Exhibit F

IN THE UNITED STATES DISTRICT COURT

FOR THE MIDDLE DISTRICT OF ALABAMA

NORTHERN DIVISION

JEFFERY LEE,

Plaintiff,

Vs. CASE NO.: 2:25cv680-ECM

JOHN Q. HAMM, et al.,

Defendants.

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BENCH TRIAL

VOLUME I

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BEFORE THE HONORABLE EMILY C. MARKS, UNITED STATES DISTRICT JUDGE, at Montgomery, Alabama, on Monday, April 27, 2026, commencing at 8:36 a.m.

APPEARANCES

FOR THE PLAINTIFF: Ms. Paige Hester Sharpe
Ms. Jocelyn A. Wiesner
Mr. Kevin Ashley Cline
Ms. Anna Ku Thompson
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FOR THE DEFENDANT: Ms. Lauren Ashley Simpson
Ms. Polly Spencer Kenny
Mr. Brenton Leigh Thompson
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Proceedings reported stenographically;

transcript produced by computer

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EXAMINATION INDEX

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(The following proceedings were heard before the Honorable Emily C. Marks, United States District Judge, at Montgomery, Alabama, on Monday, April 27, 2026, commencing at 8:36 a.m.:)

THE COURT: I did want to check in with you before we get started at 9:00. Just as a reminder, the rule has been invoked. I don't know who your witnesses are, so you'll need to check and make sure that your witnesses are not in the courtroom during the testimony.

I also wanted to let you-all know, I am reversing myself on the admissibility of Defense Exhibits 11 and 13. I am going to -- to a degree. I do believe they constitute inadmissible hearsay if they're being offered for the truth of the matter asserted, but I am going to admit them for the limited purpose of showing that Dr. Antognini's opinion does have support. So it's admissible for that reason and that reason alone, unless something else comes up during the trial proceeding.

MS. KENNY: Your Honor, we will need to renumber those, because we renumbered after your ruling. So they won't be 11 and 13 anymore.

THE COURT: That's fine.

MS. SIMPSON: Would Your Honor prefer that we just pull them from the binders now or leave them in the binders? In the defendants' binders.

THE COURT: I had ruled that they were not to be admitted. And actually, you-all had withdrawn one of those exhibits. I presume you withdrew the exhibit in response to my ruling.

MS. SIMPSON: Yes, Your Honor.

THE COURT: So I will give you -- obviously, you can continue with your decision to withdraw it, or you can alter your opinion about that.

MS. SIMPSON: I am so sorry. Because we changed the number, would you just clarify for the record which exhibits you're on right now?

THE COURT: Yes. Those are Dr. Nitschke's tweet and deposition.

MS. SIMPSON: Thank you, Your Honor.

THE COURT: And then I just wanted to check in with you if you had had an opportunity to confer about the pulse oximeter data and how that will affect how the trial is proceeding. Is there still the expectation that we will hear testimony today, potentially tomorrow, and then reconvene at a later date?

MS. SHARPE: Yes, Your Honor.

MS. SIMPSON: Yes.

THE COURT: All right. Are there any issues that have arisen since the pretrial conference that we need to discuss before we get the trial started?

MS. SIMPSON: We've agreed to their demonstratives,

Your Honor, so --

THE COURT: All right. Very good.

MS. KENNY: And we will add -- tomorrow morning we will add the two Nitschke exhibits as 58 and 59, and we will have them printed and put them in the binders before we use them tomorrow.

THE COURT: All right. Anything else? All right. Very good. You have 20 minutes. We'll get started.

(Recess from at 8:40 a.m. until 9:08 a.m., at which time the proceedings reconvened, as follows:)

THE COURT: Good morning. We're here for the trial in the case of Lee versus Hamm, case number 25cv680.

I'll take appearance for the plaintiff.

MS. SHARPE: Good morning, Your Honor. Paige Sharpe from Arnold & Porter on behalf of Jeffery Lee.

THE COURT: Good morning.

MS. WIESNER: Good morning, Your Honor. Jocelyn Wiesner, also from Arnold & Porter, and also on behalf of the plaintiff, Mr. Lee.

THE COURT: Good morning.

MR. CLINE: Good morning, Your Honor. Kevin Cline, also from Arnold & Porter, on behalf of Mr. Jeffery Lee.

THE COURT: Good morning.

MS. THOMPSON: And Anna Thompson, Arnold & Porter, on behalf of Plaintiff Lee.

THE COURT: Good morning. And good morning, Mr. Lee.

MR. LEE: Good morning.

THE COURT: And who do we have here for the defendants?

MS. SIMPSON: Good morning, Your Honor. Lauren Simpson for the defendants.

MS. KENNY: Polly Kenny for the defendants.

MR. THOMPSON: Brenton Thompson for the defendants.

MR. BUTTS: Talmadge Butts for the defendants.

THE COURT: Good morning. I understand we are waiving opening statements. Is that still the plan?

MS. SHARPE: Yes, Your Honor.

MS. SIMPSON: Yes, Your Honor.

THE COURT: All right. Then just as a reminder, the rule has been invoked, and the plaintiff will call its first witness.

MS. SHARPE: Thank you, Your Honor. Mr. Cline will be calling our first witness to the stand.

MR. CLINE: Your Honor, Mr. Lee calls Dr. Richard Schwartzstein to the stand.

Your Honor, as discussed at Thursday's pretrial conference, we have some witness binders with the specific exhibits that we intend to use with Dr. Schwartzstein. May I approach the bench and hand those out?

THE COURT: Please.

MR. CLINE: May I proceed, Your Honor?

THE COURT: Go right ahead.

RICHARD SCHWARTZSTEIN

The witness, having first been duly sworn to speak the truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MR. CLINE:

Q. Good morning, Dr. Schwartzstein. Can you please state your full name for the record.

A. Richard M. Schwartzstein, MD.

Q. And what do you do for a living?

A. I'm an academic physician at Beth Israel Deaconess Medical Center and Harvard Medical School in Boston. I'm a pulmonary and critical care physician by specialty.

