IN THE UNITED STATES COURT OF APPEALS
FOR THE ARMED FORCES

UNITED STATES,

Appellee

v.

Nicholas S. BAAS
Corporal (E-4)
U. S. Marine Corps

Appellant

BRIEF ON BEHALF OF APPELLANT (CORRECTED)

Crim.App. Dkt. No. 201700318

USCA Dkt. No. 19-0377/MC

TO THE HONORABLE JUDGES OF THE UNITED STATES COURT OF APPEALS FOR THE ARMED FORCES

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II.

DID THE LOWER COURT ABUSE ITS DISCRETION IN ADMITTING AN ALLEGED POSITIVE DIATHERIX TEST RESULT FOR GONORRHEA IN A CHILD'S RECTAL SWAB—WHERE DIATHERIX FAILED TO FOLLOW ITS OWN PROCEDURES AND THE RESULT WAS OF NEAR ZERO PROBATIVE VALUE?

Statement of Statutory Jurisdiction

Corporal (Cpl) Baas' approved general court-martial sentence includes a dishonorable discharge and fifteen years' confinement. The Court of Criminal Appeals (CCA) exercised jurisdiction under Article 66(b), UMCJ, and this Court has jurisdiction under Article 67(a)(1), UCMJ.[1]

Introduction

The government accused Cpl Baas of molesting his son G.B. A substantial part of its case—by the government's own admission[2]—was an unconfirmed positive result for gonorrhea on a rectal swab from G.B. The test

[1] 10 U.S.C. §§ 866(b)(1), 867 (2012).

[2] JA at 73 (agreeing government would rely "fairly significantly" on test result).

was performed and reported by Diatherix Laboratories ("Diatherix").

But this evidence was unreliable to prove that G.B. actually had gonorrhea. Neither Diatherix nor the government had approved the use of Diatherix's nucleic acid amplification test (NAAT) for gonorrhea on rectal swabs from prepubescent children. And due to the low prevalence of gonorrhea in minors, Diatherix's claim that the swab was positive for gonorrhea was scientifically as likely to be a false positive as it was to be true—less accurate than a coin flip.

Yet the military judge admitted Diatherix's NAAT result to prove G.B.'s rectal swab was positive for gonorrhea. He denied the defense's objection to the government falling to call a witness from Diatherix—in other words anyone who conducted or reviewed the particular test of G.B.'s swab—to testify at trial.

Diatherix's NAAT was not scientifically valid evidence on which to base felony convictions. But the members mixed verdict here shows they used Diatherix's claimed positive to convict Cpl Baas for sexual acts on G.B., when all he actually did was discuss vile fantasies of "Hailey Burtnett" in "Skype" chats. They convicted him of sexual acts only on the two occasions Hailey's messages appear to discuss anal penetration. They acquitted him of the time Haley shared equally vulgar chats which did not have fantasies of anal penetration. The findings were inevitable when they heard Cpl Baas had gonorrhea, intercourse is required to spread gonorrhea, and G.B.'s rectal swab was positive

for gonorrhea. Cpl Baas did not receive a fair trial with this NAAT in evidence.

Statement of the Case

A panel of members with enlisted representation, sitting as a general court-martial, convicted Cpl Baas, contrary to his pleas, of two specifications of conspiracy in violation of Article 81; one false official statement specification in violation of Article 107; two specifications of committing a sexual act upon a child in violation of Article 120b; and, four specifications in violation of Article 134 (two specifications of producing child pornography with intent to distribute, and two specifications of distributing child pornography).[3] The members acquitted Cpl Baas of allegedly, on or about May 2, 2016, committing a sexual act on a child, and producing and distributing child pornography.[4]

The members sentenced him to fifteen years' confinement, forfeiture of all pay and allowances, reduction to paygrade E-1, and a dishonorable discharge. The Convening Authority approved the members' sentence.[5] The lower court affirmed the findings and sentence on April 15, 2019,[6] and denied Cpl Baas' request for reconsideration. Cpl Baas petitioned this Court for review on July 15, which it granted on October 31. Cpl Baas now timely files this brief and the joint appendix per this Court's order of November 21.

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[3] JA at 537; 10 U.S.C. §§ 881, 907, 920b, 934.
[4] JA at 537.
[5] JA at 1.
[6] *Id*.

Statement of Facts

A. Cpl Baas was primary caregiver for his one-year-old son G.B. Neither Theresa Baas nor a roommate saw any behaviors indicating sexual abuse.

Cpl Baas and Theresa Baas separated in October 2015 after the birth of their son G.B.[7] He first had primary physical custody of G.B.[8] and she "never witnessed any . . . behaviors by [G.B.] that were concerning" for sexual abuse.[9] Cpl Baas lived in a small house with three-bedrooms near Camp Lejeune with a girlfriend, Ms. Miller.[10] Ms. Frankenfield lived there as a roommate,[11] and knew that G.B. had a green teddy bear named "Scout."[12]

B. Ms. Miller and Ms. Frankenfield took Cpl Baas' cellphone, and found Skype messages with the graphic sexual fantasies of "Hailey Burtnett."

On June 16, 2016, Ms. Miller took Cpl Baas' cellphone and opened the Skype application.[13] After seeing messages from "Hailey Burtnett," she gave the phone to Ms. Frankenfield—who read them as "this Hailey person asking" and "telling" Cpl Baas "to do things to" G.B.[14] Ms. Frankenfield took the phone to Cpl Baas' command, which called the Naval Criminal Investigative Service[15]

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[7] JA at 316.
[8] *See* JA at 322.
[9] *See* JA at 329.
[10] *See* JA at 260, 277.
[11] JA at 258.
[12] JA at 260.
[13] *See* JA at 278-79.
[14] JA at 261-62. "Haileyclearfl" was listed as Hailey Burtnett. JA at 928.
[15] JA at 276.

C. There was no child pornography of G.B. or any other child on any of the digital devices NCIS seized from Cpl Baas.

NCIS Special Agent (SA) Morgan seized an Xbox, several computers, multiple cell phones, and thumb drives. The government did not find child pornography of G.B. or of any other child on the devices or drives.[16]

D. Cpl Baas repeatedly denied sexually abusing G.B. or making child pornography, and Cpl Baas disclosed he was positive for gonorrhea.

SA Morgan first interviewed Cpl Baas on June 16.[17] Cpl Baas denied ever touching G.B. inappropriately.[18] He explained that Hailey is "weird, kinky, and she liked to talk" fantasies.[19] Cpl Baas took G.B.'s bear Scout, "dress[ed] him up, put a diaper on it," and Hailey asked him "to remove [Scout's] clothing" and "do weird stuff" while calling the bear G.B.[20]

Cpl Baas told SA Morgan he recently tested positive for chlamydia and gonorrhea, and said "[i]f you were to do a physical exam on my son, then you would find that nothing that you all are accusing me of is true."[21]

E. North Carolina law enforcement learned from SA Morgan that Cpl Baas had gonorrhea, and sent Ms. Baas to Dr. Kafer to have G.B. tested.

On June 17, Ms. Pfannenstiel, an agent from the Craven County Child

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[16] JA at 309-10.
[17] JA at 1912.
[18] JA at 1914.
[19] *Id*. Cpl Baas met Hailey in high school but "never had her phone number," and they only messaged by Skype. JA at 1917-18, 1923-25.
[20] JA at 1914-15, 1937, 1943-45, 1948.
[21] JA at 1922.

Protective Services (CPS) was assigned to the case.[22] CPS is part of the North Carolina Department of Social Services (DSS), a "law-enforcement" agency.[23]

Ms. Pfannenstiel met with Theresa Baas, and SA Morgan showed up to the same meeting.[24] SA Morgan admitted that at some point he told "DSS" that Cpl Baas "tested positive for gonorrhea."[25] Then Theresa Baas took G.B. to Dr. Lisa Kafer. Ms. Pfannenstiel later claimed Theresa Baas already set up a medical appointment for G.B. at Coastal Children's Clinic before they talked.[26]

But Ms. Pfannenstiel's own case notes on the meeting say Theresa Baas "agreed to have [G.B.] evaluated by Dr. Kafer [at the Clinic] for sex abuse."[27] And Theresa Baas testified she took G.B. to the Clinic because "Social Services told me that I had to."[28] She told Dr. Kafer "Social Services had sent me."[29]

Dr. Kafer was not a child abuse specialist.[30] Yet she appeared on North Carolina's child abuse evaluation registry due to the ten hours of reading she

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[22] JA at 360, 943.
[23] JA at 111 (SA Morgan stating "[w]e're both law-enforcement").
[24] JA at 949-50 (noting "gave mother pamphlet;" then "NCIS agents arrived").
[25] JA at 114 (also claiming "I do not recall who I told").
[26] JA at 363.
[27] JA at 956.
[28] JA at 319 ("Q. Where did you take him? A. Coastal Children's . . . . Q. And why did you take him there? A. Social Services told me that I had to. Q. And upon . . . that call from . . . Social Services, what did you do . . . ? A. I took him to see the doctor and to get the examination like they had asked me to.").
[29] JA at 319-20.
[30] JA at 334.

did every two years. So the Clinic gave her all such cases.[31] Dr. Kafer testified she saw G.B. once before.[32] But in the past year, G.B. only saw other doctors.[33]

F. G.B.'s physical examination by Dr. Kafer showed no signs of sex abuse.

Dr. Kafer testified Theresa Baas was "told to bring [G.B.] to our office for further evaluation and testing."[34] G.B.'s exam results were normal.[35] But Dr. Kafer tested G.B for gonorrhea and chlamydia anyway. Dr. Kafer later met with trial counsel. A member of the trial shop claims she said "she conducted the medical exam . . . for health reasons, and not for the purpose of any criminal investigation or prosecution."[36] But Dr. Kafer wrote in her notes the reason for G.B.'s exam was a complaint that the "father of child . . . molested [him]" and "[i]f either test were positive, it would be highly indicative of child abuse."[37]

SA Morgan never ordered a sexual assault forensic examination of G.B. Instead, NCIS followed up the next business day after Dr. Kafer's exam with Ms. Pfannenstiel, asking for "the results of the [gonorrhea] test."[38]

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[31] JA at 333-35.
[32] *Id.* ("I saw him once around six months of age for a routine [visit] . . .").
[33] JA at 551-53 (medical records of G.B. naming four other doctors who saw him in the past year). Counsel apologizes for incorrectly stating that Dr. Kafer never saw G.B. before June 17, 2016. Supplement of August 23, 2019 at 8.
[34] JA at 328.
[35] JA at 329.
[36] JA at 972.
[37] JA at 967, 970 (notes without the extra redactions in JA 546-49).
[38] JA at 954.

