SUPERIOR COURT OF NEW JERSEY
LAW DIVISION, CRIMINAL PART
MIDDLESEX COUNTY
INDICTMENT NO. 17-06-01785
APP. DIV. NO. _____

STATE OF NEW JERSEY,	
	TRANSCRIPT
vs.	
	OF
DARRYL NIEVES,	
	FRYE HEARING
Defendant.	

Place: Middlesex County Courthouse
56 Paterson Street
New Brunswick, NJ 08903

Date: September 24, 2020

BEFORE:

HONORABLE PEDRO J. JIMENEZ, JR., J.S.C.

TRANSCRIPT ORDERED BY:

CAROLINE V. BIELAK, ESQUIRE, A.D.P.D. (Office of the Public Defender, Middlesex Region)

APPEARANCES:

VANESSA I. CRAVEIRO, ESQUIRE, A.P. (Monmouth County Prosecutor's Office)
Attorney for the State of New Jersey

CAROLINE V. BIELAK, ESQUIRE, A.D.P.D.
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I N D E X

NOTE: Microphone not coming through channel 2, where the witness stand microphone is usually isolated on, resulting in the witness not being audible over the prosecutor when they speak at the same time or when prosecutor is moving papers/items at counsel table.

(Hearing commenced at 10:45 a.m.)
THE COURT: All right. We're live then.
Let's put on the record this is the case of State versus Darryl Nieves. The indictment is 17-06-785 and the file is 17-837.
Let me have everyone's appearances.
MS. CRAVEIRO: Good morning. Vanessa Craveiro for the state.
MS. RUE: Good morning, Your Honor. Danica Rue on behalf of Darryl Nieves.
Ms. BIELAK: Good morning, Your Honor. Caroline Bielak also on behalf of Darryl Nieves, who is present behind me to my left.
THE COURT: Okay. We're here -- have a seat, everyone.
We have this case I guess moving towards a trial, but we're here today to have a hearing to determine, I guess, two things: whether the shaken baby syndrome or the abusive head trauma is scientifically reliable and would be in this case, absent evidence of physical injury; and also to determine whether the state's expert applied the science relating to the abusive head trauma reliably in this case.
And we're having one expert from the state

today and two from the defense at some future date?
MS. RUE: Yes, Judge. We have Dr. Scheller on Tuesday, the 29th, Dr. Mack on Wednesday the 30th, and then Dr. Van Ee --
THE COURT: All right.
MS. RUE: -- on October 13th.
THE COURT: You know what? Excellent that you said that. Van Ee, what date?
MS. RUE: October 13th.
THE COURT: Ten thirteen twenty. Scheller, Tuesday?
MS. RUE: Yes, Judge.
THE COURT: What's Tuesday's date?
MS. RUE: The 29th.
THE COURT: And Mack.
MS. RUE: The 30th. And, Judge, she is only able to appear virtually, so we can coordinate that with your court staff.
THE COURT: All right.
MS. RUE: Her hospital did not give her permission to travel.
THE COURT: No problem.
All right. Ms. Craveiro, you know, I missed it or misplaced it, but I don't have a copy of your expert's --

MS. CRAVEIRO: It's Dr. Medina, Judge.
THE COURT: -- report. Would you mind giving me a copy of that?
MS. CRAVEIRO: Yes.
THE COURT: All right.
MS. CRAVEIRO: And I'll just label it S-1.
THE COURT: All right. So you're ready to proceed then; right, Ms. Craveiro?
MS. CRAVEIRO: Yes.
THE COURT: All right.
MS. CRAVEIRO: And, Judge, since I'll be wearing the mask while asking questions, if I could sit down during the questioning, --
THE COURT: Sure.
MS. CRAVEIRO: -- I would appreciate it. Thank you.
And, Judge, I did speak to defense counsel earlier. Our expert, Dr. Medina, who is entering the courtroom now, asked if she could testify without the mask. Defense counsel had no objection to that. That's why --
THE COURT: Sure. Yeah. No problem.
MS. CRAVEIRO: -- we put the plexiglass up.
THE COURT: Not a problem.
THE DEPUTY: You can put your stuff down and

(indiscernible).
MS. CRAVEIRO: If you want, you can leave your --
THE DEPUTY: No. Bring you can bring your stuff right (indiscernible).
MS. CRAVEIRO: You can take a seat right there. Yeah. Behind the plexiglass.
(Discussion with law clerk, off the record.)
THE COURT: All right. Dr. Medina, good morning. We're going to swear you in and begin with your testimony. And you can testify without the mask if you'd like. You can even pull the microphone closer to you or, honestly, hold it -- that microphone right there. Or which one gives -- no.
THE DEPUTY: The mic in front.
THE COURT: Both of them working?
THE DEPUTY: Yeah, it's working. I don't know what else (indiscernible) --
THE COURT: All right. We want to make sure we record everything you say. So even if you have to use that big mic like a game show host and hold it close to you -- or a singer, or a singer, please do so, because we -- we're trying to make things happen without things falling on top of people.
THE DEPUTY: Hopefully that works. Yeah,

that's --
THE COURT: It's good like that? All right.
THE DEPUTY: (Indiscernible)
THE COURT: Okay. Doctor, let me ask you first, do you swear or affirm that the testimony you're going to give this Court will be the truth, the whole truth and nothing but the truth, so help you God?
THE WITNESS: (Inaudible)
G L A D I B E L M E D I N A, STATE'S WITNESS, SWORN
THE COURT: All right. Would you be kind enough to just state your name for the record and spell your last name?
THE WITNESS: Gladibel Medina, M-E-D-I-N-A.
THE COURT: Okay. Have a seat. Thank you. And, Ms. Craveiro, your witness.
MS. CRAVEIRO: Thank you, Judge.
VOIR DIRE DIRECT EXAMINATION BY MS. CRAVEIRO:
Q Okay. Good morning, Dr. Medina.
A Good morning.
Q By whom are you employed?
A Saint Peter's University Hospital.
Q Okay. And maybe if you could bring the mic a little closer to you --
THE COURT: Yeah.

Q -- or speak a little louder? You're a little soft-spoken.
THE COURT: I need you to -- no. Scream like you're outside. Go ahead. Just please. We need you to speak up so we can get everything, so -- all right.
THE WITNESS: Okay.
BY MS. CRAVEIRO:
Q Okay. So, why don't you tell us again by whom you're employed?
A Saint Peter's University Hospital.
THE COURT: Noemi, make sure you hear her. Okay? Make sure that you hear her.
Q Okay. And how long have you worked at Saint Peter's?
A Twenty years.
Q Okay. And what is your title there?
A I am a child abuse pediatrician.
Q Okay. And what are some of your duties as a child abuse pediatrician?
A I conduct clinical evaluations of children when there is a concern of child abuse and neglect.
Q Okay.
A That's my main responsibility.
Q Okay. And what are some of your other

responsibilities?
A The other responsibilities besides that, I also conduct medical evaluations of children in the local hospitals, specifically Robert Wood Johnson and Saint Peter's, of course, University Hospital.
I am a mentor of medical students in the field of child abuse pediatrics, as well as general pediatrics. Medical students from the third and fourth years. Oh, and also pediatric residents. Both at Saint Peter's University Hospital and through Rutgers Medical School at Robert Wood Johnson University Hospital.
I conduct educational conferences for our community pediatricians. Specifically I cover eight counties in the central area of the state of New Jersey. And I conduct also educational conferences for law enforcement, social agencies such as DCP&P.
I am the chair of the fatality and near-fatality review board for the central region of the state of New Jersey. I'm also part of the governor's board that supervises the MDT process in the state of New Jersey.
Q Okay. And when you say MDT, what does MDT mean?
A The multidisciplinary team of professionals that

are involved in the evaluation of child abuse and neglect to provide treatment, services, et cetera.
Q Okay. And you said your main duty is to evaluate children in child abuse and neglect cases; correct?
A Yes.
Q And how many evaluations to date have you performed?
A Over the past 20 years or so, close to 4,000.
Q Okay. And about how many -- approximately how many a year do you perform?
A I'm sorry, I didn't hear that.
Q About how many a year do you perform?
A A year? About 200.
Q Okay. And how many of those are for physical abuse?
A Physical abuse evaluation comprise about 1,500 to date.
Q Okay. And how many are for abusive head trauma?
A Abusive head trauma, about 15 percent, 250 or so.
Q Okay. And how many of those evaluations out of those 250 actually end up with you diagnosing the patient with abusive head trauma?
A About seven percent of those.

Q Okay. And do you also act as a director at your current employment?
A So, I am the medical director of the Dorothy B. Hersh Regional Child Protection Center. Which is hosted in New Brunswick.
Q Okay. And what is --
A At Saint Peter's.
Q And what are your duties as a director?
A So, as a director, I am in charge of the group of physicians that eval -- and nurses, nurse practitioners, that evaluate child abuse and neglect for the eight counties that our center covers. In addition to that, I provide, again, the educational conferences to the peer review process for SANE nurses and also our own internal pediatrician, in collaboration with the other four RDTCs in the state of New Jersey.
Q And what eight counties does it cover?
A Okay. Our counties include Middlesex, Somerset, Union County, Warren County, Mercer County, Monmouth County, Ocean County.
Q Okay.
A I think that's eight.
Q And --
A Hunterdon.

Q And Hunterdon. Okay. And do you work anywhere else?
A So, at -- as part of Saint Peter's, I work for 18 years as the -- one of the pediatric faculty conducting general pediatric exams.
Q And what does that mean?
A So I took care of the health of gen -- of children in general, providing anticipatory guidance as they are growing up from birth, all the way through 18 years of age, as part of the faculty at Saint Peter's.
Q Okay.
A So it's an outpatient practice.
Q And did you also teach?
A I teach the residents during that time, as well as medical students.
Q Okay. And in that position, did you teach about abusive head trauma?
A So in that position, I conducted some lectures for residents, which are called noon conferences, to specifically educate them in child abuse and neglect. And abusive head trauma.
Q Okay. And what did you do prior to those employments?
A So prior to Saint Peter's I worked in private

practice in the Watchung area for one year.
Q And what did you do in private practice?
A Routine pediatric care.
Q Okay. And where -- are you -- you're licensed to practice medicine, obviously; right?
A In the state of New Jersey, yes.
Q Okay. Any other states?
A No.
Q How long have you been licensed?
A Since 1990 -- hmm. Since 1996.
Q Okay. And do you have any areas of specialty?
A My areas of specialties are general pediatrics and child abuse pediatrics.
Q Okay. And do you have any board certifications?
A Both in general pediatrics and child abuse pediatrics.
Q Okay. And what does it mean to be -- you -- do you have any subspecialties?
A So, child abuse pediatrics is a subspecialty recognized by the American Board of Pediatrics since 2009.
Q Okay. And what does it mean to be subspecialized in child abuse?

A So, it means that you are specialty trained to evaluate child maltreatment, which can include anything from physical abuse, sexual abuse, neglect concerns. In terms of physical abuse, you are -- become very familiar with the biomechanics of trauma, and that is through conferences and continuing medical education through the MOC service that we are responsible for completing every year in addition to educational conferences in the field of child abuse pediatrics.
Q Okay. And where did you go to medical school?
A Robert Wood Johnson University Hospital in Piscataway.
Q Okay. And when did you graduate?
A In 1995.
Q And where did you do your residency?
A Also at the Robert Wood Johnson Medical Center.
Q Okay. And you just mentioned some continuing education. Is there anything other than what you've already mentioned that you do to keep yourself up to date with everything in child abuse pediatrics?
A So, again, the MOC, which is the continuing medical education program for certification, and

through the Helfer conferences, which is an honorary society, we do training specific to child abuse and neglect every year. And I go to those conferences as an attendee.

MS. RUE: Judge, I'm sorry. If I may interrupt? I'm just having a hard time hearing.

If you don't mind speaking a little louder?

THE COURT: Okay.

THE WITNESS: Okay.

MS. RUE: Thanks.

MS. CRAVEIRO: Okay.

THE COURT: Do you need the last answer repeated?

MS. RUE: If I -- yeah, I apologize, but if you could?

THE COURT: Doctor, would you mind? That last answer?

THE WITNESS: Sure. So, the educational conferences that are provided for us to go and attend to complete our medical education credits are provided yearly through the Helfer Society and also other organizations that teach specifically in the field of child abuse and neglect.

BY MS. CRAVEIRO:

Q Okay. And how long have you been practicing

medicine, generally?

A About 25 years.

Q And what portion of that time has been dedicated to pediatrics?

A All of it.

Q Okay. And what hospitals are you currently affiliated with?

A Robert Wood Johnson and Saint Peter's University Hospital.

Q Okay. Are you a member of any organizations?

A The American Academy of Pediatrics, the American Professional Society for the Abuse of Children, and the Helfer Society.

Q Okay. And are those -- what are those societies in relation to?

A Pediatrics. Again, that's the American Academy of Pediatrics that oversees over pediatricians, about 64,000 of us. And then the Helfer Society is an honorary society for physicians in -- who are engaged in the treat -- in the evaluation of kids in the field of child abuse and neglect. And the and the APSAC, again, is a wide range of providers that are part of that society for the continuing education as well.

Q Okay. And have you received any awards for

your work in this field?
A Just teaching awards.
Q Okay.
A At the local hospitals.
Q And have you ever been qualified as an expert?
A Yes.
Q About how many times?
A About 115 times.
Q And in what counties?
A Ten counties in New Jersey. The counties that I serve, plus Essex County, Hudson and Bergen County.
Q Okay. Any of them outside of New Jersey?
A Outside of New Jersey?
Q Yeah.
A No.
Q Okay. And what time frame does that encompass?
A The 20 years.
Q Okay. And during those times, were you qualified as an expert in pediatrics and child abuse pediatrics?
A Yes.
Q And how many of those cases specifically dealt with abusive head trauma?

A About seven.
Q Okay.
MS. CRAVEIRO: And that's her C.V. that you just saw.
MS. RUE: Okay.
BY MS. CRAVEIRO:
Q Okay. I'm going to approach with what's been previously marked for identification as S-2. Do you recognize that?
A Yes.
Q Okay. And what is that?
A This is my curriculum vitae.
Q Okay. And does that accurately -- fairly and accurately represent all of your training and experience and qualifications as it pertains to the field of pediatrics and, specifically, child abuse pediatrics?
A Yes, ma'am.
MS. CRAVEIRO: Okay. So at this time I'd like to admit S-2 into evidence.
MS. RUE: No objection.
MS. CRAVEIRO: Okay. At this time I don't --
THE COURT: So moved.
MS. CRAVEIRO: Oh. Sorry, Judge? Can I continue?

THE COURT: Yeah. Just got to wait --
MS. CRAVEIRO: Okay.
THE COURT: -- for me to say it, though.
MS. CRAVEIRO: Sorry, Judge.
THE COURT: So I can -- record reflect.
MS. CRAVEIRO: At this time I also would like to offer Dr. Medina as an expert in pediatrics and child abuse pediatrics.
THE COURT: Counsel?
MS. RUE: Judge, I just have a few questions.
THE COURT: Sure.
MS. RUE: Thank you.
VOIR DIRE CROSS-EXAMINATION BY MS. RUE:
Q Good morning, Dr. Medina.
A Good morning.
Q So, I just wanted to ask you about the certifications, the annual certifications you have -- you received.
A Annual?
Q I believe you said yearly certifications.
A Yearly continuing medical education.
Q Okay. And that was in regards to the subspecialty of child abuse pediatrics.
MS. CRAVEIRO: I just don't want to cough in the courtroom. Let me just --

(Extended pause)
MS. CRAVEIRO: Sorry, guys.
THE COURT: That's all right.
MS. CRAVEIRO: All right. Sorry.
MS. RUE: No, that's okay.
BY MS. RUE:
Q So, okay. Again, Dr. Medina, you receive yearly medical certification -- or, pardon me, not certifications -- continuing legal education -- medical education -- pardon me -- annually; correct?
A Yes.
Q And that is specifically in the field of child abuse pediatrics?
A And pediatrics.
Q And pediatrics. What does that entail, those --
A Attending conferences, educational conferences, signing in that you were listening to the information provided, and they give you a certificate.
Q And how many hours is that, annually?
A It's about 40 to 75.
Q Forty -- and so it's listening to lectures, essentially?
A Listening to the lectures or attending lectures, yes.

Q And -- well, attending them. And then I assume you would listen when you --
A Yes.
Q -- attend; correct?
A Yes.
Q And you sign in and you sign off?
A Yes.
Q Okay. Now, you testified that you have worked for Saint Peter's Hospital for the last 20 years?
A Yes.
Q And cases are referred to you by DCP&P; correct?
A Yes, ma'am.
Q And by that I mean the Division of Child Protection and Permanency?
A Yes. The majority are referred by them.
Q Okay. What is your -- how is your salary paid?
A My salary?
Q Yes.
A From Saint Peter's.
MS. CRAVEIRO: Judge, I object. I don't think this necessarily has anything to do with her qualifications as an expert.