Q. And what does it mean to be a pulmonary and critical care physician?

A. As a pulmonary and critical care physician, I take care of patients with a range of lung and cardiovascular problems in particular that elicit symptoms that impair their ability to work and live. And as a critical care physician, I take care of some of the most ill patients, severely ill patients, in an intensive care unit.

Q. I understand, Dr. Schwartzstein, that you were the medical director of the asthma and dyspnea center at Beth Israel. What can you tell us about that?

A. Yes. This is a center that I started in the early nineties. At the time, I was doing research on shortness of breath. And I was also director of the pulmonary rehabilitation program where patients are sent often after hospitalizations or because of their illness and have difficulty ambulating and doing activities. And so I created this asthma and dyspnea center as a way of providing extra help for patients with asthma, which is a common respiratory problem, but for general patients who have shortness of breath as well.

Q. And, Doctor, we'll get into more details in a minute, but at a high level, what is dyspnea?

A. Dyspnea is an -- it's a sensation of difficulty with your breathing. Discomfort associated with breathing is the most generic definition that is typically used.

Q. And approximately how many patients with dyspnea have you seen and treated over the years?

A. I've been a doctor for a long time, so probably about 15 to 20,000 patients with shortness of breath.

Q. Doctor, we're going to be talking about hypoxia and hypoxemia today. What is hypoxia and hypoxemia?

A. Hypoxia is a term for low oxygen levels. Hypoxemia is a very specific term for low oxygen levels in the blood. So hypoxia might be used to think about tissue in the body with a low oxygen level, whereas hypoxemia typically is used just for the blood. The emia part, it means blood.

Q. Doctor, are those terms sometimes used interchangeably?
A. They often are by people. Yes.
Q. And is it okay if we do that today?
A. Yes.
Q. Doctor, are those conditions, hypoxia and hypoxemia, conditions you treat as a practicing pulmonologist?
A. Yes, on a daily basis.
Q. Doctor, in addition to the treatment that you give to patients, do you also do clinical research?
A. That's correct. I do clinical research focused on physiology with specific attention to the physiology of dyspnea.
Q. And, Doctor, has your expertise in dyspnea been recognized by hospitals and other institutions around the world?
A. Yes. I've been invited to participate in a number of international convocations, if you will, to opine about dyspnea, to review the literature on it, and I've been asked to be a visiting professor at universities around the world, give many talks in continuing medical education programs, things like that.
Q. And, Doctor, just a few more questions on your background. You mentioned that Beth Israel is affiliated with Harvard Medical School; right?
A. That's correct. It's one of the major teaching hospitals for the medical school.
Q. Do you teach at Harvard?

A. I do. I teach in a mandatory first-year course on physiology of the cardiorespiratory system, as well as clinical students in all years of the curriculum.
Q. And lastly, Doctor, are you a member of any professional medical societies?
A. Yes. I'm a master of the American College of Physicians, a fellow of the American Thoracic Society, and a fellow of the American College of Chest Physicians.
Q. Now, when you say you're a master of the American College of Physicians, what is that?
A. There are different levels of membership. You join as a member. Depending on your credentials and things that you've accomplished over time, you can apply to be a fellow in the organization. And then with additional activities that you do, different additional credits to your record, so to speak, you can become a master.

MR. CLINE: Your Honor, Dr. Schwartzstein is an expert in pulmonology and critical care medicine, physiology, hypoxia, dyspnea, and air hunger, and defendants have stipulated to his qualifications.

THE COURT: All right. He's accepted.

Q. (Mr. Cline, continuing:) Doctor, we're going to be talking about a number of your opinions today. Are all of your opinions given to a reasonable degree of medical certainty?
A. Yes, they are.

Q. Now, earlier you gave a high-level definition of dyspnea as breathing discomfort. Let me ask you straight up. Doctor, is dyspnea pain?
A. Dyspnea has features that are similar to pain, but it is different than pain. Pain is associated with often a particular injury to a portion of the body, whether it's an internal organ or external limbs, and dyspnea is a more holistic discomfort sensation that you can't point to and say, this is where my dyspnea or shortness of breath is. So it has a very different quality to it in that sense. It is similar to pain in that it can be rated. It is similar in that it can be minor to very severe, but it is qualitatively really quite distinct from pain.
Q. And qualitatively, how does dyspnea compare to physical pain?
A. There are many descriptors for dyspnea, as there are different descriptors for different types of pain, but it gives you a sense in the most severe forms of threat to your very existence. It's a holistic discomfort, again, something that can't be localized to one part of the body.
And it's very difficult to distract somebody from their shortness of breath. Whereas you can often distract somebody with music or watching television or doing an activity, and people kind of forget about their pain, you can't do that with people who have significant shortness of breath.
Q. Doctor, I think you mentioned that physical pain can range

from mild to severe. Is the same true for dyspnea?
A. That's correct. It can be mild, and it can be incredibly intense.
Q. And is there a term the medical uses to describe this incredible intense level of dyspnea?
A. Generally the most severe forms of dyspnea are characterized by phrases that have become lumped together under the term air hunger: I need more air. I can't get a breath. I can't get air in. So a number of these phrases that, again, collectively we refer to as air hunger, and that is the most severe form of discomfort.
Q. Doctor, is there a way to rate the level or type of dyspnea someone is experiencing?
A. We tend to use what are called ordinal scales, 11 point scales from zero to ten, similar in many ways to what people do with pain. So the intensity is generally rated in that way. What is a little bit different in some of the instruments that we've developed for assessing dyspnea is that there are also qualitative aspects -- again, what does it actually feel like -- which helps distinguish sometimes what the cause of the dyspnea is. So that's important.
And then what's really different about dyspnea compared to pain is this affective or emotional consequence. And so we've developed instruments that allow us to determine that. And there are some kinds of shortness of breath that don't evoke

much in the way of emotional things, whereas others make people anxious and fearful and threatened in ways that other types aren't. So those are ways for us to get a better handle on this situation.