G. Diatherix destroyed the only rectal swab Dr. Kafer collected, which prevented confirmatory testing to prove or disprove Diatherix's positive.

Dr. Kafer collected one swab from G.B.'s rectum. She sent it to Diatherix Laboratories for testing because it had marketed to her hospital.[39] Diatherix tested the swab on June 18, 2016 and claimed it was positive for gonorrhea.[40] It destroyed the swab about seven days later.[41] Neither Dr. Kafer,[42] nor the government (e.g. DSS[43] or NCIS[44]), requested Diatherix save the swab for retesting.

H. Diatherix ran a gonorrhea test the Centers for Disease Control (CDC) had not approved for use on prepubescent children because it is unreliable.

Diatherix's records show that it knew the sample was a rectal swab, *from a one-year old*, to be tested for gonorrhea.[45] Gonorrhea is "on a scale of [one to] ten is a ten for indicating some kind of sexual activity" occurred.[46]

Dr. Stalons, Diatherix's director, testified in a motions session on 19 April 2017 that "[w]e don't perform forensic testing, per se."[47] He agreed Diatherix's test had never been used in any court, or for a forensic purpose.

Diatherix's nucleic acid amplification test ("NAAT"), uses "molecular

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[39] JA at 329, 339.
[40] JA at 550.
[41] JA at 973.
[42] JA at 339.
[43] JA at 364.
[44] *See* JA at 313,
[45] JA at 550; *see also* JA at 933-34.
[46] JA at 63.
[47] JA at 139, 154.

amplification" to identify bacteria like gonorrhea (Neisseria gonorrhoeae) in a test medium (e.g., a swab).[48] Diatherix's "multiplex" tests are unique from other NAATs on the market in that they test for multiple bacteria at once.[49]

1. A different laboratory could have performed a "culture" test, which can determine with 100% accuracy if G.B.'s swab actually had gonorrhea.

Dr. Kafer could have ordered a "culture" test for gonorrhea instead of Diatherix's NAAT. A culture test involves placing a swab "into a media that will facilitate the growth of the organism."[50] This amplifies the bacteria in the sample so it is easier to detect the strains of bacteria present. Dr. Hobbs, the government's only expert witness to testify at trial (and who was not from Diatherix) explained that unlike a NAAT, a culture test is "preferred" because it is "100 percent certain"— "[w]e don't worry that that's a false positive."[51] But companies like Diatherix dislike culture tests because they are expensive: culture "requires samples to be immediately transported to the laboratory."[52]

2. In violation of its own policies, Diatherix ran a nucleic acid amplification test (NAAT) neither recommended for alleged sex abuse, nor rectal swabs.

Instead of culture, Diatherix ran a "CT +NG+T" (chlamydia, gonorrhea,

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[48] JA at 124. This NAAT is a TEM-PCR, a "Target Enriched Multiplex Polymerase Chain Reaction." JA at 127. It tries to find DNA sequences "readily identifiable for that organism" and "amplify" them. JA at 124, 136.
[49] JA at 131.
[50] JA at 441; *see also* JA at 47.
[51] JA at 503, 508; *see also* JA at 168.
[52] JA at 168.

& trichomonas) on G.B.'s rectal swab on June 18, 2019.[53] This was a NAAT it did not recommend for alleged sex abuse, on a sample type it had not validated (tested for accuracy on child rectal swabs), prior to testing G.B.'s rectal swab.

i. Government witness Dr. Hobbs noted Diatherix's NAAT was, by its own admission, "not recommended for evaluation of suspected sexual abuse."

Diatherix created a Client Services Manual. Dr. Hobbs noted that the manual "include[d] a disclaimer that the test" in this case "is not recommended for evaluation of suspected sexual abuse."[54]

ii. Diatherix had warned this NAAT should not be used on child samples.

Dr. Hobbs agreed "Diatherix's manual . . . mention[ed] that their test is not designed and . . . should not be used for suspected child abuse cases" or "on children" at all.[55]

iii. Dr. Hobbs noted that Diatherix's manual did not allow running of this NAAT on rectal swab samples without preapproval, and testified that Diatherix violated its own policies by testing G.B.'s rectal swab.

Dr. Hobbs agreed Diatherix's NAAT "should not have been used" on a rectal swab, and its running of the test "violated those policies of its own lab."[56] She noted that the Diatherix NAAT was "a routine, orderable test"[57] only for non-rectal swabs. Therefore the "Client Services Manual instruct[ed] users to

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[53] JA at 550.
[54] JA at 1865-66.
[55] JA at 507. She had reviewed Diatherix's client services manual. JA at 506.
[56] JA at 182, 507.
[57] JA at 1865.

obtain preapproval from Diatherix before other specimens [such as a rectal swab] are submitted."[58] Dr. Kafer did not know Diatherix had not preapproved rectal swabs for testing, and did not call Diatherix for preapproval.[59] Though Diatherix decided to run the NAAT on rectal swabs,[60] the lack of preapproval made rectal swabs untested "clinically unique specimens"[61] for this NAAT. Dr. Stalons admitted client manual preapproval was to "make sure [Diatherix is] set up to test" a type of sample as "part of the *validation*" against false positives.[62]

3. After the defense signaled it would object to Diatherix's claim the swab was positive for gonorrhea, Diatherix tried to validate its NAAT using data collected in January 2017—long after it tested G.B.'s sample in June 2016.

Diatherix in fact had neither validated its NAAT on rectal swabs, nor on samples from children before claiming G.B.'s swab was positive for gonorrhea.

Dr. Hammerschlag first questioned the validity of Diatherix's NAAT on a rectal swab at a January 12, 2017 hearing.[63] On January 24, Diatherix retested samples first tested by another company's NAAT (the "COBAS Amplicor NG [test] Assay"), and compared its results to those from the Amplicor NAAT.[64]

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[58] *Id*.
[59] JA at 138.
[60] JA at 1291-1294 (claiming "rectal swabs" as an "[a]ppropriate [s]ource[]" for "GNT" (the "CT +NG+T" NAAT) effective February 15, 2016).
[61] JA at 1866 (report of Dr. Hobbs).
[62] JA at 144-45 (emphasis added).
[63] JA at 57.
[64] JA at 1216, 1229 (noting "1/24/2017 GNT and COBAS comparison test of clinical specimens").

And on January 27, Diatherix tested disease-free child rectal swabs artificially "spiked" with known amounts of gonorrhea,[65] in a belated attempt to show that its NAAT was accurate on child rectal samples.[66] Dr. Stalons claimed this new data, as well as data from testing from unspecified dates[67] in summer 2016 on urine samples (not rectal swabs), showed its NAAT was accurate.[68]

Diatherix did not let Dr. Hobbs review the NAAT test itself because it is proprietary.[69] Using data Diatherix gave her,[70] she wrote a four-page memo in which she claimed that the accuracy of the Diatherix test was comparable to that of other NAATs.[71] Though Dr. Hobbs cited Diatherix's accreditation by the College of American Pathologists ("CAP") in her report,[72] she admitted Diatherix's belated attempt to validate the NAAT violated CAP procedures "[f]or routine clinical specimens."[73] She tried to excuse Diatherix's actions by citing a loophole in the CAP rules for tests run on a system before July 2016, on "clinically unique specimens" which had "limited validation studies."[74]

But Dr. Van Der Pol, an Infectious Diseases Laboratory Director, stated

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[65] JA at 169.
[66] JA at 1216, 1229 (bottom table in Diatherix's report).
[67] JA at 1866 (noting "specific dates were not provided" for this testing).
[68] JA at 142-43 (agreeing summer 2016 testing was on "urine samples").
[69] JA at 464; *see* JA at 139.
[70] JA at 166.
[71] JA at 170-71, 190.
[72] JA at 1865.
[73] JA at 182.
[74] JA at 1866.

that it was still "highly inappropriate" for Diatherix to test G.B.'s sample in 2016 and then only later perform rectal swab validation studies in January 2017. Dr. Van Der Pol cited CAP's "Good Laboratory Practice," which "dictate[s] that appropriate validation" tests "must be performed *before* patient testing."[75]

4. NAATs have a high risk of false positive results for rectal samples.

Dr. Hammerschlag, a clinician with 250 publications on sexual diseases in children and experience working for both the government and the defense in over 100 cases of suspected child sexual abuse, testified as a defense expert in motions and at trial.[76] She testified NAATs used to find gonorrhea are can produce false positives (finding gonorrhea when it's not really there) because of a "peculiar problem" that is not an issue with testing for other STDs—gonorrhea "can exchange DNA with other species during its life cycle."[77] This is "more of a problem" for samples from the throat and the *rectum*.[78]

Dr. Hammerschlag testified that NAATs for gonorrhea also have a "cross-reactivity" problem, which produces false positives from other bacteria "closely related" to gonorrhea.[79] She also noted one gonorrhea NAAT was

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[75] JA at 1902; *see* JA at 1032 (CAP accreditation checklist requiring lab to "validate or verify assay performance prior to test").
[76] JA at 57, 434-35.
[77] JA at 441; *see also* JA at 61, 199.
[78] JA at 61.
[79] JA at 454. Cross-reactivity occurs because DNA sequences associated with gonorrhea a NAAT looks for, are present in varying degrees in other bacteria.

"taken off the market" by the Food and Drug Administration (FDA) for this issue.[80] Both Dr. Stalons and Dr. Hobbs admitted Diatherix's test could give false positives due to cross-reactivity issues.[81] And the Amplicor NAAT which Diatherix compared its NAAT's results to, was also prone to false positives.[82]

5. Diatherix did not FDA-clear, peer-review, or clinically test its NAAT.

Diatherix's NAAT was *not* FDA approved, peer reviewed, or tested in a clinical trial.[83] The Centers for Disease Control (CDC) said "FDA clearance is important for widespread use of a test," particularly NAATs on rectal swabs.[84]

6. Centers for Disease Control (CDC) guidelines bar use of NAATs to test prepubescent rectal samples for gonorrhea for suspected child sex abuse.

CDC guidelines say laboratories should *not* use NAATs to test for gonorrhea "in cases of child sexual assault involving boys and rectal" area "infections in prepubescent girls."[85] "Because of the legal implications of a diagnosis of . . . gonorrhea in a child, if culture for the isolation of Neisseria gonorrhea is done, *only* standard culture procedures should be performed."[86]

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[80] JA at 453.
[81] JA at 157, 187.
[82] JA at 187.
[83] JA at 152-54. Diatherix is a "Clinical Laboratory Improvement Act" (CLIA) "certified laboratory." JA at 125. Though "CLIA do[es] not require that laboratories use only FDA cleared tests," JA at 167, Dr. Hammerschlag noted some CLIA laboratories have "had tons of false positives." JA at 66.
[84] JA at 1776.
[85] JA at 1763.
[86] JA at 1602.