MS. RUE: Well, it --
THE COURT: Where are you going with this, counsel?
MS. RUE: Judge, just asking if DCP&P paid for any portion of her salary. She's paid directly by DCP&P or just solely by Saint Peter's.
THE COURT: Well, there's the question.
THE WITNESS: Yes. Solely by Saint Peter's.
BY MS. RUE:
Q Okay. And are all of the cases that you evaluate, are they are all from -- referred from DCP&P?
A No.
Q What percentage would you say?
A I would say 90.
Q Ninety percent?
A Yes.
Q Okay. So your two areas of expertise are general pediatrics; correct?
A Yes.
Q And child abuse pediatrics.
A Yes, ma'am.
Q You don't have any specific certifications in ophthalmology; correct?
A No.

Q You don't have any certifications in optometry.
A No.
Q In radiology?
A No.
Q You don't have any certifications in biomechanics; correct?
A No.
Q And you don't have any certification in neurology.
A No.
Q You've never practiced in those fields; correct?
A No.
Q Your entire practice has been in the general practice of pediatrics; right?
A And child abuse pediatrics.
Q And -- and the specific subsection of child abuse pediatrics.
A Both.
Q Right. That's what I'm saying. So, generally, the umbrella pediatrics; right? And then, under that, child abuse pediatrics.
A Yes.
Q Those are the two areas where you practice.

A Yes.
Q Meaning you've never practices as an ophthalmologist.
A No.
Q An optometrist.
A Correct.
Q You've never -- you've never gotten a Ph.D. in biomechanics; correct?
A No.
Q And, specifically, you've never had any degree in radiology or practiced in that field.
A Correct, ma'am.
Q And you've never practiced --
MS. CRAVEIRO: Judge, again, --
Q -- as a neurologist.
MS. CRAVEIRO: -- objection. At this point, I am offering her as an expert pediatrics and child abuse pediatrics. We're going -- veering left into cross-examination.
THE COURT: She's asking about certain fields that might be relevant here, since we're talking about head and eyes, and -- and neck and --
MS. CRAVEIRO: Okay.
THE COURT: -- I'm expecting to have either you ask a followup question to put it into perspective

or I'll ask it. Or maybe counsel will ask it. So that's why I'm allowing it. And I'm allowing it because I like to get as much information as possible. In the end, I may find out that this entire line of inquiry is completely irrelevant, but at least I want to give everybody a chance, --

MS. CRAVEIRO: Okay.

THE COURT: -- given what we're doing here, to ask the questions that are even somewhat in line. So, let me -- I understand. So I'm going to over -- no disrespect, I'm going to overrule your objection right now.

MS. CRAVEIRO: That's okay.

THE COURT: Counsel?

MS. RUE: Thank you, Your Honor.

BY MS. RUE:

Q So, and just to be clear, you've never practiced in the field of neurology.

A No.

Q And you have no qualific -- pardon me -- certifications in that field either.

A No.

MS. RUE: No further questions, Judge.

THE COURT: How are you with regards to the proffer of Dr. Medina as an expert in the field of

pediatrics and child abuse pediatrics, objecting or consent --

MS. RUE: We don't object to Dr. Medina testifying to specifically the area of child abuse pediatrics.

THE COURT: Well, now hold on.

MS. RUE: What the state is offering her.

THE COURT: She's being offered as an expert in the field of pediatrics and child abuse pediatrics. Do you oppose or do you consent?

MS. RUE: We consent to those fields.

THE COURT: Okay. Then Dr. Medina will be able to testify in those two fields as an expert.

MS. CRAVEIRO: Okay.

THE COURT: Offer her opinion, et cetera, et cetera. Okay?

DIRECT EXAMINATION BY MS. CRAVEIRO:

Q Dr. Medina, have you heard of the term abusive head trauma?

A Yes.

Q Okay. And what does that mean?

A The term is defined by the CDC as an inflicted injury of the skull or intracranial contents in an infant or a child under five years caused by violent shaking, blunt head impact or a combination of both.

Q Okay. And --
THE COURT: Hold on, Ms. Craveiro. One second.
(Judge off bench from 11:08 to 11:10 a.m.)
THE COURT: Sorry, Ms. Craveiro.
MS. CRAVEIRO: No problem.
BY MS. CRAVEIRO:
Q Okay. And now, doctor, you were explaining what abusive head trauma was. What can the findings of abusive head trauma include?
A Abusive head trauma can include injury to the skull, injury to the intracranial structures, which involve the brain, the vasculature inside the skull, causing hemorrhaging. It can involve injury to -- injury, as defined by bruises and contusions, injury to axons of -- and that nerve tissue. You can also have associated injury with the spinal cord, associated injury with the skeleton, the appendicular skeleton -- that's the spine, the ribs -- sometimes the extremities. You can also have bruising, specifically concerning when it's the face, the ears, the torso, the neck, or internal organ injury. All -- that's the spectrum of injuries associated with abusive head trauma.
Q Okay. And what presenting symptoms or

findings raises suspicion for abusive head trauma?
A So, presenting symptoms is what you can actually see and observe on a child. And that usually is more -- mostly common by altered mental status reflecting an insult going on inside the CNS, which is the central nervous system, or very less commonly -- I wouldn't say rarely, but less commonly -- external bruises or physical injuries that you can see, specifically to the skin, mucosa of the face, eyes, et cetera. Intracranial structures will also include the eye inside the globe, specifically the retina.
Q And who identifies a concern for abusive head trauma?
A So the initial concern is brought by how the child presents to the evaluator that see him -- sees the child first for medical care. The concern is raised either because what is -- what the child is expressing or demonstrating does not fit with the history that's being provided. Sometimes traumatic findings have no history of trauma associated with them. Sometimes the presenting finding, it's not developmentally possible in a child that age, given that age. So all of that, in conjunction, raises a flag for potential inflicted injury by the initial examining physician.

Q Okay. And when you say evaluator, you mean a physician? The initial person?
A An ER physician. It could be an outpatient doctor, a pediatrician in their office, who then sends the kids for further care. So the emergency room and the pediatrician's office, those are the main doctors that are involved in the initial identification.
Q Okay. And how is such a diagnosis made?
A So, to diagnose abusive head trauma, that entails a comprehensive evaluation of the medical history, so those -- that's the clinical information regarding what brought the child to the hospital and what has been the child's demeanor, behavior immediately prior to the presentation and prior to that as his usual health. So a comprehensive medical history, in that -- in that sense.

Then it also entails evaluation of the physical exam of what the child presents with. After that, it involves consultation with multiple subspecialties in the field of pediatrics and also trauma to conduct a comprehensive evaluation of other possible findings that might be coexisting with the external presentation, and evaluation of possible pathology or medical issues that might be contributing to the presentation and any other findings observed.

That usually involves consultation with geneticists in -- when bones are a concern or metabolic disorders, a hematologist, radiologist, ophthalmologist, which work in concert so that we can -- so that the child abuse pediatrician who reviews everything, his -- back history of the child, the medical history, the physical findings, the laboratory tests, the imaging studies, can put a picture together and determine the nature of the concerns.
Q So, at what point does the child abuse pediatrician get involved?
A Hopefully from the beginning, but sometimes it is delayed, because the children are being treated for something else and then the concerns arrive after other findings come up.
Q Okay. And I know we've been discussing abusive head trauma, but has this diagnosis been known by any other names?
A Yes. So, the field of abusive head trauma or the recognition of inflicted head injury in medicine is about 160 years. In terms of the published medical literature it started in the 18 -- in the middle of the 19th century with Tardieu, who is a French pathologist, identifying injuries in children that were believed to be associated with maltreatment by

care givers.
Following that, a few years -- about 80 years later, you have English neurosurgeon Guthkelch who identified subdurals in children without any external signs of trauma. Believed again strongly to be associated with physical abuse.
Finally, in 1960 we have Kempe, who is in the United States, coined the syndrome the battered child because of fractures and other injuries that were found in association with intracranial trauma.
In 1970s -- '74, '72 -- Caffey coined the term shaken baby syndrome, prior to that calling it parent-infant traumatic stress syndrome. But when he coined in 1974 shaken baby syndrome, that is what has been used to refer to inflicted trauma in infants caused by shaking-type injury.
Then in 2009 the American Academy of Pediatrics broadened the terminology to include all mechanism of injury, not just shaken alone, calling it abusive head trauma as the official terminology in a policy statement to include inflicted injury to the head caused by shaken impacts or a combination of both. Also crushing injury, which we don't see a lot of.
Since 2009, when we child abuse

pediatricians make a diagnosis of abusive head trauma, that is the term --
Q Okay.
A -- that we are using.
Q And the mechanisms of injury that are encompassed by abusive head trauma, are those the three that you just listed? Or four, rather?
A Those are the three major ones.
Q What other ones are there?
A You can throw a child. You can shake a child upside down by the legs. But we are talking about the main ones are shaking of the head, of the upper torso, impacts, direct impacts to the head, or a combination of shaking and impact events.
Q And so how long has this type of intentional head trauma been recognized by the medical professional community?
A So, 160 years.
Q Okay. And is abusive head trauma widely accepted within the medical community?
A Yes.
Q And has the validity of the diagnosis changed in that 160 years that it's been publicly recognized?
A No.

Q Has the change in terminology over those years affected its general acceptability within the medical community?
A Not within the medical community, but within other that oppose shaking as a mechanism, yes.
Q Okay. And so then abusive head trauma is also generally accepted within the medical community?
A Yes. So, it is accepted by all the pediatric subspecialties involving intracranial injury, which are general pediatrics, pediatric ophthalmology, pediatric neurology, pediatric neurosurgery, pediatric radiology, pediatric neuroradiology. And then, on top of that, you have the societies, both national and international, that have been involved in the validity of the established diagnosis of abusive head trauma as causing injuries to the intracranial structures. Those include the American Academy of Pediatrics, the American Academy of Ophthalmology, the American Academy of Pediatric Ophthalmology and Strabismus, the Royal College of Ophthalmology, the Royal College of Pediatrics and Child Health, the Norwegian, Japan and Swedish Pediatric Societies, the American and European Societies for Radiology and Neuroradiology, the Latin American Society for Pediatric Regulatory, the American Professional Society for the Abuse of

Children, the CDC, and the World Health Organization, to name a few.
Q And so all of these societies and these medical disciplines, they all support and find abusive head trauma as a valid diagnosis?
A Yes.
Q And has that validity changed in recent years?
A It has not changed in the medical community. It has been challenged in terms of the mechanism of shaking.
Q Okay. And what do you mean by that?
A So, abusive head trauma, as a medical diagnosis, is well accepted. We know that children can sustain intracranial injuries by care givers. The concept of whiplash injury or a shaking injury, back and forth movement, at least once violently, is the foundation of biomechanical studies. And that is where the threshold for injury of intracranial structures was established by the original study of Ommaya in 1968. That was conducted in primates. So that is what we know about shaking, and the established thresholds for intracranial injury comes from that study, which then everything else in biomechanics is based on those injury thresholds.

The controversy is focused on whether shaking, which has been established to cause injury in primates, can be cause -- can cause the forces needed to generate intracranial injury in infants. And that's where the controversy exists.

Q Okay. And you just mentioned an Ommaya article. Approaching with what's been previously marked for identification as S-3. Is this the article you were referring to?

A Yes.

Q Okay. And what is important about that article in this controversy?

A So, this article is the original study conducted by Ommaya and his team in adult monkeys where they subjected these monkeys to a single cycle whiplash event without an impact and found that that whiplash event caused concussion in addition to small bruises and subdural bleeds in these monkeys. This study established the injury thresholds for intracranial injury. From this study, Duhaime and Prange and others used those thresholds to determine where vigorous shaking of an infant can reach those thresholds to then produce intracranial trauma.

So the importance of this article is that these are the thresholds that are used in biomechanic

-- in all our biomechanic knowledge or literature which are derived from primates who have been shaken once.

Q All right. And when you say threshold -- injury thresholds, what do you mean by that?

A Are the forces required to generate concussion for a brain injury in a monkey, which has been scaled to adult humans, and from there attempted to be scaled to infants. So, injury threshold is whatever force is necessary to cause intracranial injury.

Q Okay. And you -- how did you come to learn about that study?

A Those are the -- one of the basic studies we are taught as child abuse pediatricians to come to understand the medical literature in all the different fields and presentations. So this is the study that triggers all the biomechanical studies as the minimum amount of force needed.

Q Okay. And when you say it triggers the other biomechanical studies, what are you referring to?

A So the biomechanical studies conducted afterwards use different animal models and also computerized models, what we call ADTs [sic], anthropomorphic dolls -- device -- testing devices, ADT -- ATDs, which are

basically dolls. Crash dummies that are used and subjected to shaking injuries and then they want to know if the values generated reach those established by the Ommaya study to cause injury.

Q Okay.

A That is how this study works.

Q Okay.

A This was the foundation for all of the other studies.

Q And are there any other studies that -- okay. So what -- strike that.

What is the contribution of biomechanics in the field of abusive head trauma? And child abuse pediatrician [sic].

A So, biomechanics will deal with animal studies and computerized models. Right? Specifically computerized models. When Duhaime did a study in 1987, she used a surrogate doll, a crash dummy, a simple version, in an attempt to shake that apparatus to see if shaking alone could reach the thresholds established by the Ommaya study.

What she found is that shaking alone did not generate enough forces, in terms of rotational forces, but shaking with an impact did. And her conclusions were that, at least in the most severe forms of

abusive head trauma, those causing near fatalities or fatalities, impact needed to take place, not just shaking.

That was actually, we would say, confirmed -- or similar studies by Prange, who in 2003 also used a different model, a different surrogate -- and the surrogates have been getting better, better, in terms of what they -- the accuracy of the model to imitate the biomechanics of the infants. So Prange's study used a wooden mass body type where he found that vigorous shaking produced forces similar to those involved in small falls, like short-distance falls, and higher distances where the ones required to reach those thresholds that would do intracranial injury. So, according to Duhaime and Prange, you couldn't reach the minimum established threshold with shaking alone.

But then Cory in 2016 had a different model which used a more biofidelic doll. Him [sic] and Jenny both, Carole Jenny, those two used biofidelic balls [sic], and by changing the pattern of shaking -- so, instead of shaking the doll in that A-B direction, forwards and back, they used shaking that allowed the head to move in different planes. Okay? In addition to that, they varied the biomechanics of the doll,

which allowed for chin-to-chest impact and occiput-to-back impact, and those studies actually surpassed the injury thresholds produced by the original Ommaya study.

So, from biomechanics we have discrepancy as to what causes the minimum established threshold, what type of forces can reach that, and that is because if you alter the biomechanics of the doll that is used or the shaking pattern, or the material that the doll is made out of, you can actually surpass the initial injury thresholds or not.

So, from a study by Shi in 2019, the review of the biomechanic literature, the conclusions were that the conclusions from the various studies are so diverse that you can't really come to a consensus. Why? Because scaling down of intracranial trauma for -- from primates to adult human brains have not been validated, from human brains to infant brains have not been validated, mostly from the ethical reasons and also because infant brains are significantly different than adult brains. So no one really knows the injury thresholds that are required to cause injury in terms of biomechanics.

The injury -- the brain of an infant has a different water content, neck muscles are weaker, the

-- there is no myelination of the brain. So there's a lot of factors that influence that and to date there is no model -- meaning crash dummies -- that can accurately simulate the infant brain. So we can only scale down and make assumptions. Which, in the literature, has been diverse. This is also emphasized as true by the one study of the opposing views, the SBU report, which was published in 2016 by Lynøe. And in that study the authors acknowledged that no conclusion can be drawn from biomechanical studies as to the minimal amount of force required to cause infants intracranial trauma.

Q Okay. Now, you mentioned a few different studies.

(Discussion among counsel, off the record.)

Q Okay. So I'm approaching with what's been previously marked for identification as S-4 through S-8. Can you take a look at these and let me know if those are the studies you were just referencing?

A Four is Carole Jenny.

Q Let me know if I missed any.

A Yes, they're all the --

Q These are all? Okay. And are those the articles that go into depth about what you were just saying about the biomechanics?

A Yes.
Q Okay. And now, given that there is some controversy regarding biomechanics, does that mean that shaking, as a mechanism of injury, is no longer widely accepted within the medical community?
A No, shaking continues to be accepted as a mechanism of injury of -- for intracranial trauma.
Q Okay. And do you know the term benign enlargement of subarachnoid space?
A Yes.
Q Okay. And what is that?
A So, benign enlargement of the subarachnoid space is --
Q And, I'm sorry. Before we get to that, the article -- the last article that you were referencing, I --
A The SBU report?
Q Yes, the SBU report. I believe it's S-8.
A Yes.
Q Okay. There are some highlights in that one; right?
A Highlights? Yes.
Q And are the highlights in there -- if you could just take a look and let us know which page numbers those highlights appear and to what they refer

to?
A Oh, I'm sorry. I'm trying to use this and (indiscernible).
THE COURT: Sure, yeah, no.
A All right. So the SBU report is the -- so, the first page of the SBU report, it presents -- it says:
"This report presents a comprehensive systematic review of the available scientific evidence, including economic, social and ethical impact analysis."
So, they are the ones who review the biomechanical studies as well, coming to that conclusion that no conclusion can be drawn from the biomechanical literature. It is helpful, but no final conclusion can be drawn with regards to infants and --
Q Okay. Now, where in that report does it state that no conclusion can be drawn?
A Under discussion, I'm going to find the page. 27. Okay. Page 28 of the SBU it states:
"An analysis of the biomechanical studies" --
And the SBU came out in 2016.
"An analysis of the biomechanical studies disclose contradictory results and no conclusions can be drawn as to the minimal forces capable of generating this injury in children."