Q. Doctor, are you familiar with the multidimensional dyspnea profile?

A. Yes. That's exactly the instrument that we developed in our laboratory to parse out these different elements. There's intensity. Is it unpleasant, what is the quality of it, does it feel like tightness, which is characteristic of asthma, for example, is it air hunger, which is much more characteristic of things like hypoxemia. So we have that qualitative aspect.

And then, what are the things that are evoked by it? So somebody who might have just increased effort of breathing, some patients with COPD, will talk about that. That doesn't -- generally doesn't evoke a lot of these emotional kind of consequences. But air hunger can really cause this anxiety, fear, fear for your life almost, as part of it. So this is the multi dimensions that we're talking about and we've now used to assess our patients.

Q. And you've said we a few times. I just want to make sure. How are you personally, Dr. Schwartzstein, familiar with the multidimensional dyspnea profile?

A. So I and colleagues that I work with in our laboratory developed this instrument through the studies we were doing,

both on normal individuals whom we made short of breath in the laboratory, as well as patients. And when I was in the asthma and dyspnea center, I actually began this by literally giving people sort of questionnaires, if you will, and saying, tell us what your shortness of breath actually feels like.

What's interesting is historically, we don't ask that question about shortness of breath. I wasn't taught that in medical school. This wasn't a thing then. And during my fellowship, there was something called the McGill Pain Questionnaire that was developed for headaches from Canada where they said, gee, a tension headache is different than a migraine headache is different from other kinds of headaches. And that was the beginning of really thinking about how the qualities of discomfort can tell us about the actual causes of the discomfort. And with that insight, I began doing this work on trying to determine the qualities and the nature of dyspnea, which led to further and further research into this area.

Q. Doctor, can you just give the Court some examples of the types of phrases included in that questionnaire that you helped develop?

A. Again, everything from, it's hard to get a breath, to, I just can't get any air into my lungs. It doesn't go deeply into my lungs. There's a sense of not going in. I just can't get a big enough breath. I have to pay more attention to my breathing. I mean, there's a range of descriptors.

The questionnaire we gave them probably had about 20, and what we would tell patients is put a check mark next to each of the ones that might apply. They would say, now, look at those, and tell me the three that are most characteristic of your dyspnea. And from those three I would then ask, tell me the one that is the best descriptor.

And so, again, for many of these patients, particularly with the more severe dyspnea, they would land on things that we now subsume under this concept of air hunger.

Q. And, again, can you just give us some examples of those specific things that you say they land on when it's at the extreme end of the air hunger.

A. Yes. Mostly comes up to things like, I can't get enough air. It's the worst feeling I've ever had. When this happens to me, I feel threatened for my life. It's quite dramatic in some cases.

Q. Doctor, have you and other scientists published research papers on what patients have said about what it's like to experience severe dyspnea?

A. Yes, we have. Both patients who come to us in an outpatient setting, as well as patients who are admitted to the hospital.

Q. Let's look at a few of those articles.

MR. CLINE: If we could pull up Exhibit P0049.

Your Honor, these -- that exhibit has been preadmitted and, in fact, all the exhibits that I intend to use with

Dr. Schwartzstein today have been preadmitted.

THE COURT: All right. We have talked about preadmission, but we haven't actually gone through doing that. So do you want to go ahead and put on the record which specific exhibits you have agreement that can be preadmitted?

MR. CLINE: Yes, ma'am. We can do that. I believe the agreement is for all the exhibits on the plaintiff's exhibit list?

MS. SIMPSON: Yes, Your Honor. The agreement is for all of the plaintiff's exhibits.

MR. CLINE: But I'm happy to specify if you want.

THE COURT: That's fine. We just need to put it on the record. So all of the plaintiff's exhibits are being preadmitted?

MS. SIMPSON: Correct, Your Honor.

THE COURT: All right. They are admitted.

MR. CLINE: Thank you.

THE COURT: Go ahead.

Q. (Mr. Cline, continuing:) Doctor, in your binder, if you could turn to the exhibit marked P0049.

MR. CLINE: And Your Honor, it should be in your binder as well.

Q. Dr. Schwartzstein, is this a paper that you're familiar with?

A. Yes, it is.

Q. And how are you familiar with it?
A. This paper was done by members of my research group and members of my division that I've worked with on a number of other studies. I was not part of this in terms of getting authorships on it, but it is a group that I've worked with.
Q. Doctor, if we turn quickly to the last page of this study, are you the Richard Schwartzstein that the authors acknowledge there in the acknowledgment section?
A. Yes, I am.
Q. And, Doctor, what is the title of this article?
A. The title is Scared to Death: Dyspnea From the Hospitalized Patient's Perspective.
Q. And where was this published?
A. This was published in one of the British medical journals, related journals, called BMJ Open Respiratory Research.
Q. Is this research article peer reviewed?
A. Yes, it is.
Q. Can you explain what your research colleagues did in this study.
A. In this study they went to patients throughout the hospital.
And I would just note one of the authors is actually a nurse who is often involved with our group as well.
We went to patients throughout the hospital. They were not necessarily admitted because of breathing problems but often had multiple diseases. And we asked them if they were short of

breath, and we found that -- we in the colloquial way, that these were people that I have worked with -- 156 hospitalized patients completed this questionnaire, and a significant number of these individuals were experiencing dyspnea.

I would just note that the results from a study like this led to us mandating in our hospital that like pain, where the accrediting bodies for hospitals that nurses ask about pain on every shift, we mandated that nurses ask about dyspnea on every shift because it was going unnoticed and unappreciated in the hospital.

Q. And what did your research colleagues find when they surveyed patients with dyspnea?

A. They found that, again, patients were experiencing dyspnea, and it was unknown, frankly, to some of the caregivers at the time.