7. A positive NAAT is very likely to falsely claim a prepubescent child has gonorrhea even if accurate, as the *extremely* low prevalence of gonorrhea in children makes the NAAT's positive predictive value (PPV) extremely low.

Dr. Hobbs calculated from Diatherix's testing of samples spiked with gonorrhea in January 2017 that the accuracy of the NAAT was 94.6 percent.[87] She claimed that based on this, and the Summer 2016 tests, there was "a reasonable chance that the positive test in [G.B.'s] case might [be] a true positive."[88]

But accuracy—a test's sensitivity ("ability to pick up gonorrhea if it was there"),[89] and specificity (ability "to differentiate [gonorrhea] from other organisms")[90] in laboratory conditions, does not tell you the odds that a particular real-world test result is correct. Those odds—"the probability that when you get a positive result it is a real positive result"—is the positive predictive value ("PPV")."[91] If prevalence of a disease (the percentage of the population that truly has the disease) is low, the PPV will be low even if a test is accurate.

But in the spiked rectal swabs test Diatherix used to validate its NAAT, almost fifty percent of the swabs had gonorrhea. Dr. Hammerschlag noted there is no real population where fifty percent of a group has gonorrhea.[92] In some sexually active adult populations prevalence is about eight percent, so the

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[87] JA at 1867.
[88] JA at 495.
[89] JA at 500.
[90] JA at 1894 n. 6.
[91] JA at 456; *see also* JA at 60.
[92] JA at 209.

PPV of a NAAT on a rectal swab from one of these adults is about 73 percent.[93] Dr. Hammerschlag noted this level of risk of a false positive (about 25 percent of the time) for an *adult* is acceptable, because a positive test will only result in a shot of antibiotics for the adult and "isn't going to send anybody to jail."[94]

But the prevalence of gonorrhea in prepubescent children, particularly in boys, is *much* lower than even eight percent. Dr. Hobbs, the government's expert, agreed: (1) prevalence of gonorrhea in children like G.B. is as low as 0.1 percent (one in a thousand), and, (2) in the only CDC study of prepubescent boys, *none of the male children* tested positive for gonorrhea.[95] A prevalence of one in a thousand (0.01) for gonorrhea results in a PPV of *close to zero*:[96]

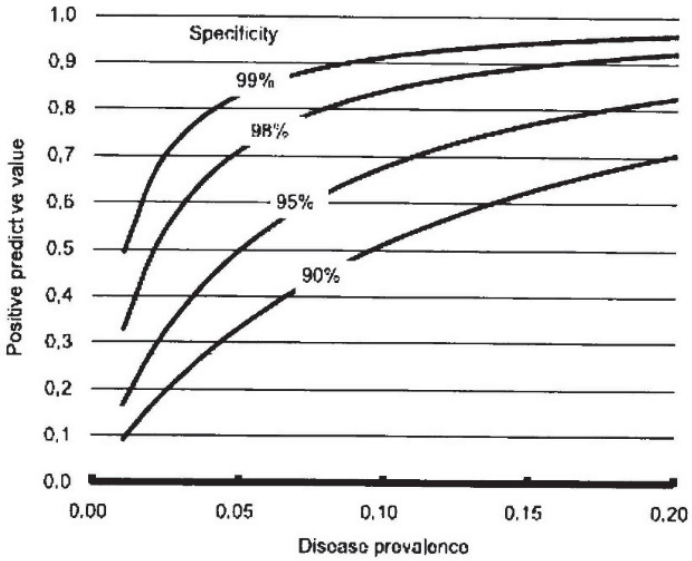

FIGURE 1. Positive predictive value by prevalence of disease at various levels of test specificity (test sensitivity in each case is set at 95%).

[93] JA at 1731-32 (discussing a population in Australia).
[94] JA at 464; *see also* JA at 63, 205-06.
[95] JA at 493, 501; *see also* JA at 180, 196, 205.
[96] JA at 1963.

The above graph shows that if the prevalence is below about 0.01 (one in a hundred on the horizontal axis), even a 99 percent specific test (very good at distinguishing between gonorrhea and other bacteria—the 99% curve at the top) has a low probability (50 percent or lower, .05 on the vertical axis) that the positive result is a true positive and not a false positive.

i. The government's expert witness agreed the positive predictive value of Diatherix's NAAT was extremely low on G.B.' rectal sample.

Dr. Hobbs agreed that the PPV of a test for a condition with a prevalence of just 0.1 percent was "very low."[97] Dr. Stalons agreed that "when you apply a highly sensitive and specific assay to a low prevalence population . . . you're going to have an increased likelihood of false positives."[98]

Dr. Hammerschlag estimated the PPV of the Diatherix NAAT was 30 percent on the rectal swab from the prepubescent G.B.—meaning there was "a 30 percent chance that the test is really positive and 70 percent that it isn't."[99] Therefore "the test was useless" in showing if G.B. actually had gonorrhea.[100]

ii. Dr. Hobbs agreed it was not appropriate to use the Diatherix NAAT without confirmatory testing due to the risk of a false positive result.

Dr. Hobbs also testified "in cases of child sexual abuse, [Diatherix's] test was not the ideal test to run," and the result was used inappropriately in this

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[97] JA at 503.
[98] JA at 157.
[99] JA at 205. Earlier, she said the PPV "c[ould] be 50% or lower." JA at 60.
[100] JA at 467.

case.[101] Dr. Hobbs acknowledged the risk of a false positive "is why [CDC] guidelines recommend confirmatory testing"[102] by the "preferred method" of testing for gonorrhea, which "in cases of child abuse" is culture testing.[103]

I. Carolina East Medical Center examined G.B. It found no conclusive symptoms to corroborate the positive Diatherix NAAT, and it failed to conduct the confirmatory scientific testing the CDC guidelines require.

Dr. Kafer knew the Diatherix NAAT "needed to be followed up with a culture test," so she sent G.B. to Carolina East Medical Center.[104] It ran the wrong tests—a "urine culture," *not* a "urethral swab"—and failed to collect a rectal swab.[105] It found no clear physical corroboration of gonorrhea, noting "no abnormal penile discharge."[106] Based on the Diatherix NAAT, Carolina East gave G.B.an antibiotic that eliminated any bacteria that may have been there, preventing confirmatory culture testing to disprove the NAAT positive.[107]

J. Hailey Burtnett's messages detailed Cpl Baas performing anatomically impossible sex acts on himself (e.g. oral sex on his own penis), in addition to fantasies about "G.B."—only some describing penile-anal penetration.

In the following consecutive messages from "haileyclearfl," Hailey

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[101] JA at 175, 189.
[102] JA at 493.
[103] JA at 179.
[104] JA at 330 (ordering urethral and rectal gonorrhea & chlamydia culture tests).
[105] JA at 344, 471-72.
[106] JA at 1655-56 (not connecting the reported "urinary frequency" and red blood cells found in G.B.'s urine to gonorrhea). Cpl Baas, by contrast, had clear symptoms (a "greenish-yellow/cloudy discharge" from the penis even when "not urinating") corroborating his positive gonorrhea test. JA at 539.
[107] JA at 331.

Burtnett first appears to describe the physically impossible: Cpl Baas performing oral sex on his penis and ejaculating into his mouth while on camera:[108]

put yoru legs up	try to lick it
over your head	yes
move down the bed more	open your mouth
ass in the air	like a little bich
yes	steok ti hard
more	i want u to cum
ass way in the air	and get every drop
try to suck on the tip	steok ti
show your face better	every drop in your mouth
open your mouth	nice
stoek it	show your mouth open
yes	shwallow u
open your mouth wide	so yummy
try to lickth tip	nice

On March 29, after Cpl Baas said he "just got done feeding [G.B.],"[109] Hailey Burtnett fantasized about penile-anal penetration:[110]

show his ass a little	don't hurt him
yes	use the tip of yoru dick a ltitle
yes	just a little
slide your finge rin a ltitle	u got him hard
ohh yes	and turn him around
do that	sit up
do that	sit up and turn him around
stoke it	ohh yes
stoek him	not to much
in gtes	sit up
yes	turn him around
wow	turn him arounde
little more	

On May 2-3, Hailey Burtnett fantasized but *not* about penile-anal penetration:[111]

[108] JA at 558 (read top to bottom left, and then top to bottom right).
[109] JA at 559.
[110] JA at 561.
[111] JA at 571-72. The chat began on May 2.

take off the diaper	get him hard
kiss down him	show all of him
down his chest	get him very hard
more	show how hard he is
he loves it	just the tip of it
his dick a little	slowly
yes	so he gets hard
he is getting turend on	softly
already	more soft
yes more	baby?
let him play with your hair	what happend
not dso close	hello
show all of him	hello
go slow	u ok?

Cpl Baas then said: "someone came over," one "of my Marines and they are fighting with their wife so he has to stay here."[112] The messages soon ended.

On May 15, Cpl Baas said he was "siting on the front porch watching [G.B.] play,"[113] and Hailey Burtnett fantasized about penile-anal penetration:[114]

lowere the cam a ltitle	use yoru mouth on him
rub the ltoin on his dick	69 him
get him hard	put your dick over his face
let him get hard	yes
between his sloge	lay down
legs	put him on top ofu
show between his legs	eys
use the lotin on his ass too	put lotion on yorudick
slowly	yes
go slwly	but his ass on yoru dick
rub his dick	yes
then use your finger in his ass very tlly	go back and forth
slowly	yes
suck him wile u do it	like taht
go slowly	don't cum yet
not to much	baby?

Though the messages discuss a camera, Cpl Baas told SA Morgan that

[112] JA at 572.
[113] JA at 575.
[114] JA at 576-77.

G.B. "may have been walking around in a diaper in my house, but that is the most . . . my son has been seen on any type of camera or video."[115]

K. The government charged Cpl Baas with sexual acts on three dates, and members only convicted Cpl Baas of the two dates where the Skype messages *and* the Diatherix NAAT positive, suggested penile-anal penetration.

Among other offenses, Cpl Baas was charged with three specifications each of committing a sexual act upon G.B., and producing and distributing child pornography—on or about three dates—March 29, and May 2 and 15, 2016. The members learned sexual penetration is required to transmit gonorrhea;[116] Cpl Baas had gonorrhea; and, G.B.'s rectal swab tested positive for gonorrhea.

