email (PIRC-04432) on 15 June 2015. On the basis of the content of my email, I was asked to produce my written statement. I have not provided any further statements or assistance to the PIRC for this case.

Education and Professional Qualifications

9. I graduated with a Bachelor of Medicine (BM) degree from Southampton University in 1982. As a newly qualified doctor, you make the decision to continue training within the hospital setting and specialise within a branch of medicine, or you undertake training to become a General Practitioner. Both options take 5 years of training. I chose to specialise within the area of Pathology. A trainee pathologist would be expected, upon completion of the 5 year training period, to have received membership with the Royal College of Pathologists. My post-graduate training took place within Southampton University Medical School.

10. In 1993, I was admitted as a member to the Royal College of Pathologists. A practitioner can be admitted either through taking exams, or based on published work. The membership is maintained by members paying an annual subscription. No further exams have to be sat or published work has to be presented in order to maintain membership. After a period of 10 years, the College will review your membership and they will look at factors such as how you have interacted with the

College and your College meetings attendance records. If the College is satisfied that you have been a good member, you can be promoted to Fellow. I received Fellowship in 2002 and gained the professional lettering, 'FRCPath'. Both membership and Fellowship can be maintained upon retirement. The person would have to make the College aware that they had retired. The annual subscription fee is reduced, but you are allowed to retain the professional lettering.

11. In May 2007, I was awarded a special Fellowship to the Royal College of Physicians. I received the professional lettering 'FRCP'. It was awarded to me by a couple of Fellows of the College in recognition of the work I had undertaken within the specialism of Toxicology. To receive Fellowship, I did not have to sit any examinations or submit any published work. This Fellowship is also maintained post-retirement.

12. In around 1990, I was a member of the Institute of Biology. Membership was granted upon presentation of the work that you had done within the relevant area of study. There was no exam. Membership is thereafter retained through payment of the annual subscription fee. I was subsequently offered a Fellowship with the Institute. Several years ago, the Institute of Biology was made into the Royal Society of Biology. I, therefore, became a Fellow to the Royal Society of Biology.

13. I received my Order of the British Empire (OBE) award in 2012, in recognition of the professional services and advice I had provided to the Ministry of Defence.

14. Whilst I am a Pathologist, I have developed an interest and expertise within the area of toxicology. My accreditation in toxicology received through the Institute of Biology is based on the work that I was doing for the Defence Science and Technology Laboratory (DSTL) at Porton Down. The work involved running the toxicology department.

Work Experience

15. When I produced my PIRC statement, I was the Chief Medical Officer at DSTL Porton Down. I held this post until I retired on 1 April 2020.

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16. As set out in the third paragraph on page 2 of my PIRC statement, I was engaged in many complex and interesting cases during my career. I have had a very busy and exciting working life. What I have included in my PIRC statement are the experiences that have a bearing on my expertise in the area of chemical weapons and sensory irritants like CS and PAVA.

17. In 1993, myself and a colleague received a call from the FBI about a Congressional hearing due to be held looking into the deaths that occurred during the siege of the Branch Davidian complex in Waco, Texas. The complex had been stormed by FBI officers and the military, where they used CS gas to remove the religious sect members from the building. The building was eventually set on fire and most of the people inside died. The FBI wanted to understand whether or not the use of so much CS gas prevented people's ability to leave the building. My colleague and I produced long statements based on information provided in terms of the overall amounts of CS gas put into the building. We were able to calculate peak concentrations of CS within the building and what the likely effects on the people inside the building would be. My colleague and I were then called to give evidence before the Congressional hearing in Washington.

18. DSTL at Porton Down has a long history in terms of developing irritant materials such as CS. We used them quite extensively in the Troubles in Northern Ireland during the late 1960s and early 1970s. The colleague, who I worked alongside on the Branch Davidian case, worked on the report focusing on the use of irritant materials in Northern Ireland since he had a lot of experience at the time in terms of the toxicology of CS. I developed upon that experience when I went to Porton Down and we both published widely on this particular topic.