Q. Doctor, if you could turn with me to the second page on the left-hand column in the section titled Emotion Related to Dyspnea. What were some of the ways patients in this research study described the experience of dyspnea?

A. So there are a number of quotes that we put in because it was -- that they put in doing this because it gives you the real sense of the experience for the patients. Breathing discomfort gets to a point where it feels like, I can't take another breath. Feels very stressful and anxious. Another phrase, panicking. Couldn't get any air in. Excuse the language, but,

scared the shit out of me. Another one says, scary. Not getting the air in. Another one, scared. I thought the world was going to end. Like in a box. I'm going to die. I might not make it.

Q. And, Doctor, if you look at the bottom of this page and the second column, right-hand column, under metaphors for dyspnea, what were some of the metaphors patients used to describe how their dyspnea felt to them?

A. One patient noted, it's like an elephant on your chest in the commercial. Or another one, like I was running in a race when you had to stop suddenly and feel like you are going to collapse. Or, it feels like a boa constrictor. It felt like there was not enough air in the room.

Q. Doctor, are these descriptions consistent or inconsistent with what patients have told you in your research and clinical practice?

A. Very much consistent with what I've heard over many years.

Q. Doctor, if you can go back to the first page of this article near the bottom of the first column. What, if anything, do these authors write about dyspnea and suffering?

A. Dyspnea causes suffering and predicts substantially increased mortality. And here we go: Dyspnea -- as I just mentioned, increased mortality. That's been shown in other studies as well with dyspnea.

Q. Let me ask you, Doctor, as someone who has researched and

treated patients. Can you explain what the authors mean by dyspnea causes suffering?
A. So dyspnea in this -- in the phrases that I've just read from here that were given by the patients, you get that sense of this is really an incredible, tortuous experience they're going through. It is scary. It provides a sense of doom, of catastrophe almost for some of them, particularly when it occurs for them at rest. I mean, it's one thing to have experience with this when you're exercising. I can stop exercising, and maybe the experience goes away. But when I have this at rest, and there is nothing I can do about it, it is incredibly scary. It is a sense of suffering, because they're not given any treatment for it that seems to work. And so it's a really incredibly disturbing symptom for them.
Q. Thank you, Doctor. We can take that down.
Let's now take a look at Plaintiff's Exhibit 56. And that is also in your binder as well. Is this another study that you rely on for your opinions in this case?
A. Yes, it is.
Q. And what is the title of this study?
A. This study is titled Prevalence, Intensity, and Clinical Impact of Dyspnea in Critically Ill Patients Receiving Invasive Ventilation.
Q. And what journal was this study published in?
A. This is the American Journal of Respiratory and Critical

Care Medicine, which is another peer-reviewed journal.
Q. Anything else you can tell us about the American Journal of Respiratory and Critical Care Medicine?
A. This is the leading journal of the American Thoracic Society, which is the leading organization for academic respiratory and critical care physicians. Many anesthesiologists and surgical critical care people also belong to this. Many international physicians also belong to the American Thoracic Society. So it is -- I would argue it is probably the leading journal for respiratory physicians in the country.
Q. Doctor, if you can turn to page 922 of this article, there's a section titled Dyspnea and Patient Important Outcomes. Do you see that?
A. Yes.
Q. And in the last sentence on that page at the bottom that carries on to the next page, can you read what the authors say about air hunger?
A. "Air hunger is known to be the most disturbing sensation of dyspnea, characterized by its capacity to evoke anxiety, panic, frustration, and fear."
Q. And do the authors provide any citations in support of those statements?
A. Yes. Citations 29 and 30.
Q. Doctor, if you would just quickly look with me to reference

29 and 30 at the end of this article. Do you recognize those references?
A. Yes. They are both from members of my research group. The first one, Banzett, Pedersen, Schwartzstein, Lansing, The Affective Dimension of Laboratory Dyspnea. Air hunger is more unpleasant than work and effort. This was one of the studies in which I was engaged, showing that some of these qualitative aspects of dyspnea are worse, cause more suffering, if you will, than others do. Just having increased work of breathing, which can be bad, doesn't evoke the same kind of discomfort and fear that it does in people with air hunger.
The second one by Banzett, Lansing, and Binks -- again, these are people with whom I've worked -- this is an article called Air Hunger, A Primal Sensation and Primary Element of Dyspnea.
Q. So these authors cited your own research to support their statements about dyspnea?
A. Yes, that's true.
Q. What can you tell us from your own research about the anxiety, panic, and fear provoked by air hunger?
A. This goes back to this questionnaire that we use, this notion of multi dimensions to shortness of breath. Yes, there is a sensation, and yes, it has a qualitative aspect to it, but it also evokes these emotional reactions; these -- this sense of dread, of suffocation, of things that are -- of air hunger that

are just very horrendous for the patient and cause incredible dread on their part.

MR. CLINE: We can take that down. Let's look at another article. If we can put up Plaintiff's Exhibit 55.

Q. Doctor, is this an article that you reviewed and rely on for your opinions in this case?

A. Yes, it is.

Q. And what is this paper?

A. This paper is entitled Dyspnea in a Acutely Ill Mechanically Ventilated Adult Patients. It's a statement of the European Respiratory Society and the European Society for Intensive Care Medicine.

Q. And who are the European Respiratory Society and the European Society of Intensive Care Medicine?

A. European Respiratory Society is analogous to the American Thoracic Society. It's the major academic organization for academic research-oriented pulmonary people in Europe. The European Society for Intensive Care Medicine is, again, a professional organization, primarily for academic, although nonacademic people can certainly join, people who are doing intensive care medicine and, again, might involve both pulmonary people as well as surgical critical care, anesthesia critical care, emergency medicine critical care as well.