The members acquitted Cpl Baas of the three specifications (committing a sexual act, and producing and distributing child pornography) alleged to have occurred on or about May 2—the only charged time where Hailey fantasized about Cpl Baas and G.B., but did not fantasize about penile-anal penetration. The members convicted Cpl Baas of the six specifications alleged on March 29 and May 15—dates on which she fantasized about penile-anal penetration.

L. The military judge overruled defense's motions to exclude Diatherix's gonorrhea NAAT results under *Daubert* and the Confrontation Clause.

The only evidence from Diatherix at trial was a page[117] in G.B.'s medical Record—claiming a rectal swab from this one-year old was gonorrhea positive:

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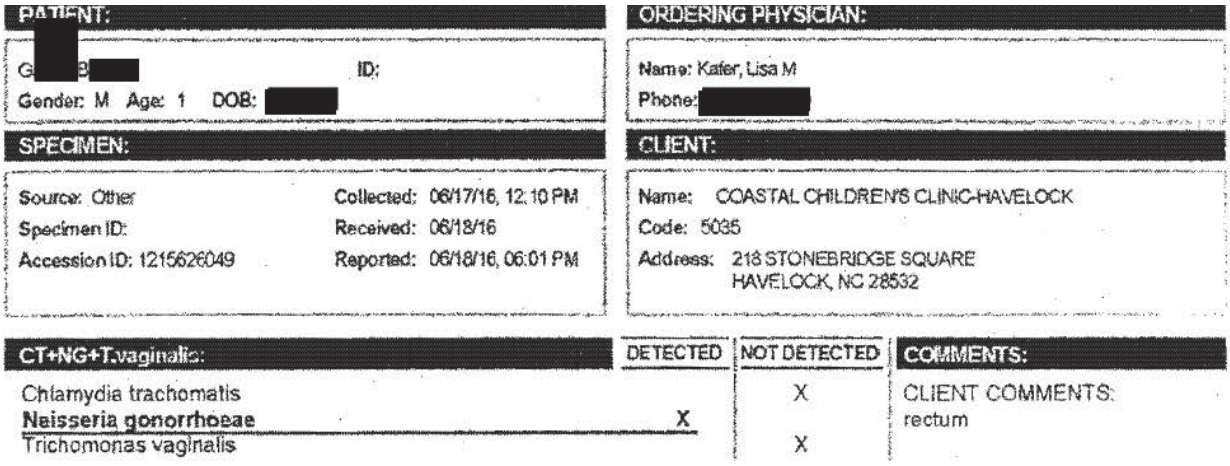
[115] JA at 1935.
[116] JA at 353, 477.
[117] JA at 550 (excluding header and bottom half of mostly white space).



PATIENT:
G[redacted] ID:
Gender: M Age: 1 DOB: [redacted]

ORDERING PHYSICIAN:
Name: Kafer, Lisa M
Phone: [redacted]

SPECIMEN:
Source: Other
Specimen ID:
Accession ID: 1215626049
Collected: 06/17/16, 12:10 PM
Received: 06/18/16
Reported: 06/18/16, 06:01 PM

CLIENT:
Name: COASTAL CHILDRENS CLINIC-HAVELOCK
Code: 5035
Address: 218 STONEBRIDGE SQUARE
HAVELOCK, NC 28532

CT+NG+T.vaginalis:	DETECTED	NOT DETECTED	COMMENTS:
Chlamydia trachomatis		X	CLIENT COMMENTS:
Neisseria gonorrhoeae	X		rectum
Trichomonas vaginalis		X	

The military judge issued written findings on the *Daubert* objection based on motions testimony. He found the accuracy of Diatherix's test as was 94.6% (additional findings are in AOE II).[118] Identifying four of the *Daubert* factors and focusing mostly on "reliability," he found that "the Diatherix test is a reliable test" not substantially outweighed by unfair prejudice.[119]

On the defense's Confrontation Clause objection to admission of the Diatherix test result without any witness from Diatherix testifying at trial, the military judge placed the following findings and conclusions in the record:

> A statement is testimonial if it is made under circumstances which would lead an objective witness reasonably to believe the statement would be available for use at a later trial. A testimonial statement must have a primary purpose of establishing and proving past events potentially relevant to a later criminal prosecution. . . .

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[118] JA at 1894.

[119] JA at 1897-1901 (considering "1) whether a theory or technique can be or has been tested; 2) whether the theory or technique has been subjected to peer review or publication; 3) the known or potential rate of error in using a particular technique and the standards controlling the technique's operation, and 4) whether the theory or technique has been generally accepted").

> . . . .
> G[.]B[.]'s [Diatherix gonorrhea] test was . . . not made with an eye toward litigation. Upon learning that the accused had an STI and allegedly performed sexual acts upon her son, G[.]B[.]'s mother took him, not to the police, but to her primary pediatrician, Doctor Lisa Kafer. Doctor Kafer then sent the sample to a civilian lab. Further evidence of the sample and test were not made with an eye toward litigation is the fact that Diatherix did not retain the sample and the sample was not processed via a forensic protocol.[120]

Dr. Kafer agreed the page in G.B.'s medical record "accurately reflect[s] the result of the . . . test."[121] But she then testified "I am not aware of the testing the [sic] happens at Diatherix . . . . [H]ow that is done at their lab I am not aware."[122] SA Morgan read that G.B. tested positive for gonorrhea, but he "d[id not] know anything about the lab" procedures, nor even recall Diatherix's name.[123]

Dr. Hobbs claimed to have reviewed documents from Diatherix "relate[d] to the test at issue," but admitted she "didn't actually evaluate the Diatherix test itself"—she "just looked at the data [it] gave."[124] Dr. Hobbs testified that the Diatherix NAAT was "*generally* acceptable as a diagnostic tool."[125] But this was based on general performance characteristics, laboratory guidelines, and validation data from spiked rectal swabs tested after Diatherix tested G.B.'s sample. Dr. Hobbs agreed that Diatherix failed to follow its manual before

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[120] JA at 242-46.
[121] JA at 329-30.
[122] JA at 340.
[123] JA at 292, 304-05.
[124] JA at 492-96 (agreeing with defense counsel).
[125] JA at 494.

processing G.B.'s rectal swab.[126] But she did not address any issues related to the particular test of G.B.'s rectal swab on June 18, 2019.

Summary of Argument

I. The government violated Cpl Baas' Sixth Amendment right to confront the author of laboratory evidence against him. It used SA Morgan and Drs. Kafer and Hobbs as conduits for testimonial hearsay as no one from Diatherix testified in findings to explain if its testing procedures for G.B.'s swab were reliable. The members erroneously heard testimonial hearsay "made under circumstances which would lead an objective witness reasonably to believe that the statement would be available for use at a later trial."[127] Diatherix knew when testing G.B.'s sample that it was for a one-year-old who may have had a sexually transmitted disease. And law enforcement (DSS & NCIS) sent G.B. to Dr. Kafer, who ordered the test knowing Cpl Baas was accused of sexual abuse.

II. The military judge omitted parts of the *Daubert* analysis in admitting the NAAT result. He failed to properly review Diatherix's failure to follow its own standards when it tested rectal samples which had not been validated. Admitting this NAAT was not reasonable where use of NAATs on pediatric rectal samples is not generally accepted—due to the low prevalence of gonorrhea and high risk of false positives when they are run (as here) without a confirmatory culture test

[126] JA at 506.
[127] *Crawford v. Washington*, 541 U.S. 36, 52 (2004).

Argument

I.
ADMISSION OF AN ALLEGEDLY POSITIVE DIATHERIX LABORATORIES TEST FOR GONORRHEA, WITHOUT TESTIMONY AT TRIAL OF ANY WITNESS FROM DIATHERIX, VIOLATED THE SIXTH AMENDMENT CONFRONTATION CLAUSE.

Standard of Review

"Whether evidence is testimonial hearsay is a question of law reviewed *de novo*."[128] This Court reviews a decision to admit or exclude evidence under the Confrontation Clause for an "abuse of discretion."[129] A military judge abuses his discretion if his facts are clearly erroneous, or he applies the wrong law.[130] Where the military judge "fails to place h[is] findings and analysis of pertinent facts on the record, less deference will be accorded" to his ruling."[131] This Court must grant relief for violations of the Confrontation Clause unless admission of the evidence was "harmless beyond a reasonable doubt."[132]

Discussion

In *Crawford v. Washington*, the Supreme Court held that "testimonial statements of witnesses absent from trial" are admissible under the Sixth

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[128] *United States v. Tearman*, 72 M.J. 54, 58 (C.A.A.F. 2013).
[129] *United States v. Katso*, 74 M.J. 273, 282 (C.A.A.F. 2015).
[130] *Id.* at 278-79.
[131] *United States v. Perkins*, No. 201600166, 2016 CCA LEXIS 441, at *8-9 (N-M. Ct. Crim. App. Jul. 28, 2016).
[132] *Tearman*, 72 M.J. at 61.

Amendment "only where the declarant is unavailable," and the opponent "had a prior opportunity to cross-examine" the declarant.[133] The Court noted that statements are testimonial if they "were made under circumstances which would lead an objective witness reasonably to believe that the statement would be available for use at a later trial."[134]

A. Assertions in documents produced by laboratories—whether public or private—can qualify as testimonial hearsay under the Sixth Amendment.

In *Melendez-Diaz v. Massachusetts*,[135] the Supreme Court "refused to create a 'forensic evidence' exception" to the Confrontation Clause.[136] The trial judge there had admitted into evidence "certificates of analysis" created and sworn to by laboratory analysts working at a state laboratory.[137] The certificates claimed bags seized from Melendez-Diaz were "examined with the following results: The substance was found to contain: Cocaine."[138] The Court held Melendez-Diaz had a right to "be confronted with the analysts at trial."[139]

In *Manery v. Commonwealth*, the Kentucky Supreme Court held that Manery had the right to confront the author of a report from "Quest Diagnostics Inc." which claimed that a penile swab from Manery was "presumptive[ly]

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[133] 541 U.S. at 59.
[134] *Id.* at 52.
[135] 557 U.S. 305 (2009).
[136] *Bullcoming v. New Mexico*, 564 U.S. 647, 658 (2011) (on *Melendez-Diaz*).
[137] *Melendez-Diaz*, 557 U.S. at 308-09.
[138] *Id*.
[139] *Id.* at 310 (quotation omitted).

positive[]" for gonorrhea.[140] The government swabbed Manery after a doctor had diagnosed a child with whom Manery allegedly had sex with gonorrhea.[141] The *Manery* court reversed because the government "introduce[d] the lab-result evidence through testimony under "the medical-records hearsay exception," and the "Quest lab specialist who conducted the test did not testify at trial,"[142]

1. Confrontation helps ensure scientific reliability of laboratory evidence.

In *Melendez-Diaz*, the Court noted "confrontation is one means of ensuring accurate forensic analysis"—to "weed out not only the fraudulent analyst, but the incompetent one as well."[143] Citing a study which found that "invalid forensic testimony contributed to the convictions in 60%" of wrongful convictions, the Court noted "an analyst's lack of proper training or deficiency in judgment may be disclosed in cross-examination."[144] The judge erred in not requiring analysts who certified the samples contained cocaine to testify as "[a]t least some of [the testing] methodology require[d] the exercise of judgment."[145]

2. Laboratory evidence is testimonial where an objective witness would reasonably believe that it would be available for use at a later trial.