Analytical Method for CS Detection

19. In the fourth paragraph on page 3 of my statement, I refer to the preliminary work undertaken at Porton Down in developing an *"analytical method for the detection of a substance in the urine called 2-chlorohippuric acid"*. I wasn't involved in the

development of this analytical method, it was one of the chemists working at Porton Down. Since I started working at Porton Down, until I retired, the laboratory was often asked if we could prove whether or not somebody had been exposed to CS or not. This question was particularly popular when the police started using CS sprays for self-protection. During my time at Porton Down, we also had our own staff actually making CS on site. From a health monitoring perspective, we needed to be sure that our own staff weren't becoming repeatedly exposed to the CS that they were handling. I think that's what drove the development of this analytical method.

20. The analytical method was an experimental tool and was not a forensically accredited method. In order for a method to become forensically accredited, you must demonstrate to appropriate forensic bodies that the method you've developed is sensitive enough to detect this material and whether or not the level of this material you get in the urine can be related to the concentration that the person was initially exposed to.

21. We considered whether there was something that we could analyse in the urine that could prove, one way or another, whether that individual had been exposed to CS. We knew that 2-chlorohippuric acid is a metabolite of CS. The metabolic process is where the body breaks down a substance into simpler, less toxic materials. It is the way that the body deals with substances, particularly foreign substances that have not been produced inside the body. It is important to note that many internally produced substances undergo the metabolism process and get broken down eventually. The breakdown products of the metabolic process are known as 'metabolites'. The metabolites can then be excreted in the urine or excreted from the gastrointestinal tract. The analytical method developed tested urine samples for the presence of 2-chlorohippuric acid.

22. At the time of writing my PIRC statement, when testing blood and lung tissue samples I was not aware of any established methods or methods in development for the analysis of either CS, PAVA, or their respective breakdown products.

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23. For urine samples, I was not aware of any established methods or methods in development for the analysis of PAVA, or its respective breakdown products.

Timescales for Testing Samples

24. The presence of 2-chlorohippuric acid within urine can only be detected for a number of hours after exposure, with the metabolite, almost completely absent by 24 hours after exposure. CS is very rapidly metabolised within the body. When urine has been expelled from the body, the metabolite will continue to undergo further chemical changes and will eventually breakdown completely. The work at Porton Down had shown that it was possible to detect 2-chlorohippuric acid following exposure to CS in the urine for a few hours following exposure but, by 24 hours after the exposure, all of the metabolite was gone because you had broken down all the CS that you were exposed to.

25. The fast breakdown of CS within the body and within the urine is the reason why I was unable to accurately test the urine sample of Mr Bayoh. I was informed of the sample on 8 June 2015, and by that time the CS exposure had occurred over 1 month prior.

26. At the fifth paragraph on page 3 of my PIRC statement, I comment:
"It is theoretically possible, therefore, that we could attempt to measure this marker in the urine sample from current case taken at post-mortem if it had have been available at the time of post-mortem. However, I believe that given the urine sample is now over a month old, that the possibility of any of this marker remaining in the sample at this time is negligible."

27. When I say it is theoretically possible, that remains the case. I don't actually know because we didn't test Mr Bayoh's urine sample, and also Mr Bayoh received a post-mortem examination approximately 24 hours after he was initially exposed. Theoretically, we might have been able to detect this substance in the urine at the time he had his post-mortem because it was around about 24 hours after he was exposed. If the post-mortem hadn't occurred at that time, but occurred several days later, then I think the possibility of detecting anything in his urine at that time

would have been very much reduced because we know that this disappears from the urine within 24 hours. It's certainly true that, if we had tested the urine sample at the time I provided my PIRC statement, the likelihood of detecting CS in the sample would be zero.

Qualitative and Quantitative Analysis

28. The analytical method for the detection of CS is a qualitative analytical tool, i.e. it is the detection of the substance itself.