Q Okay. Now, is there anything relevant -- anything else relevant about that report?
A So the first page, as I was saying before, says that the authors conducted a comprehensive systematic review of the medical literature regarding the triad. So the triad not only includes subdural hemorrhaging, which is an intracranial finding, also retinal hemorrhages and encephalopathy, which is the external presentation of intracranial trauma. But in their systematic review, comprehensive, they failed to include an ophthalmologist or a neuro-ophthalmologist in their team of evaluators for this evidence, even though retinal hemorrhages is one of the main findings that are disputed in this report.

This report also uses the criteria of only accepting medical literature that can be validated in terms of inflicted trauma in children. So the only things they would recognize is kids that have been inflicted by a video recording, videotape, or confessions. Of all the studies they reviewed, they only found two to be of moderate quality. Those two that were of moderate quality were confession studies by Vincent in 2010 and Adamsbaum in 2010.

And then, if you turn to their observations on page 27 again, it states on the second paragraph:

> "The studies by Adamsbaum and Vincent were deemed to be of moderate quality. Although both studies have methodological limitations, they support the hypothesis that isolated traumatic shaking can give rise to the triad."

Q Okay. And now I'm approaching with S-9 and S-10. Here you go. Okay. Approaching with S-9 and S-10. Can you tell us what those are?
A Okay. So, S -- I'm sorry. S-9 is the study of Adamsbaum that was used in the SBU report. And S-10 is the study by Vincent of confessed abuse versus witness accidents that was also used as the foundation for the SBU report.
Q And what are the importance of those two studies?
A So the importance of these two studies, as stated in the SBU report, is that they support that shaking an infant causes injuries, such as subdural bleeding, retinal hemorrhages, and neurologic signs or encephalopathy, that are most of the time associated and specific for inflicted head injury.
Q Okay.
A That's where they are most often seen. Not uniquely seen, but most often seen.
Q And again you were -- and now let's go to

the benign enlargement of the subarachnoid space, that term. What is that?
A So, benign enlargement of the subarachnoid spaces is a medical diagnosis that has been known for many years as putting children at increased risk for -- infants. Okay? Infants. This is in kids less than two years old. Putting kids at increased risk for subdural trauma, trauma to the bridging veins that come from the brain to the -- from the brain to the dura, or the sinus drainage. When the --
I'm going to explain it. I don't know if you want me to draw it. I can just explain it.
Q Okay. I have actually a drawing that's going to be S-11. And then I'm just going to use this.
Would a picture of that area help you explain it?
A It's easier to understand, yes.
Q Okay. And S-11. Do you see that? Is that -- would that picture help you explain what you're discussing?
A Yes.
Q Okay.
A So you can blow up this one.
Q So I'm going to project it onto the screen.

Instead of using the share screen, I'm just going to use video camera here.
MS. RUE: And, Judge, just for the record, S-11 is a copy of Dr. Mack's report?
MS. CRAVEIRO: Yes. It's just a picture from -- let's see if I can get -- okay.
(Extended pause)
BY MS. CRAVEIRO:
Q Okay. Now, if you could -- if you need to stand up to discuss it or just --
A Yes, I'm just --
THE WITNESS: Your Honor, I'm just going to put my mask on --
THE COURT: Yeah.
THE WITNESS: -- and go over there.
THE COURT: Absolutely. Yeah.
THE WITNESS: Okay.
(Extended pause)
THE WITNESS: So, essentially it's a diagram of the intracranial structures. So you have the brain and then the skull. And the brain sits in a space surrounded by membranes, three layers. The closest one is the dura. I mean the closest one is the pia. Right here. Tightly adhering to the brain.
BY MS. CRAVEIRO:

Q Okay. And when you're saying pia, that would be the dark green color on this picture?
A Yes.
Q Okay.
A Okay? You have the brain, you have surface of the brain, and there's a membrane there.
Q Okay. And just for clarification, the brain is on the bottom, the light brown, and the surface of the brain is the darker brown above that; correct?
A And the surface of the brain is the darker brown.
Q Yes. Okay.
A Yes. Okay? After that membrane, you have the arachnoid membrane, which is actually a space. That's a space in between the pia and the arachnoid. That is full of cerebrospinal fluid. This space is usually about 4 millimeters in infants.

Now, on -- in the condition known as benign enlargement of the subarachnoid spaces, you have a few millimeters increase in the space diameter caused by the fluid that exists there. So we can go from 4 millimeters to 7 millimeters, sometimes higher than that.

The bridging veins are veins that traverse the surface of the brain to the sinus. The dural sinus. Which goes sagittally in the head. So there

are about 50 or so bridging veins that are under tension when this space is increased by just a few millimeters.

So, when a child presents with this condition, we know through the medical literature that they can be -- it's not common, but it happens -- they can be predisposed to trauma, because those vessels are under tension or stress and movement of the brain within the intracranial cavity, because it is attached to the brain and the top layer, which is the dura, can actually tear with movement.

Benign external -- benign enlargement of the subarachnoid spaces is actually a well known medical diagnosis that is associated with trauma to bridging veins with minimal movement, and sometimes spontaneously they can break, which allows us to understand that infant brains can be injured easier by forces that cause movement of the brain within the intracranial cavity.

Q Okay.
A So that is where subdural bleeding would collect, because, as a point of attachment, you can have trauma and you can have blood surface there. That is the -- one of the most common diagnoses we see, subdural hemorrhages, in association with this condition, about

two to five percent of the time. It is not often. And it's called benign for the same reason that it doesn't cause any outward signs in the child.

Q Okay. And now just for the record, the bridging veins are the ones in blue connecting that kind of blue triangle to the base of the brain; correct?

A Yes. The venous sinus.

Q And then --

A Right here.

Q Yes. And then the green area is the subdural space and then --

A The green area is the subdural space, yes.

Q And then the dura is above that, that small little thin line; correct?

A Yes.

Q Okay.

A Which is adhering to the skull. So there is no separation.

Q Okay. And when you're assessing a child for whether or not they have abusive head trauma, is this one of the I guess diagnoses that you're going to be looking at, as to determine whether or not it is BESS or abusive head trauma? Benign enlargement --

A So the -- when -- okay. Should I go back? Okay?

THE COURT: Yeah, if --

MS. CRAVEIRO: If you don't --

THE COURT: -- if you -- yeah.

MS. CRAVEIRO: If you no longer need the picture, then sure.

THE WITNESS: Yes.

MS. CRAVEIRO: Okay. If you need the picture again, just let me know. I'm going to just shut off the video for now.

(Extended pause)

THE WITNESS: Okay. So, when a child comes in, for example, for an evaluation of an enlarged head and they get a CT or MRI of the head and subdural collections are identified in the context of enlarged subarachnoid spaces, the child will still get a full evaluation, trauma evaluation. When no other findings are present in the child, subdural bleeding alone, it does not -- in that context does not make a diagnosis of abusive head trauma. That is actually predisposing. The underlying condition predispose -- can predispose them to that finding. Again, it's not common, but does it occur? Yes, in about two to five percent of children.

BY MS. CRAVEIRO:

Q Okay. And in cases of abusive head trauma,

is -- do some of them have stretching and tension in the bridging veins causing them to rupture?
A So, the medical diagnosis of BESS validates that stretching of the bridging veins and tension can cause them to rupture. In any other context. So, with minor or spontaneous and with minor trauma and BESS, those injuries can break. In a shaking situation, the intracranial movement, by the same mechanism of stretching and tension, can also break.
Q Okay. So then the brain movement can cause them to rupture?
A Yes.
Q Okay. And is BESS also associated with an altered mental state?
A No.
Q Okay.
A Usually not.
Q Okay. So does that differentiate BESS -- and when I say BESS, I'm ob -- I mean the benign enlargement of the subarachnoid space; correct? That's the acronym for it?
A Yes.
Q Okay. Is -- does that differentiate BESS from abusive head trauma?
A It's -- it's the whole clinical picture.

Q Okay.
A You have to take the full -- and you -- you can never make a diagnosis of abusive head trauma based on a finding. So the child is healthy, has enlarged subarachnoid spaces, has a subdural [sic] of unknown etiology, we don't know how it happened, parents have no explanation, no history of trauma, that would not be considered an abusive head trauma situation.
Q Okay. And now you mentioned a triad of symptoms earlier. Can you just explain what that refers to?
A So the triad just means three. Three findings. In this case, the triad has been used by opponents of shaking as a mechanism of injury to say that the triad is what is used to make the diagnosis of abusive head trauma independently of anything else. Medical professionals, child abuse pediatricians, even before the case gets to us, the triad just flags a concern for abusive head trauma that further investigation, medical and social, has to occur to determine the nature of those findings.
Because the medical literature has evaluated findings in kids with inflicted injury and non-accidental trauma -- I mean and accidental trauma, meaning injury caused by car accidents, falls, et

cetera, and determined that those findings, when multiple exist in a single individual patient, are more specific -- again, the pattern, the type of findings -- are more specific for inflicted injury. And that is made after a thorough evaluation of the patient.

Q Okay. So what three symptoms is the triad referring to in abusive head trauma?

A Subdural hemorrhages, severe retinal hemorrhages and any neurological presentation, known as encephalopathy. Which can be unresponsiveness, apnea, seizures, altered mental status.

Q Okay. So what is a subdural hemorrhage?

A So, a subdural hemorrhage, again it's bleeding under the dural membrane. Blood collecting outside of the vasculature under the dural membrane.

Q In case you need the picture, it's back up.

A The dural membrane is tightly adhering to the skull. It's above the arachnoid layer. The bridging veins have to cross that space. When you have trauma in that area, you can have a collection. There is no subdural space, there is only a subarachnoid space. Subdural space does not exist. But it's a potential space that can be created when there's blood vessel damage, leakage of blood from blood vessels, and

collection of blood in that area. So that's what a subdural hematoma is -- or a subdural hemorrhage, most commonly the result of trauma, whether minor or significant.

Q Okay. And are there different types of subdural hemorrhages and hematomas?

A Different types, in terms of the cause, but not in terms of the location.

Q Okay.

A Subdural is unique to the subdural space.

Q Okay. And what can cause a subdural hemorrhage?

A Again, most of the time it is trauma. The most common kind of trauma is trauma from birth. About a third of the children -- about a quarter of the children who are born by vaginal delivery, Caesarean section, or assisted deliveries will have a subdural hemorrhage that usually resolves by a month after birth. A month -- four -- four to six weeks after birth. That is the most common subdurals.

Then we have subdurals associated with trauma, in terms of motor vehicle accidents, falls. Sometimes, again, like in BESS, we have subdurals that are incidentally found with no concerns for the well being of the child, in terms of physical presentation

of anything neurologically really wrong with the child, and those are in the context of benign enlargement of -- and -- and so those are the types that we see most commonly.

In terms of the how we see subdural hemorrhages in the different trauma presentations, most are associated with inflicted injury and less common with accidental injury.

Q Okay. And how are they associated with abusive head trauma, or are they?

A So, subdural hematomas on their own are not a diagnosis of abuse, but they can be found with other abnormalities, intracranially or in the body of the patient that is being evaluated. For example, they can be associated with retinal hemorrhages. And when we're talking about retinal hemorrhages, we have to describe them, because retinal hemorrhages can also be caused by disease, illness, accidental trauma, or inflicted injury. But the retinal hemorrhages that are observed in inflicted injury are very different with a very different pattern that only motor vehicle roll-overs or other certain medical conditions have been associated with it. Very few. But it can be caused by something else also.

Subdural -- when subdural hemorrhages are --

coexist or identified in a child that has retinal hemorrhages, severe, multi-layered, too numerous to count, that raises even more of a concern for abusive head trauma. And the medical literature has conducted probability studies where the specificity of findings have been given and established and consistently duplicated in several studies about the specificity of these findings with inflicted injury to an infant. Inflicted head injury to an infant.

Q Okay. And when you say inflicted head injury, what types of injuries are we speaking of?

A Again, direct impact to the head, shaking alone, or a combination of both. Crush injuries are more associated with severe retinal hemorrhages than other accidental injuries.

Q And when you say retinal hemorrhages, what is a retinal hemorrhage?

A So, retinal hemorrhage, blood vessels in the back of the eye. The back of the eyeball. Do you want me to continue? Yes?

MS. CRAVEIRO: Do you need a break, Judge?

THE COURT: No, I'm look -- I'm -- I'm in -- no, I'm attentive.

MS. CRAVEIRO: Oh, okay.

THE COURT: That's -- that's my attentive

look.
MS. CRAVEIRO: Okay. Just wanted to make sure.
THE COURT: All right.
THE WITNESS: Retinal hemorrhages -- I mean retinal blood vessels occupy the back of the eye, the retina and they -- they extend to the front of the eye. So, for example, in this courtroom, if this was the globe, the eye, that would be -- those doors would be the color of the eye, and these three walls would be the retina. So retinal vessels traverse the entire walls. And that's the best way to describe it.
The center of the room would be the vitreous, which is a jelly-like substance within the eye. The eyeball. That vitreous is attached to the macula, which is the back of the eye, and to the blood vessels that traverse the periphery of the back of the eye all the way to the front.
When shaking forces or -- they have to be rotational forces. The medical literature associates retinal hemorrhages with acceleration/deceleration rotational forces. Those are created by shaking and some posterior impacts to the head. The vitreous can pull against the retina causing rupture of the retinal vessels. Now that is the most common form of retinal

hemorrhages when it comes to trauma.
Retinal hemorrhages can also be caused by disease. For example, severe bleeding disorders, leukemia. Okay? Those would not be vitreoretinal traction theory -- that is disease, meningitis -- causing low platelets, bleeding, et cetera. You can see those in that context and they can be severe. But no other illness, no other disease condition, intracranial pressure, unless it's hyperacute intracranial pressure -- for example, from an aneurysm rupture -- will yield the pattern that we see with traumatic injury.
BY MS. CRAVEIRO:
Q Okay. And what pattern is that?
A Retinal hemorrhages in all three layers of the retina -- called preretinal, intraretinal and subretinal -- too numerous to count and extending -- and confined not just to back of the eye where the optic nerve comes in, the eye nerve, but also to the periphery, all the way to the front of the eyeball.
Q Okay.
A Those are the type of hemorrhages that have been strongly associated with a specific -- specificity of 96 percent in articles like Vincent, which I -- we already mentioned that study of 2010, and the medical

literature and the medical studies that have been conducted by pediatric ophthalmologists throughout the nation from 2000 to now. Specifically the Binenbaum studies and Alex Levin, Forbes study, Maguire studies.

Q Okay. And can intracranial pressure cause retinal hemorrhages?

A Yes, ma'am. However, the pattern is different. So, intracranial pressure usually leads to retinal bleeding that's intraretinal and confined around the optic nerve, what we call peripapillary, and they are not as numerous or they might be numerous, but they are confined to that location, which is known as the posterior pole.

And studies have been done, extensive studies have been done with intracranial pressure, looking at intracranial pressure in children not caused by trauma at all, just idiopathic hypertension of the eye intracranially, and then also Guillain-Barre in one case. None of those children had retinal hemorrhages of the type that has been described for abusive head trauma, vehicle rollovers, or aneurysm, hyperacute increases in intracranial pressure from a ruptured aneurysm.

Q Okay. So I'm approaching with what's been previously marked for identification as S-12 through

S-18. Oh, I'm sorry.

MS. RUE: Could we see those, Judge.

MS. CRAVEIRO: I know. I apologize.

(Discussion among counsel, off the record.)

BY MS. CRAVEIRO:

Q Okay. S-12 to S-18. Can you just take a look at those?

(Extended pause)

A Yes.

Q Okay. Do you recognize them?

A Yes.

Q Are those the studies you're referring to when we're talking about retinal hemorrhages and how they're associated with abusive head trauma?

A Yes.

Q Okay. Can we just I guess go through each one of them very briefly and tell us how they -- what's significant about them? And just tell us the title.