Citing *Crawford*, the Court in *Melendez-Diaz* found that the Government

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[140] 492 S.W.3d 140, 143-46 (Ky. 2016).
[141] *Id.* at 142-43.
[142] *Id.* at 143, 146.
[143] 557 U.S. at 318-20 (quotation omitted, alterations in original).
[144] *Id.* (citation omitted).
[145] *Id.* at 320.

could not introduce the laboratory certificates because the analysts made them "under circumstances which would lead an objective witness reasonably to believe that the statement would be available for use at a later trial."[146]

In *United States v. Katso*, this Court reviewed whether testimony by an expert witness about the results of a DNA test introduced testimonial hearsay. It applied the objective witness test in *Crawford*,[147] and noted the "knowledge of the declarant" and "the formality of the statement" are relevant factors.[148]

3. An objective witness can reasonably believe statements in a lab report are available for use at a later trial, even if the statements are informal.

This is consistent with *United States v. Porter*, which found formalities are "merely one factor relevant to whether statements are testimonial."[149] There the military judge admitted in evidence a "169-page drug testing report" which had two "summary confirmation pages."[150] These had "handwritten positive symbol[s]" claiming Porter's sample was positive for two drug metabolites, the handwritten word "Present," and "signatures of an analyst and reviewer."[151]

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[146] *Id.* at 308, 311 (citing *Crawford*, 541 U.S. at 52).
[147] 74 M.J. at 279 (citing *Crawford*, 541 U.S. at 51-52; quote, citations omitted). This Court did not apply *Williams v. Illinois*, 567 U.S. 50, 56-59 (2012) (plurality op), where a plurality of the Supreme Court suggested the Confrontation Clause did not bar expert testimony that Williams' DNA matched a "male DNA profile" produced by a private "outside laboratory"). 74 M.J. at 282.
[148] 74 M.J. at 279 (quoting *Tearman*, 72 M.J. at 58).
[149] 72 M.J. 335, 337 (C.A.A.F. 2013) (per curiam).
[150] *Id.* at 336.
[151] *Id.* at 338.

This Court found error where the expert testified that Porter's blood and urine tested positive for the drugs metabolites, based on the "summary confirmation pages"—not on the raw machine-generated data or any first-hand knowledge.[152]

This Court found these pages were testimonial hearsay even though "the two pages *do not* exhibit indicia of formality or solemnity that . . . would suggest an evidentiary purpose."[153] This Court inferred that "the pages were created for the purpose of 'establish[ing] or prov[ing] past events potentially relevant to later criminal prosecution,'"[154] and "would 'reasonably [be] expect[ed]" by an objective witness "to be used prosecutorially.'"[155]

4. The military judge did not consider facts in the record that showed an objective witnesses in the position of Diatherix's lab technicians would reasonably believe a test of G.B.'s swab would be available at a later trial.

The military judge neither found Diatherix's analysts who tested G.B.'s rectal swab[156] nor Dr. Stalons unavailable. He claimed Diatherix's "civilian lab" status, and failure to use "forensic protocol" and "retain the sample" were evidence "the sample and test were not made with an eye toward litigation."[157]

But Diatherix failing to do what it should have—given the evidentiary

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[152] *Id.* at 336-37, 337 n.3.
[153] 72 M.J. at 337-38.
[154] *Id.* (alterations in original, quoting *Bullcoming*, 564 U.S. at 659 n.6). This part of *Bullcoming* was not a majority opinion. *Id.* at 651 (noting Justice Ginsburg delivered the opinion of the Court, except as to . . . footnote 6").
[155] 72 M.J. at 337 (quoting *Crawford*, 541 U.S. at 51).
[156] Several people initialed the Diatherix Testing Lab Report. JA at 936-38.
[157] JA at 246.

value of the sample—is not relevant to whether an objective and reasonable witness in Diatherix's position would have *known* that a *statement* about G.B.'s sample "would be available for use at a later trial." On that question the record shows: (1) Diatherix's own documentation of G.B.'s test shows it was a rectal swab, from a one-year-old, to be tested for gonorrhea; (2) gonorrhea is a STD spread by sexual intercourse; and, (3) Diatherix's manual warned that this NAAT was not recommended for evaluation of suspected sexual abuse.

So even if Diatherix was not expressly told the request was for a criminal investigation, Diatherix had (as in *Porter*) "the certain knowledge that the testing was part of a criminal investigation." It had reason to believe a claim G.B.'s rectal swab had gonorrhea, would be available for use at the trial of the person suspected of giving a one-year-old gonorrhea. As in *Manery*, Diatherix's status as private laboratory does not prevent it from giving testimonial hearsay.

Diatherix's claim it "DETECTED" gonorrhea in G.B.'s swab, is like the informal but "substantive information" (handwritten positive notations for drug metabolites) found to be testimonial hearsay in *Porter*. The government did not introduce the raw machine data from the test of G.B.'s swab,[158] (data *Porter* recognized as nontestimonial), nor did any witness testify based on this data. Diatherix's summary sheet (and testimony based on it) was testimonial hearsay.

[158] *E.g.* JA at 936-41 (from appellate exhibit).

B. The Confrontation Clause prohibits elicitation of testimonial hearsay.

In *Michigan v. Bryant*, the Supreme Court considered whether a victim's identification of Bryant as the person who shot him—made shortly after the shooting and in response to police questioning—was testimonial hearsay.[159] The Court considered the "statements and actions of both the declarant *and interrogators*" in deciding the "primary purpose" of the interrogation was "to enable police assistance to meet an ongoing emergency."[160] But the Court noted that different actions by those eliciting the statement—for instance, "the police say[ing] to a victim, 'Tell us who did this to you so that we can arrest and prosecute them'"—would make the victim's words testimonial hearsay.[161]

This Court has determined whether statements are testimonial based on if: (1) "the statement was elicited by or made in response to a law enforcement or prosecutorial inquiry;" (2) "involved more than a routine and objective cataloging of unambiguous factual matters;" and, (3) "the primary purpose for making, or eliciting, [it] was the production of evidence with an eye toward trial."[162]

1. Courts have found laboratory statements to be testimonial hearsay where they were elicited by law enforcement.

This Court did not mention the primary purpose test in *Katso*. It has only

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[159] 562 U.S. 344, 348-50 (2011).
[160] *Id.* at 367, 377-78 (emphasis added, quotation omitted).
[161] *Id.* at 368.
[162] *United States v. Squire*, 72 M.J. 285 (C.A.A.F. 2013).

applied this test to oral statements like those in *Bryant*—e.g. by a child to medical staff,[163] and by a witness to an investigator.[164] But this Court and others have considered whether laboratory reports were elicited by a law enforcement or prosecutorial inquiry. In *Porter* for instance, this Court noted in the objective witness test that the summary confirmation pages were "prepared by analysts at [an investigator's] request and with certain knowledge that the testing was part of a criminal investigation."[165] And in *Manery*, the court found the gonorrhea positive to be testimonial where "[t]he forensic testing was requested by law enforcement."[166] It did so even though it did not note any facts suggesting the private laboratory was aware of law enforcement involvement.

2. This Court has found statements were "elicited by or made in response to a law enforcement or prosecutorial inquiry" where law enforcement arranged for the circumstances in which the declarant gave the statement.

In *United States v. Gardinier*, this Court found a child's statements in a sexual assault nurse examination were "elicited in response to law enforcement inquiry with the primary purpose of producing evidence with an eye toward trial"[167] where the exam was "*arranged* and paid for by the sheriff's office."[168] This Court reached a different result in *United States v. Squire*, where a child

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[163] *E.g. id.; United States v. Gardinier*, 65 M.J. 60 (C.A.A.F. 2007).
[164] *United States v. Jones*, 78 M.J. 37, 45 (C.A.A.F. 2018).
[165] 72 M.J. at 337.
[166] 492 S.W.3d at 146.
[167] 65 M.J. at 66 (the Court "consider[ed] the first and third factors together").
[168] *Squire*, 72 M.J. at 288 (summarizing *Gardinier*, emphasis added).

visited a doctor with no law enforcement facilitation at all: the child's parent called the hospital directly, the same day she first suspected a crime.[169] The child's statements to the doctor were therefore not testimonial hearsay.

3. The military judge made clearly erroneous findings, which omitted evidence that both law enforcement and Dr. Kafer elicited testimonial hearsay.

The military judge claimed that G.B.'s "sample" was "not made with an eye toward litigation" because "[u]pon learning that the accused had an STI and allegedly performed sexual acts upon her son, G[.]B[.]'s mother took him, not to the police, but to her primary pediatrician, Doctor Lisa Kafer."[170]

But these findings were clearly erroneous where Dr. Kafer was not his primary pediatrician—she had not seen G.B. for over a year. Even if G.B. normally went to the clinic where Dr. Kafer worked, she testified Theresa Baas said "Social Services had sent me to see her"[171]—*not* that Theresa Baas had spontaneously decided to bring in G.B.

Other facts also show that Theresa Baas taking G.B. to Dr. Kafer was similar to the law enforcement-arranged visit in *Gardiner*. CPS agent Ms. Pfannenstiel's notes state: "mother agreed to have [G.B.] evaluated by Dr. Kafer for sex abuse."[172] SA Morgan noted that CPS is "law- enforcement," and

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[169] *Id*.
[170] JA at 246.
[171] JA at 320.
[172] JA at 946.

he told them Cpl Baas had gonorrhea.[173] Ms. Pfannenstiel's notes also say that NCIS, CPS, and Theresa Baas all met on the morning of June 17, 2016. SA Morgan promptly followed up with Ms. Pfannenstiel to ask about the gonorrhea test result. CPS and NCIS elicited testimonial hearsay to use against Cpl Baas.