29. I have been referred to the seventh paragraph on page 3 of my PIRC statement, where I comment:
"We have done no work to relate the level of 2-chlorohippuric acid present in urine to the initial concentration of CS the person was exposed to, ie. the analysis is not quantitative."

30. Quantitative analysis looks at measuring the amounts of the detected substance. Here, where you can measure the detected substance, can you ascertain how much of the substance the person was initially exposed to? A useful analogy would be where someone is stopped by the police under the suspicion that they had been drink driving. The person is breathalysed, and that test tells the police how much alcohol the person has in their breath and whether that exceeds the legal limit. There are also tests for drugs of abuse where not only can you detect the drug of abuse in urine or blood, but you can also measure how much of the drug is in the urine/blood sample and, therefore, roughly how much of the drug the person took initially. Here, we cannot link any metabolite measurement in the sample with how much CS the person was initially exposed to. This is the point I make clear at this paragraph, that we cannot answer how much CS spray Mr Bayoh was initially exposed to.

2-chlorohippuric acid

31. At paragraph eight of page 3 of my PIRC statement, I state:

"We are far from sure whether 2-chlorohippuric acid is a signal which is unique for CS, ie. it is possible you could measure this material in urine as a result of exposure to other substances including certain food stuffs."

32. We are not sure whether this chemical substance 2-chlorohippuric acid is specific to CS. You may be able to measure it in urine or blood as it is a fairly common metabolite of possibly a wide range of substances. Therefore the presence of 2-chlorohippuric acid within a sample does not necessarily mean that the person was exposed to CS.

Scientific Developments post-2015

33. I have been asked if I am aware of any developments since 2015 that would allow for blood, urine or lung tissue samples to be analysed, either qualitatively and/or quantitatively, in terms of exposure to CS or PAVA. Whilst I have been retired since 2020, I am not personally aware of any relevant developments. That doesn't mean there haven't been, it's just that I'm not aware of any.

34. I have been made aware that wet and dry swabs were taken from Mr Bayoh's face, mouth and nostrils at the time of the post-mortem examination on 4 May 2015. It is theoretically possible that those swabs may have CS and/or PAVA trapped on them. It is possible, I'm not saying it's probable.

35. Those swabs could be analysed for intact CS and PAVA. However, I think it's unlikely that you would detect any materials. Both of those materials, when they enter the body, get absorbed very, very quickly. They don't leave any traces around on the surface of the skin for very long. CS breaks down very rapidly in water, PAVA, also, to a similar extent. So it is theoretically possible, but I don't think very likely that those swabs could be accurately analysed for CS or PAVA. I think by the time you get to post-mortem (i.e. 24 hours after Mr Bayoh was sprayed), your ability to detect on those swabs any intact material, again, is negligible.

36. I have been made aware that tapings were taken from Mr Bayoh's head, face, neck and exposed arms on the evening of 3 May 2015. Like the swabs, it is

37. theoretically possible that those tapings may have CS and/or PAVA trapped on them. Since the tapings were taken some hours after Mr Bayoh was initially exposed, I remain very doubtful that any of those tapes or the swabs would have picked up any persistent material. It would either have been absorbed or it would have evaporated off the surface of Mr Bayoh's skin.

38. In terms of any analytical methods that could be used for either the tapings or swabs, I am not appropriately qualified to comment on this. A chemist would be best placed to comment here.

39. CS and PAVA are used as irritant materials because they have such a rapid reaction on the body of those that they are administered to. CS is used to break up riots; PAVA is used in much the same way. It is to repel people and dispel crowds of people, because, as soon as you disseminate them, these materials have such a rapid effect on people, they irritate them and make them want to flee away from the area. It is impossible to say whether there is any window of time where I would be confident that the substances could be accurately detected from any swabs or tapings recovered from an exposed person. Given the rapidity with which these substances are absorbed by the body, it is likely to be a matter of minutes.

40. I believe the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.

Date January 10, 2023 | 11:42 AM GMT Signature of witness [redacted]