A Okay. So, in this study by Binenbaum in:

"Patterns of Retinal Hemorrhage Associated with Increased Intracranial Pressure ... The retinal hemorrhages are superficial intraretinal and located adjacent to the swollen optic disc nerve and this pattern does not match the

widespread pattern seen in abusive head trauma."
Q And -- okay. So --
A This is a study that's conducted specifically in children with intracranial pressure not from traumatic causes.
Q Okay. Got you. And that's S-12?
A S-13.
Q Okay. S-13.
MS. RUE: I'm sorry. What was the --
MS. CRAVEIRO: Baum [sic].
MS. RUE: -- I didn't get the exact title, because I think there's three studies by Binenbaum.
MS. CRAVEIRO: Oh. What was the title of that one?
THE WITNESS: This one? "Patterns of Retinal Hemorrhage Associated with Increased Intracranial Pressure in Children."
THE COURT: Who was the author of that, doctor?
THE WITNESS: Binenbaum.
THE COURT: So, just because I know somebody at some point is going to ask in the future, can you spell that name?
THE WITNESS: B-I-N-E-N-B-A-U-M.
MS. CRAVEIRO: Judge, at the end of this I

am also going to be asking that these be admitted.
THE COURT: No, that -- but at least --
MS. CRAVEIRO: Yes.
THE COURT: -- so if this ever has to be transcribed for an appeal, --
MS. CRAVEIRO: Yes.
THE COURT: -- at least the transcriber will know exactly how to spell these names.
MS. CRAVEIRO: Oh, got you. That -- thank you, Judge.
THE COURT: In case one of you decided to appeal this, whatever I come up with. All right.
BY MS. CRAVEIRO:
Q Go ahead.
A Do you --
Q Mm-hmm.
A "The Eye in Child Abuse: Key Points on Retinal Hemorrhages and Abusive Head Trauma" by Binenbaum and Forbes. This is from 2014 and it's marked S-12.
And this one goes through the overview of injuries that are most commonly seen in children in terms of eye ocular injuries. Emphasizes that external ocular findings as a presentation of a problem is rare, it's about five percent, but that retinal hemorrhages have been described in both

accidental and non-accidental trauma, as well as illness, disease. But the patterns are strictly different in each of these conditions.

There are the severity, it goes through the diagnostic value of the pattern when it comes to severe multilayer, too numerous to count, retinal hemorrhages and that that is most specific for inflicted trauma, taking everything into consideration, and less common in motor vehicle rollovers, although it is there, the same pattern, in intracranial pressure that's hyperacute, from a ruptured aneurysm, for example, and then crush injury to the head. That's in this article.

The prevalence of retinal hemorrhages in children -- critically ill children, by Agrawal in 2012 has looked at just the fundus, the retina, on children that present to intensive care units from illness and determined that in children with -- that severe multi-layer retinal hemorrhages were rare and observed in children with accidental fatal head injury, severe coagulopathy, severe sepsis, or a combination of these factors. So these are children that are just ill and these type of hemorrhages that you see in them from these diseases, they're rare, but it can happen, and that that's the context for the

presentation.

MS. RUE: I'm sorry, but what --

THE COURT: That was --

MS. RUE: -- state's exhibit?

THE COURT: That exhibit was marked what?

THE WITNESS: Oh, S-14.

THE COURT: All right.

THE WITNESS: An important article is the Binenbaum article again in 2013 that delineates the natural history of retinal hemorrhages in the pediatric population of head trauma. This is marked S-15.

Now, this article is -- is important, because retinal hemorrhages cannot be dated to when the -- when did they happen. However, the resolution of the hemorrhages has been extensively studied and that will give you an estimation of the time frame when something may have occurred. The conclusions of this study is that intraretinal hemorrhages clear pretty rapidly, within days to two weeks. So when you see intraretinal hemorrhages in an eye, you are talking about an insult within two weeks. Subretinal hemorrhages or preretinal hemorrhages, and even vitreous hemorrhages take longer to resolve. So when you have a child that presents with a concern and the

eye is looked at and you see subretinal hemorrhages only with no intraretinal hemorrhages, that might suggest an insult that is fewer -- I mean longer than two weeks ago, because the intraretinal hemorrhages would have resolved.

So this study is just valuable for time frames, not for specific dating, which cannot be done. And that was that one.

Okay. "Retinal Findings in Young children with Increased Intracranial Pressure from Non-Traumatic Causes." We have S-16. This is by Shi. It again reinforces that increased intracranial pressure, just alone, can present in children with a pattern of peripapillary, so around the optic nerve, superficial retinal hemorrhages in the presence of a swollen nerve in the eye called papilledema.

Their study supports the conclusion that retinal hemorrhages rarely occur in the absence of papilledema or that's a sign, a true sign of increased intracranial pressure, and do not present beyond the peripapillary area. So there are several studies that confirm the same thing.

BY MS. CRAVEIRO:

Q And what does that mean for abusive head trauma, as far as it relates to retinal hemorrhages?

A That means that in children who are brought in because of a, say an aneurysm, and you have a finding of bleeding in the head and you have severe retinal hemorrhages, you have the brain shift in the head, swollen brain edema. From an aneurysm, the rapid increase in intracranial pressure accounts for the retinal hemorrhages seen.

When you have a kid that's brought in with subdural bleeding, no other observable injuries by MRI or CT, the brain looks good, there's no swelling, there's no shift, there's no infarctions, and you see the eye or evaluation and you see this pattern of retinal hemorrhages, we know that there is, one, no intracranial pressure, because no swollen optic disc, no signs of intracranial pressure which we can know by a swollen fontanelle, neurological decompensation, and there's no evidence of brain swelling, you know that something else occurred to cause that pattern of retinal hemorrhage.

Again, full evaluation with subspecialty coagulation studies, et cetera, has to be performed before any diagnosis can be given. But these studies help us understand the context of what can be seen with what pathology, in terms of medical conditions, that could account for the presence of that finding in

a child.
Q Okay. And do you have any -- I believe you might have two more in front of you?
A The Morad study.
Q Is that S-17?
A That's 18.
Q Oh.
A I don't have 17. Oh, maybe I do. Hang on.
Okay. Well, this one is -- oh, I'm sorry. S-17, yes. I'm wrong. I'm sorry. I had two in my hand.
"Retinal Haemorrhage in Abusive Head Trauma." Again, another study looking at children who have been reported to suffer trauma. What kind of hemorrhage do you see? These studies just tell us that the side of the hemorrhaging in the head has no association with where the retinal hemorrhages can be found in the eyes. They can be -- the bleeding can be on the right and the retinal hemorrhages on the left. There was no consistency in terms of laterality for the retinal hemorrhages.
S-18 is a statement by the American Academy of Ophthalmology where it discusses what we have been talking about with regards to causes for retinal hemorrhages, the type, the location, the extent, where

can they be seen in relation to accidental trauma versus illness, versus inflicted injury, and it goes into the mechanism of how the retinal hemorrhages have been felt to occur, which is vitreoretinal traction, and this is the official statement by the American Academy of Ophthalmology in 2015.
Q Okay. And the official statement or position of the American Academy of Ophthalmology is what in relation to the validity of abusive head trauma as a diagnosis?
A That the presence of severe retinal hemorrhages of the pattern that has been described by me is specific to inflicted head injury when all else has been taken into consideration and ruled out.
Q Okay. So, I believe there was one more symptom in the triad that you discussed all the reports? I'm sorry. Strike that.
Did you discuss all of the reports you had in front of you? There was one more?
A Two more.
Q Oh, two more? Okay. Go ahead. I apologize.
A Just the study that we already mentioned --
Q Okay.
A -- by Vincent in 2010. He conducted -- he

conducted a study of the findings that can be found in inflicted head injury and accidental head injury by using only corroborated evidence of inflicted head injury, those are confessions, and trauma -- accidental injury had to be witnessed.

When he saw those kids, he identified 45 cases where there were confessions, 30 of whom were shaken alone, 15 of whom were shaken with impact, and 39 cases of accidental injuries of all sorts -- motor vehicle, in a car seat, falling from a high chair, falling out of the window, et cetera -- and they found that the prevalence of retinal hemorrhages in the inflicted group was over 85 percent and 17 percent where retinal hemorrhages were present in the accidental group. Again, the pattern different in both of these groups, being less numerous, confined to the posterior pole, and intraretinal in the accidental group and multi-layered, too numerous and confined -- and extending to the entire periphery in the inflicted trauma group.

Vincent went as far as calculating specificity for these values. In terms of subdural hemorrhages, he found that the positive predictive value was 68 percent. For retinal hemorrhages, severe retinal hemorrhages, the positive predictive value was

96 percent. And for the absence of external signs of trauma to the head, was 83 percent. And that taking all three into consideration, the specificity was 100 percent for inflicted head injury. Almost 100 percent. He put it as 100 percent. This is the study by Vincent in 2010.

Q And what S number is that on the back of that?

A S-10.

Q Okay.

A I don't know. You have it crossed out.

Q Yes, S-10.

A Finally, the study of Adamsbaum. "Abusive Head Trauma: Judicial Admissions Highlight Violent and Repetitive Shaking." The same type of injuries and retinal hemorrhages -- do you want me to continue?

Q Yes, go ahead.

A -- were observed in the confessed versus non-confessed, but this study specifically highlighted that in the confessed group shaking was described as violent in many case -- in -- in actually 100 percent of the cases -- they actually describe the confessions -- and also was repetitive in 55 percent of them. The reason for the shaking was because of it quiet down infant crying, and that was 62 percent of the cases.

Q Okay. And you mean -- when you say confessions, what do you mean?
A Perpetrator confessions. Of the cases that were studied, 45 had confessed to mishandling the infant, 30 shaken alone, and 15 shaken with an impact.
Q And what injuries were found in those children where there was confession to shaking?
A Again subdural hemorrhages, severe retinal hemorrhages, and absent signs of trauma to the head.
Q Okay. And I'm going to show you S-19. I believe this is the one I was about to show you. Can you just tell us what article -- what article that is and how it's relevant?
A This is another study, the third study for perpetrator confessions in 2004 conducted by Suzanne Starling. And this just again goes into the -- it shows that neurological decompensation or symptoms appeared immediately following an insult by the care givers when they shook -- shaking or impact of the child, they became symptomatic immediately 91 percent of the time. And in 9 percent of the cases, the symptoms surfaced about within 24 hours.
Q Okay. And when you say became symptomatic, symptomatic with what?
A Neurologically symptomatic. So that could be

irritability, lethargy, altered mental status, unresponsive, seizures, apnea -- which you stop breathing -- et cetera.
Q Okay. And is that -- are those a part of the third symptom of the triad that is --
A That is what the SBU calls the encephalopathy part where the encephalopathy just means the outward presentation or demonstration of something that has gone wrong intracranially.
Q Okay. And so you've mentioned a lot of different symptoms that -- or and that can occur with abusive head trauma. Does the presence of any one of those alone or in combination with others lead to the diagnosis of abusive head trauma on its own?
A No.
Q Why not?
A Because you cannot diagnose abusive head trauma based on abnorm -- physical abnormalities. You have to take into account the medical history of the child, the history provided by the care givers of what has been going on prior to presentation behaviorally and health wise with the child. You have to take into account the actual abnormalities that you see and then the physical -- the medical evaluation, which includes a review of whatever is going on and the

subspecialties evaluation to ensure that there is no -- an organic pathology that can account for the findings observed. So, only after a thorough review of all of those areas are those three abnormalities, which still remain unexplained, proven by the medical literature to be more specific for inflicted head injury.

Q Okay. So does the diagnosis of abusive head trauma require an elimination of other possible causes of the infant's symptoms?

A That's part of the comprehensive evaluation, yes.

Q Okay. And is the -- is this multidisciplinary process that you just described, is that consistent in the medical field of how abusive head trauma is diagnosed?

A Absolutely. And neurologists alone would not diagnose abusive head trauma, an ophthalmologist alone will not diagnose abusive head trauma. They can only say that it's very consistent with abusive head trauma, but only after a thorough evaluation of the medical history and everything else can you determine what -- what the nature is. And if it's abusive head trauma, that determination is usually performed by a child abuse pediatrician.

Q Okay. And is this process widely accepted within the medical community?

A Yes.

Q Okay. So, has abusive head trauma, as a diagnosis, been well-established in the medical community?

A Yes.

Q And is it reliable -- is such a diagnosis reliable if the practitioner follows this widely-accepted process of diagnosis?

A Yes.

Q Okay. All right. So, speaking particularly about this case and why you're here today, were you asked -- were you involved in a diagnosis of a -- of an infant named Darryl Nieves?

A Yes, but can we take, like, a second?

THE COURT: Who needs a break?

MS. CRAVEIRO: A break?

THE WITNESS: I need a break.

THE COURT: Anybody?

MS. CRAVEIRO: I'm -- I -- I -- yes.

THE COURT: Okay. Listen, folks. We'll -- we'll --

MS. CRAVEIRO: Lunchtime?

THE COURT: Let's take a -- let's take a -- no.

MS. CRAVEIRO: Oh, no? Okay.

THE COURT: Let's take a ten-minute break. Okay?
THE WITNESS: Thank you.
THE COURT: And then we'll come back -- or 15. Let's take a 15-minute break and then come back and continue, because we are going to break for the day at two.
MS. CRAVEIRO: Oh.
THE WITNESS: Oh.
MS. RUE: Oh.
THE COURT: Because I have somewhere to be of significance at two. Okay? Maybe 2:15.
So, nobody expected to get this done today; right? At least not Dr. Medina's testimony.
MS. RUE: We did, Judge. We -- that's why the day was originally --
MS. CRAVEIRO: Yes.
MS. RUE: -- blocked for it.
MS. CRAVEIRO: I thought we had the whole day.
MS. RUE: Yeah.
THE COURT: Well, I'll go to 2:15. So, ask your questions and let's see where we wind up.
MS. CRAVEIRO: Okay.
THE COURT: Okay?

MS. CRAVEIRO: And, Judge, I guess then before the break --
THE COURT: Because we are coming back on Tuesday.
MS. CRAVEIRO: It'll be Tuesday for her. Okay.
MS. RUE: Well, no. Tuesday --
THE COURT: No, no. It's going to --
MS. RUE: -- is Dr. Scheller.
THE COURT: It's Tuesday for the continue of this case.
MS. CRAVEIRO: Yes.
THE COURT: If --
MS. CRAVEIRO: Okay.
THE COURT: -- you don't finish with Dr. Medina, --
MS. CRAVEIRO: She's coming back on Tuesday.
THE COURT: -- she finishes Tuesday and then we jump to the next doctor.
MS. CRAVEIRO: Okay.
MS. RUE: Okay.
THE COURT: And then we jump --
MS. BIELAK: That might work.
THE COURT: -- to the next doctor after that.
MS. CRAVEIRO: Okay.

THE COURT: We're lining them up.
MS. CRAVEIRO: Just wanted to make sure --
MS. RUE: Right.
MS. BIELAK: That might work.
THE COURT: Like a firing squad, one after the other, bang, bang, --
MS. BIELAK: Do we --
THE COURT: -- get them done, --
MS. BIELAK: Will we --
THE COURT: -- in --
MS. BIELAK: Will we have the whole day on Tuesday? Because then that could work.
THE COURT: Well, to the extent that I have conferences in the morning, I guess I'm going to have to be here. I'm going to be here on Tuesday.
MS. BIELAK: Because we have a doctor traveling in on Tuesday. That's why.
THE COURT: Coming on Tuesday. All right. We're going to do it. Don't worry about it.
MS. BIELAK: All right.
THE COURT: I'm not going to -- I've got a doctor, I'm not letting him go.
MS. RUE: Okay.
THE COURT: Okay?
MS. RUE: I thought -- yeah.

THE COURT: So, I'll be here in the morning, and I'll be running through my conferences, and if nobody is ready, I am into this case.
MS. CRAVEIRO: Okay.
THE COURT: Or maybe I'll just do -- or maybe I'll just adjourn the conferences. I don't know.
MS. RUE: I -- I -- if we could do that, Judge, just because we have Dr. Scheller coming in on Tuesday and leaving, --
THE COURT: We are going to get Dr. Scheller in --
MS. RUE: Appreciate that.
THE COURT: -- and, listen. It depends on how well you organize your questions, how -- and how fast you ask them.
Now, I've just taken 15 minutes of our lives that we're never going to get -- five minutes of our lives we're never going to get back. So let's go take this break and come back. It's 12:26. Let's come back at 12:36 or earlier and we'll go --
MS. CRAVEIRO: That's fine.
THE COURT: -- jump right back into this.
MS. RUE: Thank you.
MS. BIELAK: Judge, also, I'm sorry. I have

Larnette Luckette here in the hall -- I think she's in the hallway. Did you want to do that or did you want me to adjourn it? Because she's going to plea. We could always do it virtually.

THE COURT: Oh, no. Emily?

MS. BIELAK: Or she was texting me --

THE COURT: No, no. You stay. Yeah, we're going to get that done.

Emily, I need you to call Vince, --

THE LAW CLERK: Yes.

THE COURT: -- and get Vince on his video so that we can do this.

Everybody else -- doctor, you're still under oath. Don't discuss your testimony with anyone as you sit outside. Just wait to come back in and we'll continue.

(Recess from 12:26 p.m. to 12:46 p.m.)

THE COURT: Emily, we're back. Right?

THE LAW CLERK: Yes, we're live. We're good.

MS. CRAVEIRO: Okay.

THE COURT: It's like big brother talking to you. All right. We'll be back on the record to -- in the matter of the Darryl Nieves case. I've got to introduce it.

MS. CRAVEIRO: Mm-hmm.

THE COURT: And continuing with the testimony of Dr. Medina being still on direct examination with the state.

MS. CRAVEIRO: Yes.

THE COURT: All right, state?

MS. CRAVEIRO: Yes.

CONTINUED DIRECT EXAMINATION BY MS. CRAVEIRO:

Q And, Dr. Medina, all of those documents and reports that you -- and studies that you discussed and that are exhibits in this case, how did you come into con -- how did you get those? How did you learn about them, I should say?

A Oh, they are part of our medical literature that we review --

Q Okay.

A -- on a yearly basis.

Q And you said in this case --

MS. CRAVEIRO: And this is going to be S-1.