The military judge also ignored evidence Dr. Kafer elicited testimonial hearsay. She did not order the STD test because G.B. had any symptoms. Her full notes say she received a "history reported by [Theresa Baas]" that was "consistent with child sexual abuse," and that she ordered the test because if "either test were positive, it would be highly indicative of child abuse."[174] Law enforcement and Dr. Kafer obtained testimonial hearsay from Diatherix.

C. A proponent of testimonial laboratory evidence must introduce it through a witness who had a role in the testing.

In *Bullcoming v. New Mexico*, the Supreme Court held the government cannot "introduce a forensic laboratory report containing a testimonial certification . . . through the in-court testimony of a scientist, who did not sign the certification or perform or observe the test reported."[175] The Court noted the "accused's right is to be confronted *with the analyst who made the certification*"—not "surrogate testimony."[176] The Court reached this conclusion even

[173] JA at 111, 114.
[174] JA at 183.
[175] 564 U.S. at 652, 657.
[176] *Id.* at 652 (emphasis added).

though the testifying scientist was "qualified as an expert witness," and the analyst had "simply transcribed the resul[ts] generated by the . . . machine."[177]

This Court applied *Bullcoming* in *Katso*, where a crime lab had an examiner "look[] for traces of semen" on swabs, "creat[e] DNA profiles from" these samples, calculate the probability it matched the DNA profile from Katso's swab, and write a report on the results.[178] Instead of admitting the report into evidence or having the examiner testify at trial, the lab's "technical reviewer" testified that the swabs from the victim contained DNA consistent with known DNA from Katso.[179] This Court found the reviewer was not a conduit for hearsay where the reviewer "performed an extensive independent review of the case file, upon which the Final Report was based, during which he determined [the examiner] took the prescribed quality control measures, that no accidents occurred, and that the results were logically consistent."[180]

1. Dr. Kafer, Dr. Hobbs and SA Morgan were testimonial hearsay conduits

The military judge made no findings as to whether witnesses at trial were conduits for testimonial hearsay from Diatherix, so this Court must review this *de novo*. SA Morgan and Dr. Kafer were clearly conduits, as neither of them knew anything about Diatherix's testing procedures. Dr. Hobbs was an expert

[177] 564 U.S. at 661.
[178] 74 M.J. at 276-77.
[179] *Id.* at 276-78.
[180] *Id.* at 282-83 (emphasis added).

witness on NAATs in general, but she was still a conduit. Her four-page report including the accuracy rate she claimed, restates data Diatherix provided from its own testing.[181] Dr. Hobbs could not confirm that technicians at Diatherix followed any procedures in testing G.B.'s swab, and thus was not the competent reviewer from *Katso* who could reference testimonial hearsay.

D. The members' mixed findings show that the erroneous admission of the positive Diatherix NAAT was not harmless beyond a reasonable doubt.

As no one who testified to the NAAT positive was qualified, the lab report was inadmissible. "[T]he question is not whether the evidence was legally sufficient without the testimonial evidence, but whether there is a reasonable possibility that the evidence complained of might have contributed to the conviction."[182] In *Porter*, the government "failed to carry its burden" where, as here, "testimonial statements" were referenced to prove "testing standards and controls were followed during the testing" of a sample.[183]

The members' mixed verdict alone shows that the Diatherix NAAT was not harmless beyond a reasonable doubt. The members acquitted Cpl Baas of the May 2, 2016 specifications, the only charged date on which Hailey Burtnett did not fantasize about anal penetration in the messages, but convicted him on the other charged dates. Diatherix produced the only direct evidence of sexual

[181] *Compare* JA at 1864-68 (Hobbs report) *with* JA at 1213-29 (Diatherix data).
[182] *Porter*, 72 M.J. at 338 (quotation omitted).
[183] *Id.* (citation omitted).

contact in this case. Denying Cpl Baas a chance to confront Diatherix in front of the members was therefore not harmless beyond a reasonable doubt.

II.
THE LOWER COURT ABUSED ITS DISCRETION IN ADMITTING AN ALLEGED POSITIVE DIATHERIX TEST RESULT FOR GONORRHEA IN A CHILD'S RECTAL SWAB—WHERE DIATHERIX FAILED TO FOLLOW ITS OWN PROCEDURES AND THE RESULT WAS OF NEAR ZERO PROBATIVE VALUE.

Standard of Review

This Court "must determine de novo whether the military judge properly followed the *Daubert* framework" and fulfilled his or her "required gatekeeping function."[184] This Court reviews a decision to admit or exclude scientific evidence for an abuse of discretion—reviewing findings of fact for clear error, and reviewing conclusions of law *de novo*.[185]

"[F]ail[ing] to mention or reconcile . . . critical facts,"[186] being "influenced by an erroneous view of the law," or reaching a decision "outside the range of choices reasonably arising from the applicable facts and the law,"[187] are all abuses of discretion. "When reviewing a decision of a Court of Criminal Appeals on a military judge's discretionary ruling," this Court has "'pierced

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[184] *United States v. Flesher*, 73 M.J. 303, 311 (C.A.A.F. 2014).
[185] *United States v. Henning*, 75 M.J. 187, 191 (C.A.A.F. 2016) (quote omitted).
[186] *United States v. Ramos*, 76 M.J. 372, 376 (C.A.A.F. 2017) (quote omitted).
[187] *Flesher*, 73 M.J. at 311.

through that intermediate level' and examined the military judge's ruling."[188]

Discussion

The Supreme Court warned in *Daubert v. Merrell Dow Pharmaceuticals* that "[e]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it."[189] A trial judge therefore has "a gatekeeping role" under the Rules of Evidence to "ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable."[190]

This Court in *United States v. Flesher* recognized the military judge has the same "gatekeeping function" under M.R.E. 702.[191] And in *United States v. Henning*, this Court noted that the "proponent of evidence has the burden of showing that it is admissible" under *Daubert*.[192] There the government tried to admit laboratory results comparing a DNA sample from clothing the alleged victim was wearing at the time of charged offenses, to Henning's DNA.[193]

Though Courts may analyze expert testimony on scientific issues under *United States v. Houser*,[194] this Court stated in *Henning* a military judge "must determine" admissibility of scientific evidence under the six *Daubert* factors.[195]

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[188] *United States v. Feltham*, 58 M.J. 470, 474-75 (C.A.A.F. 2003).
[189] 509 U.S. 579, 595 (1993).
[190] *Id.* at 589, 597.
[191] 73 M.J. at 311.
[192] 75 M.J. at 188.
[193] *Id.*
[194] 36 M.J. 392 (C.M.A. 1993). The six *Houser* factors are "consistent . . . with [the] *Daubert*" factors. *Henning*, 75 M.J. at 190 n.10, 191.

A. The military judge failed to apply several *Daubert* factors and abused his discretion in admitting the positive Diatherix NAAT.

A review of the six *Daubert* factors shows that as in *United States v. Hill*, the military judge abused his discretion in admitting the allegedly positive Diatherix NAAT test of G.B.'s rectal swab as conclusive proof that G.B. had gonorrhea. In *Hill*, the Army Court of Criminal Appeals found the military judge erroneously admitted a scientific test result as conclusive proof of a fact under *Daubert*.[196] The government charged Hill with attempted murder by stabbing. An investigator "performed a luminol test on [Hill's] PT uniform" and "the result was a 'presumptive positive' for blood."[197] Over Hill's objection, the military judge admitted "testimony on the presumptive positive luminol test . . . to show that there *was blood* on [Hill's] PT uniform."[198]

The Army Court found the military judge erred because the *Daubert* factors showed that "a luminol test reveals *only* the presumptive positive presence of blood."[199] It found error even though the test results would have been admissible if the government introduced them for a limited purpose and

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[195] *Henning*, 75 M.J. at 191 n.15. *But see United States v. Sanchez*, 65 M.J. 145, 149 (C.A.A.F. 2007) (suggesting *Daubert* "'inquiry is a 'flexible one,' and the factors do not constitute a 'definitive checklist or test'") (quoting *Daubert*, 509 U.S. at 593-94)).
[196] 41 M.J. 596 (A. Ct. Crim. App. 1994).
[197] *Id.* at 598.
[198] *Id.*
[199] *Id.* at 598, 602 (emphasis added).

not as conclusive proof of the presence of blood;[200] or, introduced evidence of "one of the commonly accepted confirmatory tests" with the luminol test.[201]

1. First *Daubert* Factor: Diatherix's NAAT had not been tested for use on child rectal swabs, and it created child rectal swab data to litigate this case.

The first *Daubert* factor is "[w]hether the theory or technique can be (and *has been*) tested."[202] The Supreme Court has recognized there must be a close fit between a use of a test and the data offered to support it. Though experts can "extrapolate from existing data," a "court may conclude that there is simply too great an analytical gap between the data" given "and the opinion proffered."[203]

i. Data from non-rectal and non-child samples used in Diatherix's licensing tests, was not adequate to prove the NAAT was reliable on a rectal swab.

The government did not establish this *Daubert* factor in *Hill* where the investigator testified "Luminol is an investigative tool . . . any positive test is just the inducement . . . for a confirmatory [test] or further investigation."[204] Other "evidence from scientific testing ha[d] revealed that luminol is limited to disclosing only a presumptive positive presence for blood, not a confirmatory presence for blood," because some non-blood substances could test positive.[205]

Similarly, the New Hampshire Supreme Court did not find a close

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[200] *Id.* at 602 (citing *United States v. Burks*, 36 M.J. 447, 452 (C.M.A. 1993)).
[201] *United States v. Holt*, 46 M.J. 853, 857-58 (N-M. Ct. Crim. App. 1997).
[202] *Henning*, 75 M.J. at 191 n.15 (emphasis added).
[203] *General Electric v. Joiner*, 522 U.S. 136, 146 (1997).
[204] 41 M.J. at 601.
[205] *Id.*

enough fit between validation data and the use of a test in *Osman v. Lin*.[206] There the trial judge excluded results of "verbal and nonverbal intelligence and general intelligence" tests on refugees who "learned English as a second language"—offered as evidence they had suffered lead poisoning.[207] The court noted that although the tests were "generally used to determine whether school children are in need of educational services," the putative expert used them here "in a way that is very different . . . from the usual application in clinical practice, and for a purpose for which those tests have not been validated."[208]

The military judge claimed that this *Daubert* factor favored admission, citing Diatherix's claims that its NAAT was 100% accurate in "validation testing in the summer of 2016" using "'blind' samples" that were "spiked" with gonorrhea.[209] But the military judge did not acknowledge that the testing which produced 100% accuracy was from "summer 2016 (specific dates . . . not provided)" and involved non-rectal samples.[210] Dr. Hammerschlag noted rectal gonorrhea creates unique issues for gonorrhea tests. And the CDC requires confirmatory testing by culture for child rectal samples. Like the data showing

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[206] 147 A.3d 864 (N.H. 2016).
[207] *Id.* at 866-67.
[208] *Id.* at 871 (alterations in original, internal quotations omitted) (noting "expected levels of performance of" refugee "children generally . . . are unknown").
[209] JA at 1893, 1899.
[210] *See* JA at 1866 (Dr. Hobbs noting that these test "results were not separated out by the specific sample matrix used (e.g. urine vs. rectal swab)").

luminol could provide a presumptive positive in *Hill*, validation data from testing on non-rectal sources only shows that NAATs produce a presumptive positive (at best) in the specific setting of a child's rectal swab.