Q. Dr. Schwartzstein, did you have any involvement in this ERS statement?

A. Yes, I did.
Q. Is that your name among the list of coauthors there?
A. That's correct. Yes.
Q. Were there any other physicians from this country, the United States, on the committee that authored this European respiratory society consensus statement?
A. No. I was the only American that participated in this process.
Q. And, Doctor, are you familiar with the methodology of how a statement like this is put together?
A. Yes, I am, because we've also done two of these for the American Thoracic Society related to this sort of work. Not mechanically ventilated patients, but this notion of bringing together experts. And what we do is we review the literature on the topic that we're trying to address. We then meet together among the experts and discuss different elements and what do we learn from this and how do we think about it; how will this lead to recommendations for the greater community. And this is in a sense a service that academics provide for the greater community of doctors taking care of patients to help guide them. We then come up with recommendations as well, evidence-based, based on the best research that we have on the topic area.
Q. And, Doctor, what journal was this article published in?
A. So this was published in the European Respiratory Journal, which is the leading journal, also peer reviewed, in Europe for

pulmonary doctors.
Q. Now, Doctor, you had told us and mentioned that the title of this consensus statement is Dyspnea in Acutely Ill Mechanically Ventilated Adult Patients, an ERS/ESICM statement.
What is mechanical ventilation?
A. When a patient develops what's called acute respiratory failure, meaning that whatever their disease process is, they are about to die because they can't get enough oxygen into their blood because they're just not able to sustain themselves, we have to save them, and we do that by putting a tube, an endotracheal tube, into their mouth, down into their windpipe, and then connecting them to what's called a mechanical ventilator. So this is a device that pushes air into the lungs. We can add up to 100 percent oxygen as well to take care of any hypoxia that's going on. And we can control their breathing in a sense by taking over, sustaining them while we're trying to treat the underlying disease or problem that is causing the acute respiratory failure.
Q. So, Doctor, can you explain to the Court how the experience of patients on mechanical ventilation informs your opinions about inmates executed by nitrogen gas?
A. So one of the things that we talked about in this report is that the data has emerged that suggests that people are going to be more short of breath if you have restrained breathing. So one of the problems that we have with mechanical ventilation is

that data has shown if we give people too big a breath with a ventilator, given the disease in their lung, we can overstretch the gas sacs that are called alveoli. And repetitive overstretching of the gas sacs will lead to lung injury. It's called volume-induced lung injury or VILI. So we have to constrain the tidal volume. The tidal volume is the word for the size of your breath. We all take normally about 400 milliliter breaths, little bit less than half a liter.

If we give people bigger breaths with the ventilator and they have injured lungs, we can further injure the lung. So we have to give them relatively smaller breaths. And that makes their shortness of breath worse.

When you are short of breath, you want to take bigger breaths. It's just the reaction of the body to try to compensate for it. And by keeping people with smaller breaths, we are making them more short of breath.

Q. And so how does that relate to -- how does restrained breathing relate to what's happening during a nitrogen hypoxia execution?

A. So based on pictures that I've seen of people who are going through this process of nitrogen asphyxiation, they are placed on a gurney and they have straps that are placed around them from their shoulders, down to their upper abdomen, and they're tight enough that people can't really sit up or move very much from there, and that they are likely to be restraining the

motion of the chest wall and the upper abdomen.

And I mention the upper abdomen in part because when your diaphragm moves, it has to push the abdominal contents out of the way. And if you actually looked at somebody breathing, their abdomen moves out. So if your abdomen and chest wall can't move out, then we are restricting the tidal volume, the size of the breath. And if somebody has an urge to breathe, air hunger, wants to get a deep breath, feels like they can't get enough air, that's all made worse by the inability to get that deeper breath.

Q. Now, Doctor, you used the term nitrogen asphyxiation instead of nitrogen hypoxia. Why do you use that term?

A. Well, the process that's used in this protocol is essentially smothering somebody. So asphyxiation I would argue is the medical term, really, for smothering someone. It's the way that physicians refer to what's happening with this type of protocol.

Q. Thank you, Doctor. Back to Exhibit P55, if you could turn to page 2. In the first sentence of the introduction there, can you read what you and your coauthors wrote about the experience of dyspnea.

A. "Lacking air, having to breathe forcefully, experiencing chest constriction, or more generally the feeling that breathing is abnormal constitute experiences that are among the worst suffering that a human being can experience."

Q. And what did you mean by that?
A. That this type of dyspnea, this air hunger that is associated with these people who are going through this really is an intense experience that is really terrible. It is worse than pain. It is the most unimaginable thing or most -- you can't imagine it. It's just a horrendous experience for people. This is what our patients are telling us, and this is what we are worried about for patients who can't tell us, which is what this paper was about, for people on mechanical ventilation.
Q. Well, Doctor, in fact, in the next sentence, can you explain what you and your colleagues said about dyspnea in relation to pain.
A. "Although it shares many similarities with pain, dyspnea can be worse than pain in that it is consistently associated with the fear of dying."
Q. And can you explain that a little bit more for the Court.
A. It evokes this sense of doom that I just can't do anything about it. I'm going to die. And again, it's distinguished from --
And I'll just use a personal experience. I broke my elbow three years ago in a jogging accident. I got hardware in there with a plate and six screws. And I had terrible pain afterwards, but I could distract myself from it. I wasn't worried I was going to die from that.
And when we've done some of these experiments on healthy

individuals in the laboratory, I've also been a subject for some. I tried it out on myself before we do it with our subjects. And when I've been subjected to this same kind of air hunger that we're talking about, it is totally different, and it is worse than that fractured elbow that I had. I mean, it just -- it's associated with a sense of I've got to escape this, I've got to make this better, that's just different than even really bad pain is.

Q. And, Doctor, is dyspnea associated in any way with physical suffering?

A. I mean, it is a physical suffering that they're going through. This is a part of my body, so it's physical, you know, in that sense, but it has, again, this emotional and affective response to it that just really isn't part of most pain experiences.