MS. RUE: S-1.

MS. CRAVEIRO: The Judge has a copy. That's actually for --

MS. RUE: Got you.

BY MS. CRAVEIRO:

Q And you said in this case you were asked to conduct an evaluation of a patient by the name of

Darryl Nieves; correct?
A Yes.
Q And pursuant to that evaluation, you wrote a report; correct?
A Yes.
Q Okay. And I'm approaching with what's been previously marked for identification as S-1. Can you tell us what that is?
A It's my medical consultation on patient Darryl Nieves.
Q Okay. And is that a true and accurate copy of your consultation on Ms. -- on Mr. Nieves?
A Yes.
THE COURT: I'm sorry, what was that? S what?
MS. CRAVEIRO: S-1, Judge.
BY MS. CRAVEIRO:
Q Okay. And let's start at the beginning. What brought Darryl to the hospital?
A Darryl was brought to the hospital on the 10th of February 2017 because of an episode of unresponsiveness at home while under the care of his parents.
Q Okay. And how old was Darryl at the time?
A Eleven months.

Q And did the care givers have any explanation as to how his unresponsiveness occurred?
A The parents reported to medical staff that the patient was being changed, a diaper, and all of a sudden went limp. Dad brought him immediately up to mom and mom and dad contacted 9-1-1. He was having seizure -- what appeared to be a seizure-like episode and he was brought to the hospital.
Q Okay. And how did you become involved in the case?
A I became involved in 2000 -- in -- on February 15th, five days after Darryl was admitted to the hospital. During the evaluation of what was felt to be seizures, both mom and dad reported that he had had three similar episodes for the two weeks prior to coming to the hospital where he had some limpness and he was being evaluated by neurology at the hospital.
When a CT scan was performed, they found the subdural hemorrhages, subacute and chronic subdural hemorrhages. Of course that raised concern, because seizures are usually not associated with or not a cause for subdural hemorrhages, even though subdural hemorrhages can give you seizures.
The patient had an evaluation started looking for any other potential abnormalities. He had

an ophthalmological exam that revealed severe multi-layered retinal hemorrhages on both eyes, and that is where DCP&P was contacted, and that is where medical staff and DCP&P contacted our center to -- in order to assist in the evaluation of this case.

Q Okay. So DCP&P was contacted by who?

A The hospital.

Q Okay. And then you were contacted by who?

A By the hospital and DCP&P.

Q Okay. And what recommendations -- what were your recommendations regarding the evaluations of these concerns?

A So, once the subdural and the retinal bleeding was identified, I reported to the treating medical team, once I met with the parents and evaluated the patient, that the child needed to have a comprehensive metabolic evaluation looking for a metabolic condition that potentially could be associated with subdural bleeding and retinal hemorrhages. That would be conducted by a geneticist. In addition, because of the bleeding abnormalities, the child required a full hematological consultation to ensure that he didn't have any underlying coagulation issues that could facilitate or account for the findings of retinal bleeding and subdural blood in this case.

So that is where the initial evaluation began. He did have some subsequent studies, blood work, over the ensuing couple of months and followups that also helped reinforce the nature of his finding.

Q Okay. And what were the findings of the subspecialties that were involved?

A So, he was diagnosed by neuroradiology with subdural bleeds. He also had some areas of atrophy on his brain. He was diagnosed by a pediatric ophthalmology -- ophthalmologist with severe retinal hemorrhages they documented, consistent with inflicted head injury.

He was evaluated by neurosurgery and neurology in terms of video EEG, because the concern was seizure-like activity coming into the hospital. No seizure was recorded on video EEG. That's a video encephalogram which records electrical activity of the brain. There was some slowing, but no clinical indications of seizures. During the three weeks that he was hospitalized, the neuroradiology, the treating staff, the floor staff did not observe any seizures during diaper changes or during the day at all for Darryl.

Q Okay. And when you say atrophy, what do you mean by atrophy?

A Some volume loss of the brain.
Q I'm sorry, I --
A Some volume --
Q Volume loss. Okay. And what did you do after obtaining these findings from the subspecialists?
A The child again was being worked up for trauma because of the findings of the retinal hemorrhages and the context of the altered mental status, which the parents have described occurred over a period from February 3rd through February 10th. Parents had described, when I met with them, three episodes where dad was the primary care giver for the child.

The first episode on February 10th [sic], again during a diaper change the child became unresponsive. Dad blew in his mouth, contacted mom, because that he was not himself. By the time EMS got there, the child was better. Improved. The child was immediately taken to the pediatrician because of that incident. The pediatrician felt maybe it was because of reflux. The child could have had that episode maybe because acid came up or choked.

He was on reflux precautions for the rest of those two weeks, meaning elevation of the head to keep him straight up, to avoid vomiting. The parents

reported that he was a little bit more irritable and cranky during those days and vomiting maybe more than reflux, just like twice a day. It was being monitored by the pediatrician.

On February 8th, I believe Darryl was also having a diaper change and went limp. This time the episodes resolved after a blow-by, which is oxygen, was administered to his face, nose.

And finally, on February 10th, that's when the third episode happened. Really suggestive of seizure-like activity. He had stiffening that mom saw with limpness. And she described that to the medical team treating him. He was admitted under -- to rule out a seizure event, and that is why five days later we were contacted.

So it's an acute episode over two weeks with the findings that we encounter. Again, the retinal hemorrhages being intraretinal, subretinal and preretinal. And as I stated before, the intraretinal hemorrhages account for that two-week period of time, because after that they usually resolved.

He did have followup ophthalmological studies with a retinal specialist at the Will Center [sic], which is one of the best centers. No new retinal hemorrhages were seen, just residual retinal

hemorrhages from his previous finding, and also there was a concern for a possible mass in the eye, but that was ruled out, and the pediatrician -- the retinal specialist wrote in the documentation, you know, rule out shaken baby, but that is why this child went there, too, has been part of the work-up for abusive head trauma.

Q Okay. And what else did you do in order -- did you reach a diagnosis in this case of --

A So, prior --

Q -- Darryl Nieves?

A -- to reaching the diagnosis, I had to review his medical records. Darryl has a very complicated birth history. He was born extreme premature. And when you're born extreme premature, many things can happen. Right? His birth records at -- he was hospitalized for the first six to seven months of his life. He -- I reviewed the -- not only the birth records, but the records from Saint Peter's and the records from the admission to CHOP.

He had some cardiac issues. Specifically, some openings in his heart, a patent ductus arteriosus, a VSD. That was surgically repaired, both of them. One in May, one in July. And after having those procedures, at the -- in Pennsylvania,

Children's Hospital of Philadelphia, he was returned to the -- to Saint Peter's.

Reviewing those records is very important, because mom had very good concerns about Darryl being administered some anticoagulant medication during his stay at CHOP that could have contributed to the bleeding observed. The records were reviewed and his -- I didn't find any of the medications listed in the medical record. None of them contained anticoagulants, but he was discharged in October on some heart medicines, mostly diuretics and no anticoagulant medication.

So, if Darryl was on anticoagulant medication at the time of his presentation, that is definitely a contributory factor for bleeding of the brain, so that's very important. But he wasn't on any of those type of medications and the records did not show that he had had those when he was there, at least not the records that I reviewed.

Q Okay.

A After that, I also reviewed or attempted to review his pediatric records, but I wasn't able to get those. That was important, because of his head circumference. Darryl had two very important areas that were examined throughout his neonatal course.

That's his birth. From birth through seven months. One is his head. He had three neurosonograms.

Now, neurosonograms are not as sensitive as an MRI, but neurosonograms is what is used in infants with an open fontanelle to look at the intracranial cavity. At one week, at two months, at -- at two weeks, at one month, and at three months of age at Saint Peter's he had neurosonograms that did not reveal any subdural hemorrhage. As I mentioned before, kids can be born with that. He didn't have any subdural hemorrhage identified. Subarachnoid spaces looked normal. The brain structure looked normal.

That's really important, because now he's presenting with subdural blood. However, in Darryl's case, there's other factors that you have to be taking into consideration with the head, specifically that volume loss which can also predispose him to having subdural collections. That is important and that is why head circumference tracking is important.

His head was growing pretty well up to the CHOP admission. He had been tracking along 25th percentile, but really 10 to 50 percentile on corrective age. For premature babies, those curves are more accurate. When he was --

Q I have another bottle of water if you need that.

A I have a little bit.

Q No?

A I'm good. I'm good. When he was at CHOP his head circumference measured between the 25 and 50, nearly 50 percent. And having head circumferences from the pediatrician would have helped to confirm whether that was an accurate reading or whether -- or how his -- his head circumference was tracking. If you have blood in your head, that it's been there, the head can tend to enlarge. If you have other abnormalities in your brain, like a mass, the head can enlarge. So tracking the head circumference from the pediatrician -- because the parents had taken him for routine pediatric care multiple times. He was seen by the doctors for his conditions. That would have been helpful to determine anything that could have been going on with his head.

But the ultrasound that was conducted at CHOP was also reported as normal. However, we can't really say much about the head circumference, because we didn't have the data from the pediatrician, only to say that when he presented to Saint Peter's his head circumference corrected was between the 50 and 75th

percent, which is a change --
Q Okay.
A -- for this child that could be explained by the subdural blood.
Q Okay. Just to get the time line down. When was Darryl born?
A March 2007 -- wait. '16.
Q If you need to refer to your report --
A March 2016.
Q -- feel free to. Okay.
A March 2016.
Q And you said -- you mentioned that he was born premature?
A Yes.
Q Okay. How many week --
A Extreme premature.
Q Okay.
A Twenty-five weeks.
Q Okay. And where was he born?
A At Saint Peter's.
Q And he -- how long did he stay in Saint Peter's?
A Until May. And then he was transferred to CHOP for the first cardiac surgery.
Q Okay. And where did he go after the

surgery?
A Back to Saint Peter's.
Q Okay. And then when was his next cardiac surgery?
A In July.
Q Okay. And did he stay in Saint Peter's until that time?
A No, he stayed at CHOP until October and then came back from [sic] Saint Peter's for about a week and then was discharged home.
Q Okay. And so the records that you reviewed from Saint Peter's and CHOP, they're from March 2016 until October 2016?
A Also the birth records. Yeah. I mean yes. The answer is yes.
Q Okay. And when you said you were looking for anticoagulants, that was in those -- the records from that time frame?
A Records from CHOP. Because mom stated that he may have received anticoagulant medication at CHOP.
Q Okay. And so that would have been for the May and July visits there?
A Correct.
Q Okay. And you mentioned that children normally get their head circumference mention --

measured at two weeks -- or, I'm sorry. Darryl Nieves got his head circumference measured at two weeks, one month and three months?
A He had several head circumference measurements throughout this stay --
Q Mm-hmm.
A -- at Saint Peter's, as routine, but had neurosonograms done at two weeks, -- that's an imaging study of the head -- at --
Q Got it.
A -- one month and at three months.
Q Okay.
A Also at CHOP at six months.
Q Okay. And you mentioned that Darryl had an open fontanelle. Can you just explain what that means?
A The open fontanelle is the soft spot on the babies. That's how they do the neurosonograms. They put the machine, the probe, and then they can see the brain structures.
Q Okay. And what did you find regarding Darryl's head circumference?
A So the head circumference, again, was steady. It jumped at CHOP and it jumped when he came, but we -- I can't determine any conclusive evidence for that,

because I don't have pediatric records. Just to say that from when he was at the hospital to his time of presentation, it was larger, but I don't know if it was larger when he left the hospital and saw the pediatrician.
Q Okay. And when you say left the hospital, you mean in October?
A Yes.
Q Okay. So, what dates do you have his head circumference for?
A (Indiscernible)
Q Months.
A That's it.
Q What months? Just so that we're all clear.
A So, I'm looking in my report to --
(Extended pause)
A October 2, 2016 was the last one that we have before presentation to the hospital.
Q Okay. So before February?
A Yes.
Q Okay. And what page is that, just so that we're clear for the record?
A (Indiscernible)
Q Page 5. Okay. And what, if anything, did you learn about Darryl's eyes from his birth records

and the CHOP records, as well?
A So, Darryl had retinopathy at prematurity. That's abnormally growing blood vessels in the back of his eye. That is a normal routine screening that is done on premature babies. And his -- he had mild retinopathy. He was again reevaluated at six months of age at CHOP and he was found to have healthy mature -- mature retinas without any abnormalities. So no abnormal retinal findings, no hemorrhages, the back of his retina was healthy, as expected.
Q And what, if anything, did you find about any altered mental states from birth to October in those medical records?
A So, he was a pretty healthy baby. There were usually no concerns, in terms of seizure-like activity until these events in February. He did have a screening at -- at the -- while in the hospital looking for abnormalities on EEG, did not reveal any clinical evidence of his seizure disorder, he was never on any seizure medicine until he came with these three days of seizures, different dates, and -- and that was the only relevant finding, in term of his altered mental status. His irritability, vomiting, not himself, was over that two-week period. He did not have that the three weeks that he was at the

hospital.
Q Okay. And when you say two-week period, what two-week period are you referencing?
A February 3rd through February 10th.
Q Okay. And the three-week period would be thereafter?
A The three-week period was in the hospital.
Q Okay.
A From February 10th through March when he was discharged.
Q Okay. And did you learn anything else of relevance from his birth records?
A No. Just, like I said, his brain was healthy and his eyes were healthy. So he did not have any retinal hemorrhages before presentation or subdural collections that were identified before coming.
Q Okay. And during those three weeks that he stayed at the hospital after February 10th, did you have a chance to examine Darryl Nieves yourself?
A Yes, on February 17th.
Q Okay. And what, if anything, did you find of value?
A He was developmentally delayed, as expected for a preemie. It's just really a measure of how he was 15 weeks premature. So, even though he was 11 months

old, he was at the developmental stage of a three- to four-month old. Where they are starting to roll over, but they can't really do much else. He was babbling, smiling, but had really not good head control, a decreased tone for the -- for the expected age, but that is not unusual when it comes to extreme prematurity.

Q Okay. And when did you speak to the parents?

A On February 17th.

Q Okay. And what, if anything, did you learn about any accidents that may have happened?

A The parents denied any history of accidental trauma.

Q Okay. And during that three-week period, what, if any, other further studies did Darryl Nieves have?

A After he was discharged from the hospital, he did have follow up with hematology, he had follow up with genetics, he had follow up with the retinal specialist. There was no metabolic disorder that was identified impacting Darryl physical findings. Hematology denied that he had any evidence on laboratory examination of a bleeding disorder contributing to his bleeds, and the retinal specialist

again saw residual retinal hemorrhages and was concerned for shaken baby syndrome. No abnormalities of the retina were identified.

Q Okay. And who recommended those follow ups?

A The treating -- well, so the initial introduction of those specialties was myself. However, the specialists determined the timing of follow up and so those appointments were given by each individual subspecialty.

Q Okay. And what was your ultimate diagnosis of Darryl Nieves?

A So my diagnosis, again, was made in April, at the end of April 2016 [sic], after review of all of this follow up. Given that Darryl presented to the hospital with altered mental status, subdural hemorrhages, and retinal hemorrhages in the pattern that is severe and usually associated with very specific circumstances -- in this case, none of those other circumstances were present. He did not have any evidence of hyperacute increase in intracranial pressure or an aneurysm that could result in that.

Again, subdural bleeding he could have because of other underlying conditions, but that along with retinal hemorrhages and his sudden altered mental status during diaper changes only and irritability

over that two-week period, more specific for an inflicted injury, such as abusive head trauma through shaking.
Q Okay. So what you just discussed, is that what led you to your diagnosis?
A Diagnosis was made after all of those reviews of subspecialty diagnosis. The fact that there was no explanation for his presentation in terms of other potential accidental trauma, and the presence of these specific findings that were not accounted for by a metabolic disorder or an accident.
Q Okay. So did you rule out any -- every other possible explanation?
A Everything else was ruled out by the treating providers.
Q Okay. And the fact that you didn't have his head circumference measurements between October and February, does that change your diagnosis in any way?
A So, head circumference can enlarge with subdural collections. Not all the time. It would have helped to see if the measure in -- at Pennsylvania was accurate. But in terms of the findings, no, --
Q Okay.
A -- it wouldn't have changed the findings.
Q And is your diagnosis within a reasonable

degree of medical certainty?
A Yes, ma'am.
MS. CRAVEIRO: Okay. I have no further questions.
MS. RUE: Thank you, Your Honor. Pardon me.
CROSS-EXAMINATION BY MS. RUE:
Q Good afternoon, Dr. Medina.
A Good morning.
Q Now, you just testified -- you described -- I'm going to call him DJ, because, as you know, Darryl Nieves is also the father. Correct?
A Oh, yes.
Q So just for clarity sake, DJ, if that's okay with you, since they're both Darryl Nieves.
A Yes, ma'am.
Q Okay. So you just described DJ as a pretty healthy baby; correct? You just testified to that.
A Yes.
Q But you also testified he was born at 25 weeks.
A Yes.
Q And obviously normal full-term birth is at 40 weeks.
A Yes.
Q And in your report you note that DJ was

born, he was .6 kilograms.
A Yes.
Q That's a little over one pound.
A Yes.
Q And as you already testified, that's considered extreme prematurity.
A Absolutely.
Q Now, on the night of February 10, 2017, one of DJ's parents called 9-1-1; correct?
A Yes.
Q They were the ones who also had called 9-1-1 ten days prior.
A Yes.
Q And they both went to the hospital.
A Yes.
Q Meaning both of DJ's parents were at the hospital.
A I'm not sure ten days prior. I wasn't there.
Q When you went to speak about a week after DJ was admitted, they were both there at that point.
A Yes, absolutely.
Q And the hospital staff got DCP&P involved.
A Yes.
Q And that was when there were no further seizures seen on the EEG.