Though the military judge claimed that the "validation data" not being "necessary, appropriate, or specific to pediatric rectal samples" goes "to the test's weight" instead of admissibility,[211] this conclusion of law was error in light of *Osman*. The fact that the proponent offered the results of a test administered to subjects "for which those tests have not been validated" was a threshold issue to be addressed by the *Daubert* gatekeeper—not the members.

ii. Data developed for litigation purposes is illegitimate under *Daubert*.

Courts have also required that research under *Daubert* be "legitimate, preexisting," and "unrelated to the litigation."[212] The Ninth Circuit Court of Appeals upheld rejection of the scientific testimony in *Daubert* after the Supreme Court remanded the case, noting "independent research" done "in the usual course of business" "carries its own indicia of reliability."[213] In *Daubert* by contrast, the expert "developed their [scientific] opinions" in the matter "expressly for purposes of testifying."[214]

The military judge cited Dr. Hobbs claims that Diatherix's NAAT was

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[211] JA at 1899.
[212] *Daubert v. Merrell Dow Pharms.*, 43 F.3d 1311, 1316-22 (9th Cir. 1995).
[213] *Id.* at 1317.
[214] *Id.* at 1316-17.

94.6% accurate and data "demonstrate[d] . . . no cause for concern" in claiming that this *Daubert* factor favored admission.[215] But the military judge did not acknowledge that the accuracy statistic was from testing *by Diatherix* on spiked rectal swabs "completed 27 January 2017" (from Dr. Hobbs' report).[216] This was over half a year after the testing of G.B.'s sample, and after Dr. Hammerschlag raised doubts about Diatherix's NAAT in the 12 January 2017 motions session. Nor did the military judge acknowledge that this accuracy figure was based on a comparison with another NAAT test that "is known to give false positive results" (as Dr. Hobbs noted).[217] The military judge abused his discretion as a matter of law by failing to recognize the legal significance in relying on data manufactured by Diatherix to support this prong of *Daubert*.

2. Second *Daubert* Factor: The NAAT was not peer reviewed or published.

The second *Daubert* factor is "[w]hether the theory or technique has been subjected to peer review and publication."[218] The Supreme Court in *Daubert* noted "submission to the scrutiny of the scientific community is a component of 'good science' because it increases the likelihood that substantive flaws in

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[215] JA at 1894, 1896, 1899.
[216] *See* JA at 1866-67 (noting accuracy was determined from the "method which compared the Diatherix GNT Panel results . . . with those obtained from the same samples using the . . . Amplicor NG assay").
[217] JA at 1866 ("[I]t is not possible to conclude that all concordant positive results were actually true positives.").
[218] *Henning*, 75 M.J. at 191 n.15 (emphasis added).

methodology will be detected."[219] In *Hill*, the Army Court agreed "luminol has been the subject of peer review and publication."[220] But because "articles concluded that luminol can only show a presumptive positive presence for blood,"[221] the military judge erred in admitting it as conclusive proof at trial.

This Court has also indicated that the peer review must be specific to the particular test used by the laboratory. In *Henning*, the government moved to admit a crime laboratory's test result that Henning was a possible contributor to the DNA sample found on clothing. A representative of the laboratory testified that it followed standard DNA analysis formulas "as a guideline," but that "the calculation they used in this case was a 'modified version of things that are listed in the guidelines.'"[222] This Court noted that even if the "general [DNA] formulas . . . were widely accepted and peer reviewed," the lab failed to show the specific "modified formula utilized in this case" was "peer reviewed."[223]

The military judge here found as fact that "Diatherix's [NAAT] has never been admitted in court, and has not been peer reviewed."[224] However, he found that aside from testing for "two organisms at the same time, the "science behind the NAAT" from Diatherix "is the same as other commercially available

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[219] 509 U.S. at 593.
[220] 41 M.J. at 601.
[221] *Id.*
[222] 75 M.J. at 188.
[223] *Id.* at 192.
[224] JA at 1899.

NAATs."[225] He found as a matter of law that as "other NAAT's have been FDA cleared and subject to peer review," this factor "weighs towards admission."[226]

But this was an abuse of discretion that reflected "an erroneous view of the law." First, he wrongly conflated the peer review factor with the factor of acceptance by the scientific community (discussed below in Section 5). Second, his reliance on peer review of NAATs in general as a substitute for peer review of Diatherix's specific NAAT is contrary to *Henning*. Dr. Stalons testified that Diatherix's multiplex NAAT was unique, like the modified formula in *Henning*.

And even if peer review of NAATs in general was acceptable, the military judge received studies from the CDC and others. These stated that NAATs cannot be used to provide a conclusive positive for gonorrhea on samples from children—particularly on rectal samples from boys. As in *Hill*, the military judge abused his discretion in citing peer review supporting one use of a test, to support the non-peer reviewed use of the test actually performed.

3. Third *Daubert* factor: the known or potential error rate for Diatherix's NAAT on prepubescent rectal swabs was extremely high, because a positive result was no more likely than not to prove G.B. had gonorrhea.

The Supreme Court noted in *Daubert* that for a "scientific technique, the court ordinarily should consider the known or potential rate or error."[227] In

[225] JA at 1892.
[226] JA at 1899.
[227] *Daubert*, 509 U.S. at 594.

United States v. Sanchez, this Court stated that "[n]othing . . . requires that a military judge either exclude or admit expert testimony because it is based in part on an interpretation of facts for which there is no known error rate."[228]

But this Court has since suggested that under *Daubert* a test result must at least establish that a test result is at least more likely than not to be correct. In *Henning*, his Court upheld the military judge's rejection of the government's proffered DNA test result where the defense expert testified: "we are in no better position to say if Major Henning's DNA is present with this sample after we've seen the test results than we were before the tests were performed."[229]

The Sixth Circuit Court of Appeals likewise upheld the exclusion of lie detector evidence under the "rate of error" *Daubert* factor. It noted testimony showed the "error rates . . . proposed [we]re based on almost no data" and were created "under circumstances [that] do not apply to the real world."[230]

And in *Hill*, the Army Court found that the "frequency of erroneous results"—the error rate—was too high for luminol analysis to conclusively establish the presence of blood under *Daubert* without a separate confirmatory test.[231] There the expert testified to facts establishing a "14-to-37.5 percent rate

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[228] 65 M.J. at 151.
[229] 75 M.J. at 189.
[230] *United States v. Semrau*, 693 F.3d 510, 521 (6th Cir. 2012).
[231] 41 M.J. at 601.

of error"—the percentage of times he failed to confirm the luminol preliminary positive for blood in a "follow-up confirmation test."[232]

i. Even assuming it is very accurate, the Diatherix NAAT has a high error rate because of the low prevalence of gonorrhea in prepubescent children.

The military judge relied on the "accuracy" of the test under this factor, but that statistic is analytically less valuable than the positive predictive value (PPV). A practical example shows that where the prevalence and positive predictive value (PPV) are low, even a test that appears to be very accurate in the laboratory can produce a high enough "frequency of erroneous results" that it provides no useful information (as in *Henning*).[233] Consider a hit-and-run accident on a rainy night in a city with 1,000 taxi cabs but only in two colors: forty blue-colored taxis, and 960 green-colored taxis. A witness who is 95 percent accurate at identifying the color of a vehicle under the conditions, testifies he is *sure* he saw a blue taxi commit the hit-and-run. The PPV, the probability that a blue taxi actually committed the hit-and-run, is not 95 percent. Counterintuitively it is only about 44.2 percent—no more likely than not.

This is clear mathematically by showing how the witness would have identified each of the 1,000 cabs, based on the 95% accuracy rate, if the hit and run was shown to the witness 1000 times, with all of the taxis in the city. Of the

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[232] *Id*.

[233] Example from DANIEL KAHNEMAN, THINKING, FAST AND SLOW 166-68 (2011).

forty blue taxis he would correctly see thirty-eight as blue,[234] but incorrectly see two as green.[235] Of the 960 green taxis the accurate eyewitness would correctly see 912 as green,[236] but incorrectly see forty-eight as *blue*.[237] Of the eighty-six taxis he identified as blue,[238] only thirty-eight of them were actually blue. This is only a 44.2 percent[239] probability the witness gave a correct identification. As blue taxis are rare (low prevalence among taxis), even the accurate eyewitness claiming to see a blue cab, was actually more likely to have seen a green cab.

Blue taxis represent the very small number of prepubescent children who actually have gonorrhea. Green taxis are the vast majority of children who do not have gonorrhea. The accuracy of the eyewitness, is about the accuracy of the Diatherix test as stated by Dr. Hobbs (94.6%). This shows accuracy is unimportant relative to the PPV, because even this accuracy gives a high error rate.

ii. The government failed to prove Diatherix's NAAT had an error rate on pediatric rectal samples sufficient to show reliability under *Daubert*.

The military judge claimed "the error rate for the [Diatherix NAAT] is acceptable."[240] He did so notwithstanding the testimony of both "Dr. Hobbs and Dr. Hammerschlag [that] test results in the pediatric population are

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[234] .95*40=38
[235] .05*40=2
[236] .95*960=912
[237] .05*960=48
[238] 38+48=86
[239] 38/86=.4418,
[240] JA at 1899.

considered less reliable."[241] The military judge did so based on Dr. Stalons' self-serving claim that Diatherix's summer 2016 testing was 100% accurate.[242]

But Dr. Hobbs stated that under the "more rigorous method" of testing Diatherix's NAAT for "[a]ccuracy" (the January 2017 rectal swab tests), its accuracy compared to the reference NAAT was only 94.6%.[243] And the military judge's reliance on the accuracy of the test shows a misunderstanding of the significance of these statistics. The taxi example shows that the level of accuracy Dr. Hobbs claimed for the NAAT, still produces a high error rate if testing for a rare condition of gonorrhea in a child's rectal swab. And the four percent prevalence of blue taxis (forty out of 1000), is much greater than the prevalence of gonorrhea for prepubescent boys: Dr. Hobbs and Dr. Hammerschlag agreed the prevalence here was under one percent, and as low as one out of 1000![244] The military judge's claim that this *Daubert* factor favored admission was an abuse of discretion where members were in no better position after the test to say if G.B. had gonorrhea, as in *Henning*.