Q. Thank you, Doctor. We can put that exhibit down.

You mentioned earlier that you've been involved in other expert consensus documents relating to dyspnea; correct?

A. Yes, that's correct, for the American Thoracic Society as well. Two occasions, yes.

Q. Let's take a look at Exhibit P-74. Can you tell us what this is.

A. I'm having a problem finding it in my binder, but this is the official American Thoracic Society statement, Update on the Mechanisms, Assessment, and Management of Dyspnea.

Q. Doctor, if you need a second to locate it --
A. What was the number again for that one?
Q. P0074.
A. Okay. Got it now.
Q. You've got it, Doctor? Okay. And I think you said this is the -- well, can you tell us what the title of this document is again, please --
A. So this is an official American Thoracic Society statement. Update on the Mechanisms, Assessment, and Management of Dyspnea.

And I just want to explain for a moment, when it says official American Thoracic Society statement. So, yes, we have a group of experts who have, again, come together. This included nurse researchers as well as physicians and physiologists coming together. Again, although it's the American Thoracic Society, there are international people that have been involved in this as well, because they're often members of the ATS.

But once they've come with their conclusion, once we have written a draft of this, it then is reviewed by the leadership of the American Thoracic Society, and they have to acknowledge that it's well done; it meets all the expectations in terms of review of articles and the way this was put together with groups, again, debating various things and so on. So that's how it becomes an official statement. It's quite an elaborate process. I would say it probably took about 18 months. This is

not something that's done overnight. This is a really deliberative process to write something like this.
Q. And can you explain your personal involvement and role in the ATS consensus?
A. Yes. I along with Mark Parshall, who's a nurse researcher, we were the codirectors of this group.
Q. And is P74 the most recent consensus statement from the ATS on dyspnea?
A. This one is from 2012. Yes. We also did one in 1999.
Q. And when you say we, were you involved in that earlier statement --
A. I was also the co-chair -- co --
Q. Sorry, Doctor. Let me finish.
A. Oh, I'm sorry.
Q. For the benefit of the court reporter.
A. Yes.
Q. Let me finish my question, make it a little easier.
Were you also involved in that earlier consensus statement?
A. Yes. I and Dr. Parshall were also the co-chairs of the committee in 1999.
Q. Okay. And, Doctor, what journal is the American Thoracic Society consensus statement published in?
A. As I noted earlier, this is also the American Journal of Respiratory and Critical Care Medicine, again, the leading journal of the American Thoracic Society, also a peer-reviewed

journal.
Q. Thank you, Doctor. If you could turn to page 439 of this document.
A. Yes.
Q. In the top right corner, can you explain what table three is.
A. Table three is titled Descriptors For Air Hunger Commonly Chosen From Lists. And so I had mentioned early on about how we give patients these lists or questionnaires, so to speak, of phrases that other people have used at times for their shortness of breath; which one is commonly chosen by people. So these are descriptors that have been associated with this category of air hunger. And you can see, urge to breathe. Starved for air. Breaths feel too small. Again, that sense, I want to get bigger breaths than I can. Cannot get enough air. I need more air, and I'm feeling a feeling of suffocation.

Again, these are the phrases they use, and you can get the sense of that emotional or affective quality that's associated with it. It's not just a little bit of shortness of breath. I'm starved for air. I'm feeling like I'm suffocating.
Q. Doctor, as part of your research and clinical experience, have your patients described air hunger as a feeling of suffocation?
A. At times, yes.
Q. How about a feeling of being starved for air?

A. Yes. These are among the phrases that I have heard personally.
Q. How about being hungry for air?
A. Yes.
Q. Doctor, we can turn to page 436. In the left side column, top left corner, can you explain what you and your co-authors wrote in this first bullet.
A. "Data from investigations using three-dimensional brain imaging technology demonstrate that dyspnea activates corticolimbic structures." Again, what we're saying now is you have this sensation, and it's actually triggering very specific areas of the brain. It's being processed there in the brain. And being able to make this correlation between I feel this way and, wow, it lights up in the brain at the same time, and it's a part of the brain associated with unpleasant experiences that people have. So this is a nice way of linking what the subject is saying, what the patient is saying, with a neurological correlate that demonstrates how this is being processed neurologically.
Q. And what, if anything, does this data tell us about how dyspnea and pain are related?
A. Well, when you give someone a painful stimulus, you can also find areas of the brain, very similar areas, light up there. And we tend to then think of these things -- again, there are similarities between pain and dyspnea, although there are also

differences. One of the similarities is we can treat them with similar drugs, which are the opioids. That's also mentioned in this paragraph that both endogenous, which are endorphins -- it's a type of endogenous opiate that's released when you're distressed, as well as exogenous medications like morphine or dilaudid that we can use to treat shortness of breath.

Q. Doctor, if you could turn to page 439 of the ATS document.

A. Yes.

Q. In the paragraph that starts with air hunger/unsatisfied inspiration, does the ATS discuss some of the causes or stimuli of dyspnea?

A. They do here. And just to read this first sentence here: "Hunger or unsatisfied inspiration" -- again, another term for air hunger, another phrase for that -- "is intensified by stimuli that increase spontaneous ventilatory drive." So we have a part of our brain that I typically call for my students the controller. The part of the brain that says, breathe this rate. Breathe with this depth of breathing; the size of your breath. So that's ventilatory drive. And the things that provoke that are things like hypoxia, hypercapnia, acidosis, building up of acid in the blood, and signals arising from exercise-related drive. So these are just some of the stimuli that we're talking here.

The last phrase, "Especially if ventilatory response is constrained in some way." So the brain works by saying, I want

to take a breath that, say, is one liter big or one-and-a-half liters big, and I don't let that happen. Well, how does the brain know that? The brain has -- we have receptors all through our body in the muscles, in the joints, in the lungs. And when they do things, when they move, they send information back to the brain saying, this is what you got. You wanted a one-liter breath? Sorry. Half a liter is all you got. And when the brain says, wait a second, I asked for this and I got back this, alarm bells go off. It's not happening the way it should be. And the alarm bell is shortness of breath. Something needs to change. Something has to happen here. Your life is under threat.