A No.
Q No that's not correct?
A Right.
Q Well, they saw no further seizures; correct?
A Right.
Q They did further -- well, like, strike that. They looked at the EEGs and saw that there were subdural hemorrhages.
A Yes.
Q That was after there was no further seizure activity when they were conducting the EEGs.
A So, the EEG does not look for subdural bleeds.
Q Okay. So first they did EEGs.
A Yes.
Q There was no further seizure activity.
A Yes.
Q They then did a scan.
A Yes.
Q And they saw subdural hemorrhages.
A Correct.
Q And at that point they involved DCP&P.
A I'm not sure if it was ay that point or when the retinal hemorrhages were identified.
Q Okay. Now, they didn't see any further seizure-like activity on the EEG, but there -- when DJ

was admitted to the ER there was some seizure-like activity in the ER itself.
A Yes. Yes.
Q He had seizure-like activity and he vomited.
A Yes.
Q Now, Dr. Medina, it's fair to say that determining the cause of an illness is important.
A Yes.
Q It's crucial.
A Yes.
Q And that's for a number of different reasons.
A Yes.
Q If you get a diagnosis wrong as a doctor, a condition could get worse.
A Yes.
Q And treatment for an incorrect diagnosis could also cause damage.
A Yes.
Q And what I mean by that is, like, if you prescribe medication that was for the wrong illness, that could make a child ill.
A Yes.
Q Or not prescribing the right course of treatment could exacerbate a problem.

A Yes.
Q Because it still wasn't being treated.
A Yes.
Q And obviously there are other reasons to get a diagnosis correct.
A Yes.
Q And specifically when it comes to child abuse.
A Yes.
Q Because you know that the findings you make have a lot of consequences to them.
A Yes, ma'am.
Q And that means a child could be removed from his or her parents' care?
A Yes.
Q It means that a child could be removed and placed into foster care.
A Yes.
Q Or with a different family member.
A Yes.
Q You're aware that a parent wouldn't be able to see his or her child.
A Yes.
Q A parent could be charged criminally.
A Yes.

Q Facing time in prison.
A Yes.
Q And based on these -- based on the findings you make, you're aware that -- or pardon me. Based on the findings you made regarding whether you believe abuse occurred leads to these outcomes.
A Yes, ma'am.
MS. BIELAK: Danica, she needs to speak up. It's getting too low. She needs to speak up.
MS. RUE: Okay. I'm sorry. My co-counsel is telling me it's getting hard to hear you, so if you wouldn't --
THE WITNESS: Oh, okay.
MS. RUE: -- mind speaking up a little bit?
THE WITNESS: Yes.
BY MS. RUE:
Q Okay. Now, you work as a child abuse pediatrician, as we've talked about extensively; right?
A Yes.
Q And the name of the center where you work at Saint Peter's Hospital is Dorothy Hersh Regional Child Protection Center.
A Yes.
Q And the request came to that center on

February 15th of 2017.
A Yes, ma'am.
Q From DCP&P.
A Yes.
Q They requested your assistance.
A Yes.
Q To determine whether DJ had been the victim of abuse or neglect.
A Yes.
Q Based on his clinical presentation.
A Yes.
Q Now, I don't know if you have your C.V. up there or just your report.
MS. CRAVEIRO: Should have her C.V. I can give her another copy.
A Yeah, I have a C.V.
Q Okay. Great. And that's I believe S-2?
MS. CRAVEIRO: Mm-hmm.
Q Now, you list on your C.V. that you look for the nature of physical findings.
A In my C.V.?
Q Yes. With -- it's the first bullet point on page 1. You look for the nature of physical findings.
A Uh-huh.
Q And by that you mean the cause of certain

findings?
A Yes.
Q Finding --
A The nature. Whether they are medically, developmentally trauma-type related.
Q What causes them. Sorry if I --
A Yes.
Q Okay. Excuse me one moment.
(Extended pause)
Q And by finding, you're referring to injuries; correct?
A Not all the time. Physical injuries, yes, but other findings also.
Q Symptoms?
A Yes, symptoms and other findings that not necessarily have to be injury in the head.
Q So symptoms would be another example? Or illnesses?
A Just other abnormalities of the brain. Abnormalities of the bone that can be associated with metabolic conditions, et cetera.
Q Okay. Something that causes concern from another physician; correct?
A Something that causes concern for disease.
Q Pardon me?

A For disease.
Q For disease.
A Yes.
Q Right, but that's from findings from other physicians; correct?
A It depends on who is finding them, yeah.
Q Right. So what I'm saying is, you don't -- you aren't the treating physician.
A No.
Q And you've described on direct examination that you become involved after oftentimes other pediatricians --
A Yes.
Q -- or emergency room physicians make findings.
A Yes.
Q That's when you become involved in these cases.
A Correct.
Q And you come in to consider why a child may exhibit certain symptoms; correct?
A Correct.
Q Or injuries.
A Yes.
Q Or bone -- broken bones, thing -- fractures,

things like that?
A Yes.
Q And to determine the nature of the physical finding, you need to consider all of the potential causes.
A Yes.
Q Of every plausible cause for why a child may present certain injuries.
A Yes.
Q And you not only consider them, but you apply them to the circumstance; correct?
A Correct.
Q So it's not just thinking about it, it's actually do the work, go through all of the records to see whether those would be applicable.
A Correct.
Q And to rule out every other possible cause to come to your conclusion.
A Yes.
Q So, on your report on page 1 you list under intake information that DCP&P requested your assistance. Right?
A Yes.
Q And they asked you to determine the nature of DJ's injuries.

A Yes. To help determine the nature of --
Q Right, but that --
A -- his injuries.
Q -- had been done already; correct?
A No. Everything was identified and then the work-up starts.
Q Right, but and when I -- when I'm saying that I mean the nature of his injuries, meaning subdural hematomas had already been found.
A So that's not nature, that's identifying the lesion.
Q Identifying the lesion?
A The abnormality.
Q Right. So they found the injury, meaning the subdural hematoma.
A Correct.
Q The neuroradiologist found that.
A Yes.
Q And the ophthalmologist had already seen DJ.
A No. After the subdural hematomas --
Q Correct. I mean, before --
A -- (indiscernible) --
Q -- you're involved. Sorry I'm not being clear. So first the neuroradiologist finds a subdural hematoma.

A Yes.
Q Then DJ was referred to an ophthalmologist.
A Correct.
Q And that's -- that ophthalmologist determined that DJ had retinal hemorrhages.
A Yes, ma'am.
Q Then you became involved.
A Yes, ma'am.
Q And so when I say that the cause -- or, pardon me -- the nature of the injuries had already been determined, I mean those two injuries had already been found.
A Yes.
Q By other doctors.
A Yes.
Q Along with the seizure-like activity which had been reported by both the parents, as well as within the ER DJ exhibited seizure-like activity.
A Yes, ma'am.
Q All of those things happened prior to your involvement.
A Yes.
Q You were brought in to look for abuse.
A No. I was brought in to ensure the comprehensive evaluation of the case.

Q Well, you were brought in for a suspicion of abuse.
A For a suspicion of abuse. Correct.
Q That's why DCP&P calls you.
A Correct.
Q To see if there was abuse.
A Correct.
Q And again, you describe your duties as a child abuse pediatrician to conduct evaluations where there is a concern.
A Correct.
Q So meaning there's already a concern of abuse. That's when you arrive.
A Correct.
Q And that can be concern about maltreatment.
A Yes.
Q Right? Physical abuse.
A Yes.
Q Sexual abuse.
A Yes.
Q Neglect.
A Yes.
Q And so the purpose for you coming in is to diagnose.
A Yes.

Q Whether that's the -- whether any of those circumstances are the case.
A Yes.
Q Now, in medicine there are obviously a number of tests that can be performed; correct?
A Yes.
Q So an eye exam determines someone's vision.
A Yes.
Q A hearing test determines whether someone might have hearing loss.
A Yes.
Q An MRI looks for soft-tissue damage.
A Yes.
Q There is no test to determine whether abuse has occurred.
A No, I --
Q There's no specific diagnose -- pardon me -- no specific diagnostic criteria to define what abusive head trauma is.
A No.
Q There are symptoms a child may exhibit when you are looking for to see whether to diagnose abusive head trauma.
A Yes.
Q Now you testified that DJ had subdural

hematomas, as we know; correct?
A Yes.
Q And you've testified that those can exist for a number of different reasons.
A Yes, ma'am.
Q One of them is abuse.
A Yes.
Q But there are others.
A Many others.
Q Many others. Infection?
A Yes, meningitis.
Q Meningitis. Several different diseases can result in this, I believe you said.
A Trauma is the most common, but diseases can be associated with it.
Q Diseases can be associated with it. And I believe you said lymphoma? Leukemia.
A Leukemia, --
Q And --
A -- retinal hemorrhages, yes.
Q And coagulation abnormalities could --
A Yes, ma'am.
Q -- result in those? Right? As well as what we've discussed as BESS or benign enlargement or expansion of the subarachnoid --

A Correct.
Q -- spaces.
A Yes.
Q And when you looked at -- or, pardon me. Strike that. DJ also, as we know, had subdural hema -- or retinal hemorrhages.
A Yes, ma'am.
Q Right. Those can also come from a number of different -- there can be a number of different causes for them.
A For his pattern, few causes, but yes.
Q There can be -- well, just for retinal hemorrhages generally, there can be a number of different causes.
A Oh, many causes.
Q Right. Vomiting. A lot of coughing.
A Vomiting. Coughing has not been associated with retinal hemorrhages, but could it? Rarely, yes.
Q Right. Intracranial pressure can cause retinal hemorrhages.
A Yes.
Q And as we know, DJ was referred to the ophthalmologist after his subdural hematomas were found.
A Yes.

Q And the ophthalmologist looked for the retinal hemorrhages because of the subdural hematomas.
A Correct.
Q So the retinal hemorrhages were not found first.
A No.
Q Which is often the case with abusive head trauma cases. Right?
A That the retinal hemorrhages are not found first?
Q Correct.
A That is correct.
Q Meaning the subdural hematomas are found.
A (Non-verbal response.)
Q Right? Oh, so you're nodding your head yes.
A Yes.
Q Yes.
A Yes. I'm sorry.
Q The -- yeah, the subdural hematomas are found and then an ophthalmologist is sought to review to see if there are retinal hemorrhages.
A Yes, ma'am.
Q Okay. There is not a single study that has proven that retinal hemorrhages are caused by shaking.
A I disagree with that.
Q What study has shown that retinal

hemorrhages are caused by shaking?
A Retinal hemorrhages has had a strong association with shaking to a specification -- specificity of 96 percent in confessed medical literature of perpetrators who have shaken only the -- only shaking the child and the child becomes symptomatic, subsequently the child has ophthalmological evaluations, and the severity that I described before is found on fundoscopic exam. So there -- there is a time association with that event, the neurological decompensation and the findings of retinal hemorrhages.
Q So those are cases where abuse was already suspected.
A No, confessed.
Q Well, it was suspected, because the person was interviewed because they were suspect --
A Oh, correct.
Q Right.
A Yes.
Q So abuse was already suspected.
A Yes.
Q The person is questioned by law enforcement.
A Yes.
Q And they confessed.

A Yes.
Q Because retinal hemorrhages were already found.
A They were already found, yes.
Q Right. So we don't actually know whether that child was abused; correct? It's just based on confessions.
A It's the strongest evidence. Yes.
Q Well, in the nanny cam cases that wasn't the case; correct?
A You can tell me.
Q Right. So, in the study by Papetti where there's actual proof, meaning not a confession after the fact, --
A Okay.
Q -- but videos of a child being shaken on a nanny cam.
A Okay.
Q And so we know that that happened.
A Yes.
Q We don't rely on a confession.
A Yes.
Q We don't rely on we suspect that it took place because of injuries.
A Okay.

Q We know it happened, --
A Yes.
Q -- because the baby was shaken. Those babies did not show severe retinal hemorrhages.
A Oh, correct.
Q So what I mean is, in the one study or the one finding where there's actual physical proof of the shaking occurring, --
A Yes.
Q -- those babies did not show severe retinal hemorrhages.
A But retinal hemorrhages insensitivity is not -- not -- is less. So they are present in 85 -- 10 -- 85 percent of the cases will have retinal hemorrhages, then you have the others that will not have retinal hemorrhages as the result of a shaking event.
Q But those are based on the assumption that there was a shaking having taken place.
A No, like the nanny cam.
Q No, they -- the babies did not have ret -- severe retinal hemorrhages.
A Correct. Not every shake event leads to severe retinal hemorrhages.
Q Right. So in the -- just to be clear. In the one study --

A Yes.
Q -- where there's actual physical proof of shaking, --
A Yes.
Q -- not one child had severe retinal hemorrhages.
A Correct.
Q But you do believe that pure shaking can cause subdural hematomas?
A So, subdural hematomas can happen with minor trauma and they would happen in severe shaking, as has been seen in the literature of inflicted head injury, more so prominent than an accidental trauma.
Q So I'm going to ask again. You believe that shaking alone can cause subdural hematomas.
A Yes, ma'am.
Q Okay. What is the minimum force necessary to cause that injury?
A Not established, not known.
Q But you believe that's the case.
A Yes. We see it in BESS.
Q Without it being established.
A We see it in the medical condition of BESS.
Q Without it being known.
A We see it and we know it in the condition of

BESS.
Q Well, BESS doesn't deal with force. Right?
A Exactly. You don't need -- that's minimal force and they still break.
Q Well, it doesn't have to have force at all for BESS.
A And that's absolutely correct.
Q Right. It could just be a large collection of fluid in the subarachnoid space.
A That causes tension and stretching of the bridging veins.
Q Exactly.
A Yes.
Q So, it's not know whether any amount of force -- in a non-BESS situation, you don't know what the minimum level of force is to cause injuries.
A We don't know as to value. But clinically you know that tension and stretching can cause subdural vein trauma. And --
Q But it's --
A -- bleeding.
Q -- not been proven.
A It's been proven by the condition of BESS in the literature.
Q Okay. I'm going to move on. You did talk

about the study by Duhaime; correct?
A Yes, ma'am.
Q And that was in 1987.
A Uh-huh. Yes.
Q And that was to examine whether shaking a baby -- and this -- these were models; right?
A Yes.
Q No one was actually shaking a baby.
A They were --
Q They weren't actually --
A -- dolls.
Q Dolls. Right. But I'm --
A Yes.
Q What I'm saying is there weren't actual babies being shaken.
A Yes, yes, of course.
Q Right. And that was to see if a minimum force could be generated by shaking of these dolls.
A Yes.
Q And shaking alone could not cause the injuries that Duhaime frankly came in expecting to find. Right?
A Correct.
Q She came in expecting to find subdural hematomas or something similar -- because it's not a

real baby; right? -- in those models.
A No, they're actually -- the models just were to see if the established thresholds could be obtained. Of course models are not going to have injury, because they are fake.
Q Right.
A But the purpose of the Duhaime study was taking the thresholds established by shaking alone in primates who had a concussion and injury and seeking if shaking that doll would produce the same forces that they measured in the original study. And if the forces are reached, the assumption is that shaking alone can hurt a child in that manner.
Q And Duhaime found that those -- that threshold was not met by shaking alone.
A Correct.
Q And that was confirmed in her study in 2010. It was 1987 as well as 2010.
A Different models, but --
Q But the same result.
A Yes.
Q And by the same result, I mean shaking alone did not reach the threshold.
A Correct.
Q Now you just referenced shaking of primates;

correct?
A Yes.
Q That's the Ommaya study.
A Yes.
Q That was not shaking.
A That was a whiplash.
Q That was whiplash.
A A single event.
Q A single event of a car accident, essentially; right?
A A whiplash single event. Yes. Back and forth movement of the head, one cycle.
Q Once. So back and forth, meaning one back and one forth.
A Correct.
Q And it's not the same thing as shaking.
A No, shaking is worse.
Q Well, it's different. Correct?
A It's --
Q It's not equivalent.
A It's back and forth movement in the anterior-posterior direction, yes.
Q It's not the same movement, though.
A It is hyperflexion and hyperextension of the neck.

Q Okay. Again, you're not a biomechanist; right?
A It's hyper -- that's what whiplash is.
Q Are you a biomechanist?
A No.
Q Okay. Monkeys are shaped differently than babies; right?
A I've never seen a monkey being shaken, but --
Q Well, you've seen a monkey.
A A monkey in the study, I don't know how they were shaked. It just says the ant -- forward --
THE COURT: Did you say -- I'm sorry. Did you say shaped differently --
MS. RUE: Shape -- I'm -- pardon me.
THE COURT: -- or shaked differently?
MS. RUE: Shaped.
THE COURT: Shaped.
THE WITNESS: Oh, I thought you said shaked.
MS. RUE: Yes, no, shaped.
THE COURT: Okay.
MS. RUE: Pardon me. With a P. Yeah, I know, the masks aren't great.
THE WITNESS: Okay. Sorry.
MS. RUE: Yes.
THE WITNESS: My mistake.