4. Fourth *Daubert* Factor: Diatherix failed to follow its own standards in running its NAAT on a pediatric rectal swab.

The fourth *Daubert* factor is "the existence and maintenance of standards

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[241] JA at 1900.
[242] JA at 1899.
[243] JA at 1866.
[244] JA at 1895; *see also* JA at 180, 510-11.

controlling the technique's operation."[245] In *Henning*, this Court upheld the military judge's decision to exclude the test result where the "record also fails to contradict the military judge's finding that the modified formula used by" the crime lab was "impermissible under" field "guidelines."[246]

The military judge cited this fourth *Daubert* factor,[247] but failed to make any findings. This Court should find that Diatherix's NAAT failed this factor because Diatherix misused its NAAT in this case. Diatherix's own manual first said the test is "not recommended for evaluation of suspected sexual abuse."[248] Yet Diatherix ran the NAAT on a sample which was not only from a one-year-old, but also a rectal swab (which Dr. Kafer could not submit for testing without preapproval). Dr. Stalons agreed that "based on [the client] manual," Diatherix "need[ed] preapproval . . . before . . . test[ing] the rectal swab" to confirm that the NAAT was validated for these samples.[249] And Dr. Hobbs agreed that based on its own client manual, Diatherix should not have run its NAAT on the rectal swab.[250] The NAAT fails this *Daubert* factor.

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[245] 509 U.S. at 594.
[246] 75 M.J. at 192.
[247] JA at 1897.
[248] JA at 1866.
[249] JA at 144.
[250] JA at 182.

5. Fifth *Daubert* Factor: Use of a NAAT on prepubescent child swabs and without confirmatory testing is not accepted in the scientific community.

The fifth *Daubert* factor is the "degree of acceptance within the relevant scientific community."[251] The *Daubert* Court noted "a known technique which has been able to attract only minimal support within the community, may properly be viewed with skepticism."[252] In *Henning*,[253] this Court noted that "there [was] nothing in the record to show" that the crime lab's formula was "employed anywhere outside of" the one crime lab that ran this test.

Simply because a community has accepted use of a test for some purposes, does not mean that every use is generally accepted. In *Hill*, the Army Court cited the fact that "luminol testing has gained acceptance in the criminology community . . . *only* as a preliminary test" in rejecting the military judge's admission of a luminol test to conclusively prove the presence of blood on Hill's uniform.[254] And the Eighth Circuit Court of Appeals upheld exclusion of expert economic testimony in a case even though the expert "utilized a method of analysis typical []in his field."[255] This factor still opposed admission because there was "no evidence in the record that other economists" used the

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[251] *Henning*, 75 M.J. at 191 n.15.
[252] 509 U.S. at 594 (internal quotation and citation omitted).
[253] 75 M.J. at 192.
[254] 41 M.J. at 601-02 (emphasis added).
[255] *Blue Dane Simmental Corp. v. Am. Simmental Ass'n*, 178 F.3d 1035, 1040 (8th Cir. 1999).

method the way this expert did (to analyze "causes of market fluctuation").[256]

The military judge did not analyze this factor separately from the peer review and publication factor. He found as a conclusion of law that the factor favored admission as "the use of NAAT's in general was gaining prevalence in the industry" and "the CDC generally allows" using NAATs for STI testing.[257]

But this was an error of law in light of *Henning* and *Hill*. Allowing the use of NAATs to test for gonorrhea in adults, where the prevalence of gonorrhea is many times higher, does not imply support for Diatherix's use of its NAAT on a rectal swab from a prepubescent boy. The military judge also ignored critical facts in the record about how the use of NAATs on children is not generally accepted. For instance, that the CDC does not recommend NAATs for use in prepubescent boys because there is "insufficient" data on their performance.[258] And that Dr. Hobbs testified"[t]he way in which the [Diatherix] test result is being used [here] is inappropriate."[259] These facts show this *Daubert* factor opposed admitting the NAAT test of G.B.'s sample.

6. Sixth *Daubert* factor: The low probative value was substantially outweighed by unfair prejudice, misleading the members and wasting time.

The Supreme Court noted in *Daubert* that a trial judge must "exercise[]

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[256] *Id.* at 1040.
[257] JA at 1899.
[258] JA at 1893, 1893 n.2.
[259] JA at 189.

more control over experts than over lay witnesses" in excluding even relevant evidence "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury."[260]

i. The low positive predictive value (properly understood as the probative value) of this NAAT was substantially outweighed by unfair prejudice.

Unfair prejudice is "capacity of . . . relevant evidence to lure" a factfinder "into declaring guilt on a ground different from proof specific to the offense."[261] The Connecticut Supreme Court excluded polygraph evidence under this *Daubert* factor in *State v. Porter*.[262] It cited the "highly questionable predictive value" of polygraphs (which "may be greater than that of a coin toss" but "not significantly greater"), and found "any limited evidentiary value" the "evidence does have is substantially outweighed by its prejudicial effects."[263]

The military judge claimed that the "Diatherix test [wa]s highly probative" that G.B. had gonorrhea.[264] But this was "outside the range of choices reasonably arising from the applicable facts and the law" where Dr. Hammerschlag testified that the "positive predictive value" was under 50%, meaning that any positive result was no more accurate than a coin flip.[265]

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[260] 509 U.S. at 595 (emphasis added).
[261] *Old Chief v. United States*, 519 U.S. 172, 180 (1997).
[262] 698 A.2d 739 (Conn. 1997).
[263] *Id.* at 767-69.
[264] JA at 1900.
[265] JA at 60.

The military judge also dismissed the "potential prejudicial effect of the test" by concluding the defense could address through cross-examination concerns about "the Diatherix testing validation," the "use of this type of test on a pre-pubescent boy," and the "inability to conduct a confirmation test.[266]

But this reflected an erroneous view of the law. *Daubert* says not to simply allow introduction of scientific evidence and leave it to the members to decide if it is sufficiently reliable. *Daubert* instead requires the trial judge as gatekeeper to exercise *more control* over experts than over lay witnesses, as expert evidence can be "powerful and quite misleading because of the difficulty in evaluating it." As Dr. Hammerschlag testified, a positive gonorrhea test in a young child likely leads to a "forgone conclusion that abuse occurred."[267]

Admission of the NAAT also allowed the government to introduce evidence Cpl Baas had gonorrhea, encouraging the members to find guilt based on general disgust. The military judge abused his discretion in disregarding the high level of unfair prejudice based on the low probative value of the NAAT.

ii. The low probative value was also substantially outweighed by the dangers of misleading the members and wasting time.

Military courts have recognized the need to exclude scientific testimony based on "the danger of confusi[ng]" the members and the "wast[ing] of time"

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[266] JA at 1900.
[267] *Id.*

at trial.[268] Military judges should also avoid a "proverbial trial within a trial."[269]

The military judge claimed that the NAAT result would "not confuse or mislead the members."[270] But more than one hundred pages of motions testimony on the reliability of the Diatherix test (JA 119-223), show the military judge ignored that its admission would create a trial in a trial. And allowing the Government to introduce the NAAT elicited misleading testimony from Dr. Hobbs. She testified that if members *assumed* "a potential exposure from an infected person with a positive gonorrhea test occurred," the "hypothetical prevalence" of gonorrhea "in that population" of children was high enough that it was "not unlikely that this was a true positive."[271] The government's reference to this testimony in its closing was misleading, confusing, and intruded on the role of the factfinder.[272] It shows the military judge abused his discretion in admitting the NAAT result under M.R.E. 403.

B. The members' mixed findings show that the erroneous admission of the positive Diatherix NAAT materially prejudiced Cpl Baas.

The government must prove evidence admitted in error was harmless.[273] It cannot do so here where the government's case was weak without Diatherix's

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[268] *United States v. Griffin*, No. ACM 32229, 1997 CCA LEXIS 441, at *11 (A.F. Ct. Crim. App. Aug. 11, 1997), *aff'd*, 50 M.J. 278 (C.A.A.F. 1999).
[269] *United States v. Graham*, 50 M.J. 56, 59 (C.A.A.F. 1999).
[270] JA at 1900.
[271] JA at 494-95.
[272] JA at 517-18.
[273] *United States v. Berry*, 61 M.J. 91, 97-98 (C.A.A.F. 2005).

claim that the rectal swab from G.B. tested positive for gonorrhea. This was the only evidence purporting to provide physical proof of sexual acts. The government's case without the NAAT otherwise rested on Skype messages from Hailey Burtnett: a profoundly unreliable narrator who described anatomically impossible acts—like Cpl Baas sucking his own penis. Cpl Baas described these acts as mere fantasies, and the defense's case was strong as there was no other corroboration of any sexual abuse.

The members' mixed verdict shows that the Diatherix NAAT was material. Two members asked questions on the topics of positive predictive value, and the validity of a NAAT.[274] The government referenced the positive gonorrhea NAAT in about four pages of its roughly thirteen page closing argument, and in its opening statement.[275] Then the members *did not* convict Cpl Baas of the 2 May 2016 specifications, the only charged date on which Hailey Burtnett did not fantasize about anal penetration in the messages. It appears the Diatherix test results were dispositive for the members' decision.

But the scientific evidence shows that Diatherix's NAAT was of too low a quality (unlike a 100% accurate culture test) to prove that a rectal swab from a prepubescent boy—a very low prevalence population— actually had gonorrhea. The government cannot prove admission of NAAT positive was harmless.

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[274] JA at 1966-67.
[275] JA at 250-51, 516-18, 534-35.

Conclusion

Cpl Baas respectfully requests that this Court set aside the sentence and the findings of guilty to all charges and specifications because the military judge erroneously admitted the Diatherix NAAT test result in evidence.[276]

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[276] The Diatherix positive most directly influenced findings of guilty on specifications alleging commission of a sexual act on G.B. (Charge II, Specifications 1 and 3), conspiracy to commit a sexual act upon G.B. (Additional Charge, Specification 1), and, whether Cpl Baas lied about committing sexual acts on G.B. (Charge I, Specification 1). JA at 50, 52. But it also substantially influenced the findings that Cpl Baas produced or distributed child pornography (Charge III, Specifications 1-2 and 5-6); and conspired to do so (Additional Charge, Specification 2). JA at 51-52.

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