Q. Thank you, Doctor. Let's break some of that down.

First, the ATS document mentions hypercapnia. What is hypercapnia?

A. Hypercapnia is elevated carbon dioxide.

Q. Can you give us examples of when hypercapnia would cause dyspnea?

A. So hypercapnia tends to be associated with things where you can't get enough air in and out of the lung. Probably the most common disease that causes that is emphysema where people, because of destruction of lung tissue, are not able to get enough air in and out of areas of the lung that are receiving blood flow and so forth, and they get elevated CO2 levels.

But anything that reduces ventilation. The amount of air

going in and out of the lung per minute, we call that minute ventilation. Anything that reduces that below the level of carbon dioxide that you're producing will lead to elevated levels of carbon dioxide.

Q. Now, Doctor, does a person need to have elevations in carbon dioxide to feel short of breath?

A. No. In fact, the vast majority of patients who are short of breath have normal or low levels of carbon dioxide.

Q. And can you explain that a little more.

A. Well, there are many precipitants for shortness of breath based on which receptors in the lung and other parts of the body are being stimulated. And hypercapnia, again, is relatively uncommon. Hypoxemia, I would say, is much more common than hypercapnia is as well.

Q. And, Doctor, can hypoxemia alone without an elevation in carbon dioxide cause dyspnea and air hunger?

A. It absolutely can. It's relatively appreciated for that now. Historically people didn't really understand how that worked, and so, frankly, even, again, when I was in med school, I wasn't taught about that. But I'm telling you that now as a professor at Harvard med school, I am definitely teaching my students about this and have been for a number of years.

But the literature, particularly from the last 40 years, although a lot of this predates that, it just wasn't in the clinical arena, demonstrates how hypoxemia can cause ventilation

to go up, cause our breathing to go up, and is a strong stimulus for that.
Q. Doctor, you mentioned the literature. Are there studies that looked at whether hypoxemia alone, without hypercapnia, can cause air hunger?
A. Yes. Studies that were performed, again, by members of my research group.
Q. Well, let's take down the ATS document and turn to Plaintiff's Exhibit 72. Tell me when you're there, Doctor.
A. Okay.
Q. Are you familiar with this study, Dr. Schwartzstein?
A. Yes. This is a study by Shakeeb Moosavi, who is actually a British researcher who spent time in our lab doing a postdoctoral fellowship; Dr. Binks, another British researcher with whom I've worked for a number of years; Dr. Lancing from Arizona, a Ph.D. psychologist who was a very big contributor of our work; Dr. Brown from our VA hospital, an expert physiologist and pulmonary physician; and Dr. Banzett is a Ph.D. physiologist as well with whom I've worked.
Q. What is the title of this study?
A. Hypoxic and Hypercapnic Drives to Breathe Generate Equivalent Levels of Air Hunger in Humans.
Q. And what journal was this study published in?
A. This is in the Journal of Applied Physiology, which is arguably the leading journal for physiologists in the world.

Q. Is it also peer reviewed?
A. And is also peer reviewed, yes.
Q. And so what were the authors studying here in this research study?
A. So in a well done, controlled study of healthy individuals who were made hypoxemic by giving them concentrations of gas that had low oxygen levels in it, versus making them hypercapnic, they found equivalent levels of shortness of breath in these subjects. They also found that if I restrained the size of the breath, if I didn't let them take as big a breath as they wanted, as the brain was telling them, that that further exacerbated the shortness of breath that they were experiencing.
Q. And, Doctor, why did your research colleagues look into this issue? In other words, what was the commonly held view about hypoxia as a cause of dyspnea at the time they studied this?
A. The notion for years has been that hypoxia just isn't that bad. We don't see it so much. You know, we see patients who are hypoxemic in the hospital, and they don't seem to be breathing that much or that short of breath. And it comes from a fundamental misunderstanding of the physiology of dyspnea and the way that we have evolved as human beings to do this.
Q. And, Doctor, did you help us create a demonstrative to help explain this point and this point about how we evolved?
A. Yes, I did. It's actually one that I put into my textbook on this and that I use in my teaching on a regular basis.

MR. CLINE: Your Honor, with your permission, I would like to use a demonstrative that depicts Plaintiff's 97. We've showed this to opposing counsel who does not object.

MS. SIMPSON: Correct.

MR. CLINE: May I approach and turn the demonstrative?

THE COURT: You may.

MR. CLINE: Your Honor, I'd also like to ask Dr. Schwartzstein to come down so he can better explain it. May we proceed?

THE COURT: You may.

Q. Dr. Schwartzstein, I think you said these figures were reproduced from your textbook. What can you tell us about your textbook?

A. Yes. So I authored a textbook on respiratory physiology called Clinical Physiology -- Respiratory Physiology: A Clinical Approach because I wanted to make this available to clinicians and to medical students. And this is a required textbook in my first year course as well, and it's used by, frankly, medical schools in the U.S. and internationally. And I've gotten e-mails from people internationally, Imperial College of Medicine in London, as well as people in the Middle East who are using this as well.

So I tried to tie the physiology with clinical medicine because the problem that we had in the past was the

physiologists knew about this and the clinicians didn't. So I'm trying to bring together what we know about physiology, make it available to clinicians from the first year of medical school so they can take better care of the patients and avoid some of the discomforts and things that we know are experienced by patients.
Q. Okay. Doctor, before I ask you to explain what we're looking at here --
MR. CLINE: Just for the record, Your Honor, these figures are on pages 109 and 138 of Exhibit P-79.
THE COURT: Thank you.
MS. KENNY: Your Honor, if Dr. Schwartzstein is going to be pointing to the exhibit, can we either move it or can counsel move so we can see what he's doing? Because we can't see the exhibit.
THE COURT: We can probably do both. If you would maybe turn it so that I can see it but that you can also all see it. If the attorneys need to move, you can feel free to do so.
MR. CLINE: Your Honor, you tell me when is a good angle for yourself. Is that still good?
THE COURT: I can still see it. That's great. And if the attorneys want to move so that you can also see how he's referring to the exhibit -- or to the demonstrative, you can.
A. Your Honor, there are two --
Q. Dr. Schwartzstein, let me ask you a question. Can you just explain what we're looking at here.