MS. RUE: No, no, it's not clear.
BY MS. RUE:
Q What I -- so the shape, with a P, of a monkey is different than the shape of a baby.
A Absolutely.
Q Right. And in very critical ways.
A I would assume, yes. I only know babies.
Q Well, you know that a monkey's head is much smaller to the proportion of its body than a baby's.
A Okay. Yes.
Q Right?
A Yes.
Q A baby's head is very big on its body.
A Yes.
Q And that is a very different shape than what a monkey looks like.
A Yes, ma'am.
Q And what an adult human looks like.
A Yes, ma'am.
Q Those monkeys did not have retinal hemorrhages in the Ommaya study.
A I don't know that they were looked for. They weren't mentioned.
Q Well, they weren't noted.
A They weren't mentioned, no.

Q Right. They had neck injuries.
A They had.
Q Right?
A Yes.
Q But they did not have, that you know of, that weren't noted -- and they were looking for injuries; correct?
A Well, you don't look for injuries in the eye unless you do an eye exam.
Q Right, but the whole premise of the Ommaya study was to look for what injuries would be caused by this motion.
A Yes, but it doesn't state whether eyes were examined.
Q Is it not fair to say they were looking for injuries?
A That's all we can say.
Q Right. And what we know of from that finding was that there -- we don't know of any eye injuries having been noted.
A No. It was study on concussion.
Q And no eye injuries were noted.
A Correct.
Q That's not the only time that animals have been used to study this area of science.

A Oh, no.
Q The Finnie study, which was done twice, dealt with lambs.
A Yes.
Q The shaking of lambs.
A Yes.
Q All of those lambs had spinal injuries.
A Yes.
Q And I believe two of all of the lambs had retinal hemorrhages.
A Yes.
Q When they recreated it, I believe zero had retinal hemorrhages.
A I am not sure, but --
Q Okay. So you've testified that shaken baby syndrome or abusive head trauma as of 2009, but that it's been accepted in medicine for 160 years?
A It has been identified in medicine for 160 years. Abusive head trauma as a diagnosis has been accepted in medicine since the -- the terminology, since 2009. Before that, shaken baby syndrome.
Q But it hasn't been shaken baby syndrome from --
A Two thousand and --
Q -- 160 years ago --

A Yes. No.
Q When was it first called shaken baby syndrome?
A Nineteen seventy-four by Caffey.
Q And it's fair to say that since Duhaime's study in 1987 there is debate about whether shaking alone can reach that threshold for injuries.
A Yes, ma'am.
Q And by injuries, I mean the injuries that child abuse pediatricians like yourself look for to make this diagnosis.
A That we look for in corroboration with ophthalmologists. Yeah.
Q Right.
A Yes.
Q So what I'm saying is, the -- since 1987 there has been debate about whether just shaking alone can reach the force that would cause the injuries, including retinal hemorrhages, including subdural hematomas, that a child abuse pediatrician looks for to diagnose abusive head trauma.
A Yes, ma'am.
Q Or child abuse.
A Yes, ma'am.
Q Okay. And the Cory study from 2003

referenced on direct examination also backs this up.
A No. The Cory story [sic] does not back it up. Actually it has opposite results.
Q Well, the Cory study in 2003 says --
A That's the Prange Study.
Q -- we don't know if shaking can cause fatal head injuries.
A That is the Prange study.
Q That's the Cory study from 2003 has that.
A I didn't reference Cory story [sic] of 2003.
Q You didn't reference the Cory study?
A Two thousand sixteen?
Q Okay. Are you familiar --
A (Indiscernible)
Q -- with the Cory study?
A Yes, 2016. Do you want me to --
Q There's one from 2003.
A I don't know that one.
Q Okay. And pardon me. The statements -- you're familiar with what's called the statement; correct?
A Yes.
Q And who is that from?
A The statement?
Q Yeah.

A Oh, I don't know. What, more specific?
Q Right. You just said you're familiar with it.
A The statement from the articles that I gave?
Q Well, it's referenced as the statement.
A What's the statement?
Q Okay. So you're -- you're not --
A The statement that I gave is the pediatric AOP?
Q Pardon me.
A Okay.
Q There is a piece of literature known as "The Statement." Are you familiar with that?
A No.
Q Okay. Are you familiar with Dr. Chaudhary? I'm --
A Yes.
Q Okay. Are you familiar --
A Oh, the --
Q -- with any of his --
A -- consensus statement.
Q Correct.
A Oh, yes.
Q Okay. And it's often referred to in literature as the statement.
A Consensus statement is better.

Q That's better? Okay. But now you're familiar with it; right?
A Yes, of course.
Q As a consensus statement.
A Two thousand eighteen.
Q Right. There's -- there's more than one consensus statement; correct? There's actually one that came out in 2020 as well.
A That's right.
Q Okay. And the -- that is a -- it would be fair to say, a proponent paper? Meaning it advocates for the position that you hold is what --
A Correct.
Q And Dr. Chaudhary acknowledges that there is this -- still this debate about whether shaking alone could cause these injuries.
A There is no debate in the medical community, but there is controversy, yes.
Q Well, it does acknowledge that there's discussion over whether these things exist.
A Oh, yes. Yes.
Q Now, you did testify to other possibilities that you considered when coming -- before coming to the conclusion of child abuse. Right?
A Yes.

Q You wrote in your report -- S-1, which I believe you have -- that retinal -- that the retinal hemorrhages DJ suffered from did not result from seizures.
A Correct.
Q Or subdural bleeding.
A Correct.
Q Or from CPR.
A Correct.
Q Or vaccinations.
A Correct.
Q Coughing.
A Did I write that?
Q You did.
A Okay.
Q You can look -- you -- you -- you have it there. If you don't recall. It's page 14, section 8.
A Okay. Go ahead.
Q Okay. So you write in your report there that the retinal hemorrhages DJ suffered from did not come from seizures.
A Okay.
Q Right?
A Yes.
Q Okay. Or subdural bleeding.

A Yep.
Q Or CPR.
A Yes.
Q Vaccinations.
A Yes.
Q Coughing.
A Correct.
Q Or reflux.
A Correct.
Q You don't cite anything in making those conclusions.
A There are no studies with seizures specifically that -- or CPR -- that have shown the pattern of severe retinal hemorrhages that I described.
Q Is that written in your report?
A No.
Q Okay. So there's nothing cited about those conclusions you came to.
A Okay. No.
Q And you just testified that you haven't read the 2020 consensus statement?
A The echo chamber?
Q No.
A Which one?
Q The 2020 consensus statement.

A No.
Q Now, you and I have never met before; correct?
A I don't think so.
Q We haven't. Obviously I'm not memorable. You haven't met Ms. Bielak either; correct?
A I don't think so.
Q As far as you recall, you don't remember meeting with Ms. Bielak?
A Meeting with her?
Q Correct.
A No.
Q Or meeting her.
A No.
Q Okay. I did attempt to meet with you; correct?
A Yes.
Q On a number of occasions.
A Yes.
Q I emailed you.
A Yes.
Q I called you.
A Yes.
Q And you refused to meet with me.
A No.

Q Did you meet with me?
A No.
Q Okay. Did you meet with Ms. Craveiro?
A Yes.
Q I want to talk to you about when you spoke to Darryl's parents. DJ's parents.
A Yes.
Q You spoke to them, you testified, on February 17th; correct?
A Yes.
Q This was at the bedside of their 11-month-old son.
A Yes.
Q Who was in the hospital.
A Yes.
Q Who had been there for a week at that point?
A Yes.
Q Who had spent the first seven months of his life in the hospital?
A Yes.
Q And had many hospitalizations and doctors' visits during those first 11 months of his life.
A Yes, ma'am.
Q Who you testified was -- as a very healthy baby. Pretty healthy baby.

A Pretty healthy.
Q Now, when you spoke to Darryl and Lucy, you were looking for information.
A Yes, medical history.
Q Right. An historical account of their son's life.
A Yes, ma'am.
Q Right? His medical background.
A Yes, ma'am.
Q Their background as parents.
A In relation to Darryl?
Q Well, in relation to Darryl. Meaning, if they -- if one of them had some sort of disorder that would possibly account for --
A Oh, yes. Family history.
Q Family history.
A Yes.
Q That's what I mean by their background. Pardon me. You looked to see what medication DJ took.
A Yes, that they know of.
Q That they know of.
A Yes.
Q What surgeries he had had.
A Yes.
Q Information about his disposition.

A Yes.
Q And you were looking for this for a number of different reasons; is that fair to say?
A Yes, as part of the --
Q To see whether they were consistent with each other. Right?
A They -- I spoke to them at the same time.
Q Okay. But you wanted to see if -- I'm assuming you would want to see that they had consistent stories. Right?
A Sure.
Q Well, it would raise a red flag if they weren't consistent.
A Correct.
Q If one of them said he had been in an accident and the other one said he hadn't, that would raise a flag.
A Yes.
Q Right. And you wanted to make sure or see whether they were consistent with medical records. Right?
A With medical care? Yeah.
Q And they were pretty much consistent with DJ's medical history.
A Oh, yes.

Q The -- which is extensive, as we know.
A Yes.
Q The one area Lucy believed that he had -- may have been on an anticoagulant, it turns out he hadn't from the records that you had. Right?
A From the records.
Q But other than that, everything was pretty consistent.
A Yes.
Q There wasn't anything from what they told you that raised concerns.
A No.
Q They told you that he had eczema; correct?
A Yes.
Q His -- they advised you about his developmental milestones.
A Yes.
Q And you learned that Darryl's parents -- you've met both of them; right?
A Yes.
Q And you described Darryl, our client, as being unemployed.
A That is information they provided.
Q Well, you described him as unemployed; right? In your report.

A Yes.
Q That was the term you used. But he actually was DJ's primary caretaker.
A Yes.
Q His mother, Lucy, worked outside of the home.
A Yes.
Q Right? And Darryl stayed at home, as the parent.
A Yes, ma'am.
Q And it's fair to say that every baby needs somebody watching them.
A Yes, ma'am. Yes.
Q Particularly someone in DJ's circumstance, with all of these medical complications.
A Yes.
Q You learned in speaking to them, as well as reviewing the DCP&P records, that DJ had passed out and went limp when Darryl had been changing his diaper.
A Yes, ma'am.
Q That he passed out fast.
A Yes, ma'am.
Q That he performed mini CPR by blowing in his mouth.

A Yes.
Q That an ambulance was called.
A Yes.
Q And that when the ambulance arrived, DJ was relatively alert at that point.
A Yes.
Q And the paramedics advised them they could still have DJ taken to the hospital or they could follow up with their pediatrician.
A Yes.
Q And they chose to follow up with their pediatrician.
A Yes.
Q And they did do that.
A Absolutely.
Q And that pediatrician advised them that -- that he or she believed that it was acid reflux that caused this.
A Yes.
Q And this is on February 3rd of 2010 [sic].
A Yes, ma'am.
Q A week prior to DJ being admitted.
A Yes.
Q You learned that a few days before he was admitted something similar happened; correct?

A Yes.
Q And DJ passed out when Darryl put him on the bed?
A Yes.
Q And Darryl applied oxygen from home.
A Yes, ma'am.
Q And the situation appeared to resolve itself.
A Yes, ma'am.
Q And then finally on February 10th Darryl was with DJ downstairs with the two of them; correct?
A Yes, ma'am.
Q And Lucy was upstairs at that point.
A Sleeping. Yes, ma'am.
Q And that DJ -- pardon me -- Darryl had DJ in a chair to keep him upright.
A Yes.
Q Which is the protocol for the acid reflux that the pediatrician told him.
A Correct. Yes.
Q That he had him upright in a chair.
A Yes.
Q And he went to pick him up.
A Yes.
Q And he went stiff.

A Yes.
Q And he immediately brings DJ to his wife, to the child's mother.
A Yes, ma'am.
Q Right? And they called 9-1-1.
A Yes, ma'am.
Q They took a video of the incident.
A Yes, ma'am.
Q And then an ambulance took him to Saint Peter's.
A Yes, ma'am.
Q The records from DCP&P had essentially the same account of what Lucy and Darryl told you.
A Yes.
Q About the three episodes.
A Yes.
Q The pediatrician saying that he or she believed it was --
A Reflux.
Q -- reflux.
A Yes.
Q That Darryl said he would never hurt DJ?
A Yes.
Q And Lucy said she had no concerns about Darryl's ability to care for DJ.

A Absolutely.
Q And that was said when they were not together.
A Yes, absolutely.
Q Both of them independently said D -- Darryl said he would never hurt his son.
A Yes.
Q And Lucy said she didn't have any concerns about Darryl ever hurting their child.
A Correct.
Q When you went to the hospital after or before speaking to them, did you do an examination of DJ?
A During -- during? Yes.
Q Oh, while you were speaking to them?
A Yes.
Q So you're speaking to them while you're examining the baby.
A Oh, no, no. After -- after that.
Q Same visit.
A Yeah, same visit.
Q Speak to parents, --
A Yes.
Q -- conduct an examination. You checked his weight. Right?

A It was taken already.
Q Oh, so you didn't do it -- make those findings yourself?
A The weight was taken from the chart.
Q Okay. So you just had the medical records.
A Yes, right there, the same day.
Q Okay. You didn't take his head circumference?
A No, it was documented.
Q Okay. You noted that his anterior fontanelle was soft and flat.
A Yes.
Q The soft spot.
A Yep.
Q You noted that he had no bruises.
A Correct.
Q You did note that he had some dry skin.
A Yes.
Q Which they told you he had eczema.
A Yes.
Q He didn't babble at all.
A Babble, as in consonants, no.
Q He -- but he appeared comfortable.
A Yes.
Q And he smiled.

A Yes.
Q I want to talk about DJ's head circumference now. It went from 41 centimeters on October 2nd of 2016 -- that's on page 5 of your report --
A Yes.
Q -- to 44.8 centimeters on February 15th of 2017. That's almost 4 centimeters larger.
A Yes.
Q Now it indicates in your report, when you examined him, on page 11, you have his head circumference at 45 centimeters.
A Yes.
Q So the hospital had it at 44.8. Was his head re-measured?
A So it's measured by the geneticist --
Q Uh-huh.
A -- and the nurses, and sometimes there is discrepancy, but it's around 45.
Q So you didn't personally measure it, but there is this slightly larger measurement than what was taken on February 15th of 2017.
A Yes.
Q And that was two days later that you saw him.
A Yes.

Q And noted the measurement of 45 centimeters.
A Yes.
Q Now, you discussed at length the fact that you didn't have any record of his head circumference from that Children's Hospital of Philadelphia of October to February.
A Correct.
Q And you said it would have been helpful to have the head circumference in that time frame.
A Absolutely.
Q How did you get the records that you reviewed?
A DCP&P.
Q And what efforts did you make to get those records from his pediatrician?
A DCP&P. Several phone calls, actually.
Q You made several phone calls.
A Yes.
Q What did they tell you?
A They couldn't get them.
Q They couldn't get them.
A For whatever reason.
Q Okay. Did you make any other efforts to get his records?
A No, due to HIPAA confidentiality, it has to go

through the whoever is granted permission to get information. Health care protected information.
Q Did you try through the prosecutor's office to get those records?
A Through the prosecutor's? No. DCP&P. I even tried to get mom back in after the evaluation, but that was impossible either.
Q Well, that was after you had found her husband guilty of child abuse; right?
A No, my report was written on April 26th.
Q It was when you --
A Before that I had been trying to follow up with the parents --
Q Okay.
A -- and DCP&P and the pediatrician, and for whatever reason I couldn't. And it would have been very helpful, yes.
Q It would have been very helpful to have those.
A Yes. Which is why I write in the end, if there is any other information that is not here, we need to know it.
Q Did you ever speak to the prosecutor's office about trying to obtain those records?
A No.

Q That would have been very helpful to your findings?
A Well, we don't have direct with the prosecutors. We do DCP&P.
Q You don't speak to the prosecutor?
A When they called. We don't get involved in the investigation per se in law enforcement. We are the medical --
Q Right, but --
A -- (indiscernible).
Q -- but you're dealing with a state agency with DCP&P.
A Yeah, but they have their own protocols.
Q Right. So my question is, you never endeavored to get records that you qualified as being very helpful.
A Yes.
Q You never endeavored to get them from the prosecutor's office.
A I don't even know who was in charge in the prosecutor's office of this case.
Q So it's fair to say that's a no.
A Yes. No.
MS. RUE: Judge, I don't know if we want to break. I'm going to into another area. Or --

THE COURT: I'm going to stop at 2:15, so --
MS. RUE: Okay.
BY MS. RUE:
Q I want to talk to you now about premature babies.
A Yes, ma'am.
Q Premature babies have more medical problems than full-term babies.
A Absolutely.
Q They can have -- have -- pardon me. There can be more neurological problems with them.
A Yes.
Q This is because their neurological system hasn't been fully developed.
A Correct.
Q And same with though with their digestive system.
A Yes.
Q That can lead to more problems with regurgitation.
A Yes.
Q Vomiting.
A Yes.
Q Can lead to breathing problems.
A Yes.

Q Regurgitation and vomiting can lead to obstruction of airways. Right?
A Yes.
Q And emesis in the lungs.
A And what? I didn't hear that.
Q Emesis in the lungs.
A Emesis? What is that?
Q Well, like, fluid in their lungs.
A Okay. Yes.
Q Okay. And being premature can also delay a baby's reactions to things.
A Yes. Absolutely.
Q Right? They can be less effective in self-protective measures.
A Yes.
Q So, meaning, they -- that isn't fully formed or fully functional.
A Yes.
Q So coughing.
A Yes.
Q And gagging.
A Yes.
Q Those -- those reflexes are not as well developed in a premature baby as it would be in a full-term baby.

A As in the protective sense, yes.
Q Right? In the self-protective sense.
A Yes.
Q Right. And, like, turning your face away when a mouth is blocked.
A Correct.
Q Or when a nose is blocked.
A Yes. Yes.
Q And DJ was born extremely premature.
A Yes, ma'am.
Q Hospitalized for the first seven-and-a-half months of his life.
A Yes, ma'am.
Q A very complex medical history.
A Yes, ma'am.
Q Of which -- which you have described.
A Yes.
Q When a baby is born at 25 weeks, it is inevitable that that baby will have a number of medical problems.
A Could have, yes.
Q It's not inevitable that a baby at 25 weeks will have medical problems?
A At 25 weeks, at that period, or later?
Q When a baby is born at 25 weeks --

A Uh-huh.
Q -- there is going to be --
A Oh, yes.
Q -- medical problems.
A Yes, yes, yes.
Q If the baby is able to survive, frankly.
A Yes. Yes.
Q And there are problems that would be present at birth.
A Yes.
Q And I think you described at birth subdural hematomas can occur with premature babies especially.
A In any baby. Yes.
Q Especially with premature babies.
A Yes.
Q Especially with male premature babies.
A Yes.
Q They don't know why; right?
A No.
Q But, for whatever reason, --
A Yes.
Q -- male premature babies are particularly prone --
A Yes, ma'am.
Q -- to subdural hematomas. And then there

are problems that can present months later.
A Yes, ma'am.
Q Delays in milestones.
A Yes, ma'am.
Q In DJ's case, he had to have heart surgery.
A Yes, ma'am.
Q Issues with organs that can require surgery.
A Yes.
Q Other organs, I should say.
A Yes.
Q Those can develop later. Diabetes? I mean -- I mean, when I say later, I mean not at birth.
A Yes. Oh, well, he -- the -- the cardiac problems were at birth.
Q Were at birth. But other -- other internal organs could show problems --
A Absolutely.
Q -- present later.
A Yes.
Q Because of the prematurity.
A Yes. Yes.
Q Diabetes could be shown later. Not at birth.
A Yeah.
Q Right. And it could even take years for certain problems to present.

A Yes.
Q Delays in speech.
A Yes.
Q Other developmental delays.
A Yes.
Q That you wouldn't know at birth are going to occur later on.
A Yes, ma'am.
MS. RUE: Sorry. One moment, Your Honor.
(Extended pause)
BY MS. RUE:
Q Sorry. I'm just looking for -- I believe you testified the things you look for when you're assessing for abuse. I believe you gave a list of those. Right?
A You mean the subspecialty work-up?
Q Right. The -- the --
A Yes.
Q -- the things you would look for --
A Yes.
Q -- when you're looking to diagnose or see whether child abuse is an appropriate diagnosis.
A Correct. We do -- uh-huh.
Q Right. You look for whether there's a preexisting condition.

A Yes.
Q Whether there's subdural hematomas.
A Yes.
Q Retinal hemorrhages.
A Yes.
Q A brain malfunction.
A Yes.
Q Meaning seizures.
A Yes.
Q Lethargy. Whether there's a scalp fracture.
A Yes.
Q Scalp swelling.
A Yes.
Q A neck injury.
A Yes.
Q A limb fracture.
A Yes.
Q A rib fracture.
A Yes.
Q An external body injury.
A Yes.
Q Or an internal body injury.
A Yes.
Q It's fair to say that if all of those -- those are ten different symptoms -- if all of those

exist, you are likely to diagnose abusive head trauma.
A Yes.
Q What about if five of those exist?
A Depends what five.
Q Which five?
A Depends.
Q You tell me.
A Oh, it depends on what symptoms and the developmental stage of the child. So, if Darryl has facial bruising, he can't move, he's not ambulatory, how did that happen? Without an explanation of trauma, that's very concerning. Right.
Q But Darryl didn't have that; right?
A No.
Q Okay.
A Now, if you find a fracture in a non-ambulatory child that can hurt himself through walking or cruising, and there's no history of trauma, that's concerning. So the developmental age matters with regards to what finding means what --
Q Sure.
A -- in what kid.
Q So, what five of them would exist that you wouldn't necessarily diagnose abusive head trauma?
A In Darryl's case?

Q As an expert.
A None of them. It -- you -- there is no specific abusive head trauma diagnosis with any finding. Because any finding can be explained by other things. It's the history in general that you have to take into account.
Q So, what if a child presented with just two of those?
A You mean, like what two?
Q Well, tell me which ones are relevant to you.
A The most -- the findings that are most specific for the diagnosis of inflicted trauma is, for example, severe retinal hemorrhages in the pattern described, that's 96 percent specificity. Absence of external trauma is 83 percent specific or the positive predictive value. Subdurals, --
Q Okay. So --
A -- not really. A pattern mark is very significant, very specific for trauma, as a slap mark. So it really depends on the finding and the context and the history. So just -- I can't tell you that having a broken bone is going to be abusive head trauma. A skull fracture even cannot be -- might not be abusive head trauma at all. No specific finding is

diagnostic of abuse.
Q Right. But you just testified that it's fair to say, if a baby or a child, a young child presented with all ten of those -- or, pardon me -- it's eleven of those, it's fair to say you would diagnose abusive head trauma.
A Without a history, and without metabolic disorder, and without osteogenesis imperfecta, and no accidental, yes.
Q Okay. So, if a baby just presented with two of them, would your finding be to the same degree of medical certainty?
A It -- so --
Q Well, --
MS. CRAVEIRO: Objection; asked and answered.
THE WITNESS: Yeah, I can't diagnose abusive head trauma --
THE COURT: One -- one second.
THE WITNESS: -- based on findings.
THE COURT: I'm going to overrule --
THE WITNESS: Sorry.
THE COURT: I'm going to overrule the objection.
THE WITNESS: I'm sorry.
THE COURT: Go ahead.

BY MS. RUE:
Q So the amount of symptoms that exist, does that affect to the degree of medical certainty the conclusion you come to?
A Yes.
Q Can you explain that?
A So, after a thorough evaluation of the case, the patient, taking into account the possibility and excluding medical diagnosis that can account for those findings, after definitely excluding no history of accidental trauma, no inherent condition in the kid to give him that finding, then the more injuries find -- found increases specificity for inflicted head injury or inflicted trauma. If that finding is severe retinal hemorrhages, which have only been described in very few conditions, that increases the specificity to the 96-7 percent. So the findings are taken always in the context of ruling and overview of the evaluation, then the specificity of those things can be supportive of a diagnosis of abusive head trauma with confident medical certainty.
Q So what effect does it have on your degree of medical certainty?
A I just said that.
Q I -- I -- I -- and perhaps I don't

understand. I understand how all of those things matter.
A Okay.
Q But with the absence of eight of them, is your diagnostic -- diagnosis likely to be the same as it is if ten of them exist?
A So, in this case the subdurals, the retinal hemorrhage and altered mental status yes, that is confident within medical certainty that it is.
Q And what if there was bruising, rib fractures, limb fractures, brain bruises?
A Even more.
Q Even more. Now, you remarked about how Lucy and Darryl had indicated DJ had been fussy during that time period.
A Yes, ma'am.
Q And had vomited.
A Yes, ma'am.
Q It's fair to say that's a common phenomena with babies.
A Yes. Yeah.
Q It's not necessarily indicative of any trauma.
A Nope.
Q But it could show that there is something

happening.
A Yes.
Q In the brain.
A Yes.
Q Right? So, when we talk about something like a limb fracture, when you look at an MRI or an X-ray, I guess, for a limb fracture, it's going to look the same whether that bone was broken on -- jumping off a trampoline or if someone purposely broke it. Right?
A Oh, yes.
Q The actual image itself is not affected by what caused it.
A That's correct.
Q They look exactly the same.
A Yes.
Q And there was a skeletal survey done on DJ.
A Yes, ma'am.
Q And that was done before your involvement.
A I'm not sure, but --
Q If you want to look at your report, I'll tell you what page.
A I can -- yeah, I can find the date.
Q It was done on February 14th.
A Okay. Yes. Before I got involved.

Q Right. And that was four days after he was in the hospital.
A Yes, ma'am.
Q And there was no evidence of an acute fracture.
A Nope.
Q No evidence of a healing fracture.
A No, ma'am.
Q And what that means is there was no bone that was currently broken, healing.
A Correct.
Q And no sign that a bone had been broken and already healed.
A Yes, ma'am.
Q After you saw Darryl there was a second scan done for broken bones.
A Yes.
Q And that was done on February 24th.
A Yes, ma'am.
Q Ten days after this prior scan.
A Yes.
Q And you noted that it was unremarkable -- that it was an unremarkable study.
A Yes.
Q And that means, because it showed no acute

fractures.
A Right.
Q And no healing of fractures.
A No, no -- no healing fractures.
Q It showed neither acute fractures --
A Yes.
Q -- and it did not show healing fractures.
A Correct.
Q Meaning his bones had not been broken.
A Yes. No.
Q That includes his ribs.
A That includes his ribs, yes.
Q Now, DJ had no neck injuries; correct?
A None that were identified.
Q None that were identified.
A Right.
Q Right. And this is a case where they were looking. There was concerns after the subdural hematomas were found, they were looking, suspicions of child abuse.
A Yes.
Q Suspicions of shaken baby.
A Yes. Yes.
Q No neck injuries were noted.
A No, ma'am.

Q When you examined DJ, --
A Yes.
Q -- you didn't notice any neck injuries.
A No.
Q But he was whiplashed so violently that his brain was damaged.
A Yes.
Q He was whiplashed so violently that his eyes were damaged.
A Yes.
Q That his brain bled.
A Yes.
Q That his eyes bled.
A Yes.
Q But no injuries to his neck.
A Right.
Q And as we talked about, Dr. Chaudhary, who you're familiar with, does note spinal ligamentous?
A Ligamentous.
Q Is that -- ligamentous abnormalities --
A Yes.
Q -- are in a very high percentage of abusive head trauma victims.
A Yes.
Q And none existed in this case.

A No. By imagine.
Q Or your findings.
A Imagine is not 100 percent to identify those lesions.
Q No one diagnosed DJ with neck injuries.
A Correct.
Q Looking for specifically child abuse.
A Correct. By imaging and on physical exam he had none.
Q Under no examination did he have neck injuries.
A No.
Q The finding of abusive head trauma is essentially a biomechanical finding. Right?
A No.
Q Well, it's acceleration and deceleration forces causing these injuries.
A It's a clinical diagnosis.
Q But it's from biomechanics.
A No.
Q Why is that no?
A Because biomechanics have not yielded anything conclusive regarding trauma.
Q Right. They haven't proven your premise.
A They haven't proven any premise.

Q Well, they haven't proven the premise that acceleration and deceleration caused these injuries.
A Oh, no, they have proven that. Whiplash causes injuries. They've proven that in monkeys, --
Q They --
A -- but that's about it.
Q They didn't prove these injuries though.
A That's correct. Only --
Q They prove --
A -- concussion.
Q -- neck injury. And concussion?
A Concussion is --
Q And neck injuries.
A -- the only one.
Q And not subdural hematomas.
A Correct.
Q And not retinal hemorrhages.
A Not retinal hemorrhages.
Q They proved neck injuries.
A They proved tiny subdurals in the craniocervical and the surface of the brain, and concussion. The study was about concussion.
Q Right. And a small percentage had those subdural hematomas.
A Small percentage, yes.

Q And none of them had retinal hemorrhages.
A I don't know if they ever looked for that, but yes.
Q That we know of, none were found.
A No.
Q Right?
A Yes.
Q And so when we talk about biomechanics, your opinion is based on acceleration and deceleration of a baby.
A Correct. Of the head.
Q Of the baby's head.
A Yes.
Q Causing retinal hemorrhages.
A Yes.
Q Causing subdural hematomas.
A Yes.
Q Can you explain what acceleration and deceleration forces are?
A It's just movement of the head in different planes inside the intracranial cavity.
Q Okay. And can you explain them?
A More than that?
Q Yeah.
A No.

Q Okay. You write that the tearing of the bridging vein in DJ's brain caused his subdural hematomas.
A That's the mechanism --
Q Okay. What study --
A -- in his skull.
Q -- shows that there is a tear of a bridging vein?
A No study shows that here is a tear in a bridging vein. There -- the assumption is, for conditions such as BESS, that the increased diameter of the subarachnoid spaces places tension on those bridging veins -- that's all we know about bridging veins -- and causes them to rupture on the dural end of the membrane.
Q So what study shows that subdural bleeding -- or pardon me -- subdural hemorrhage bleeding can happen?
A So, subdural hemorrhages has been shown in studies where macrocrania has been evaluated and the incidental finding is subdural blood. But that is only in the minority of cases, 2.5 to 5 percent.
Q Right. And there is no study that shows the tearing of the bridging vein; right?
A No.

Q And you don't know what force level would do that.
A No. We don't know injury thresholds for infants.
Q And that's what we're dealing with.
A Correct.
Q Injury thresholds of an 11-month-old.
A Correct.
Q A premature 11-month-old.
A Yes.
Q And you are not an expert on biomechanics, as we discussed; right?
A No.
Q You don't have any training in biomechanics.
A And -- no, ma'am.
Q And -- or on impact.
A No, ma'am.
Q But your findings are based on shaking.
A On the medical literature, yes.
Q Your medical evaluation is based on the premise of shaking.
A Yes.
Q When you conducted the evaluation of DJ, you didn't notice any grip marks on his body; right?
A No.
Q The doctors who evaluated DJ prior to you

didn't notice any grip marks on him.
A No, ma'am.
Q And what I mean is if a baby was grabbed around the rib cage and shaken, there were no marks there.
A Correct.
Q Okay. When you did your physical examination of DJ, you didn't notice any bruises on him.
A Correct.
Q None -- no bruises on his arms.
A No.
Q On his neck.
A Nowhere.
Q His body.
A Nope.
Q Anywhere on his bod -- on his -- anywhere on the body, I should say. His face.
A No.
Q Okay. And from the scans that were done, the radiologist, the neurologist didn't notice any other brain injury; correct? We discussed the subdural hematomas.
A Correct.
Q And no --

A But other brain injury? No.
Q His brain wasn't injured in any other way.
A No, ma'am.
MS. RUE: Judge, I don't know if you want to break now before I -- it's 2:15.
THE COURT: You're not going to finish; right?
MS. RUE: No, but I -- I think we'll be done by 12 on --
THE COURT: Okay. Well, I think Tuesday --
MS. RUE: -- Tuesday.
THE COURT: I think Tuesday we'll start at 9, so --
MS. RUE: That's -- so, Judge, I'm coming from Essex County. Can we start at 9:30? I think we'll still be --
THE COURT: We'll start when you get here.
MS. RUE: Thank you. I'll get here as quickly as I can.
THE COURT: And as we're doing today, we're finishing when I'm leaving, so --
MS. RUE: Understood, Judge. That makes sense.
THE COURT: All right.
MS. RUE: I think that's a good place to

stop.
THE COURT: Doctor, 9:30 Tuesday?
THE WITNESS: Yes, Your Honor.
THE COURT: Okay. Now, look. You're still under oath.
THE WITNESS: Yes.
THE COURT: Don't talk to anybody from the state about this case, nothing of that nature. Okay?
THE WITNESS: Yes, Your Honor.
THE COURT: All right. Thank you.
MS. RUE: Okay.
THE COURT: You heard that, Ms. Craveiro? All right. Everyone, I'll see you on Tuesday.
MS. RUE: Thank you, Judge.
MS. BIELAK: Thank you, Judge.
THE COURT: Before you go, if you have those items, those S items, --
MS. CRAVEIRO: Yes.
THE COURT: -- that are in evidence, leave them on this desk.
Okay, Em. We're off.
(Hearing adjourned at 2:12 p.m.)

CERTIFICATION

I, TERRY L. DeMARCO, the assigned transcriber, do hereby certify the foregoing transcript of proceedings recorded on CourtSmart, Index Nos. from 10:45:54 to 12:26:45 and 12:46:03 to 2:12:25, is prepared to the best of my ability and in full compliance with the current Transcript Format for Judicial Proceedings and is a true and accurate compressed transcript of the proceedings, as recorded.

/s/ ***Terry L. DeMarco*** — AD/T 566
Terry L. DeMarco — AOC Number

KLJ Transcription Service — 09/28/20
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