A. Your Honor, there are two figures here, and I'm going to start with this one on the left, then go to this one on the right, and back to the left.

Whenever we look at a figure, to begin with you have to look at what the axes are. So on this axis, this is the arterial partial pressure of oxygen. Now, oxygen exists in two forms in our blood. It's dissolved in the liquid part of the blood we call plasma. That term may be familiar to you. It's just mostly liquid and proteins and things like that. And it also exists on hemoglobin in our red blood cells.

And far and away most of the oxygen exists on our red blood cells bound to hemoglobin, but it's in equilibrium with this dissolved oxygen in the blood as well. So we refer to the partial pressure of oxygen, which tells us information about how much is on the hemoglobin. That's just what we often measure, getting a sample of blood from the radial artery. And we live around 100.

Now, on this axis, this is minute ventilation, liters per minute -- so, again, how much air is going in and out of your lung. We use liters in terms of the unit as opposed to gallons or something like that. So liters per minute that's going in and out. And a normal individual might be breathing five or six liters per minute, so way down here. Now, what you notice is that we live with a partial pressure of oxygen of about 100, and we're breathing about, again, five or six liters per minute.

The oxygen saturation, which is a common measure of the pulse oximeters that you may have seen during COVID and so on, where they put this thing on your finger and it tells you what the saturation is, that's looking at the hemoglobin.

So if I have a hundred binding sites on my hemoglobin that can pick up a molecule of oxygen, and we say you're 98 percent saturated, that means 98 out of a hundred of those binding sites have an oxygen molecule. That's really good. That means the content of oxygen in your blood is high. It's going to be delivered to your vital organs so that everything works well.

So at a PO2 of 100, partial pressure of 100, you'll be 100 percent saturated. All the binding sites will be fine. And if you go down to 60 -- so that's a pretty significant drop, 100 to 60 -- actually, ventilation doesn't change, but the O2 saturation doesn't change very much at all either, and that's what I'm going to show over here.

So this now is oxygen saturation. Again, how many of those binding sites? What percent of those binding sites in hemoglobin have oxygen on them? Again, that's where most of the oxygen is in your blood. It's on hemoglobin.

Well, at 100, PO2 of 100, you know, it's right up there near -- almost all the sites are bound with oxygen. And look what happens. As I go from 100 to 60, it doesn't change very much.

Well, why have we evolved that way? I mean, I can be --

drop this oxygen level from 100 to 60, and my hemoglobin is still mostly bound, 90 plus percent bound with oxygen.

And think about a time before medicine, you know, prehistoric times, and you've got this person, and they get pneumonia. Well, if they had a linear relationship like they have here in this area, they would be hypoxic and they would die.

So we evolved in this way because this allows us to have problems with our lungs, mild to moderate problems with our lungs, and still have sufficient --

MR. BUTTS: Objection, Your Honor.

THE COURT: What's the objection?

MR. BUTTS: Narrative testimony.

THE COURT: You need to ask a question.

Q. Dr. Schwartzstein, let me ask. What does the solid line -- well, strike that.

Why does the solid red line at the bottom stay relatively flat or straight from 100 partial pressure of oxygen to 60, but then suddenly shoots up after 60? Can you explain that?

A. So this is relatively flat, as I noted before, because why spend energy breathing more when I'm already still 90 percent saturated? It doesn't make sense. It wouldn't be something that would favor evolutionary development. It's wasted energy.

But now when I get below 60, and I'm dropping my oxygen saturation, and I'm at risk now of organ damage because I don't

have enough oxygen in the blood, suddenly now ventilation takes off and becomes almost a vertical line here. So this now goes from my five or six liters a minute up to 50 to 60 liters a minute, just going down to partial pressures of about 35 to 40. So now I'm desperate to try to do something to correct the hypoxemia. This is a very strong stimulus to breathing.

Q. Doctor, just in layman's terms, what is ventilation? What does that mean?

A. Ventilation is the amount of gas, amount of air going in and out of my lungs. How many liters per minute, every breath. So we measure ventilation, calculate it by our tidal volume, the size of a breath, and the rate at which we're breathing, how many breaths per minute. So the multiplication of size of breath and how many breaths gives me how many liters per minute are going in and out of the lungs.

Q. So, Doctor, how does this figure relate to air hunger and hypoxemia?

A. So, again, the notion, you know, before people clinically were thinking about this was that hypoxemia is not much of a stimulus, but the reality is it's a very strong stimulus. And for this case, with thinking about nitrogen asphyxiation, we're operating below PO2 of 60, and this is an incredibly strong stimulus for ventilation.

Q. Thank you, Doctor.

MR. CLINE: Your Honor, may Dr. Schwartzstein return to

his seat?

THE COURT: Yes.

Q. Doctor, I want to turn back to Plaintiff's Exhibit 72, the Moosavi study that we were looking at before you came down and talked to us about the demonstrative. Can you tell us, what did this study show? What did these authors conclude?

A. The conclusion of this study was that hypoxemia with normal CO2 levels, or even on the low side, produces air hunger and produces symptoms quite similar to what people have with elevated carbon dioxide levels as well. And again, they did this model of constraining ventilation, which exacerbated the shortness of breath.

Q. Doctor, based on the Moosavi study and your own research and experience studying dyspnea over the years, do you have an opinion on whether hypoxia in the absence of carbon dioxide elevation causes air hunger?

A. Yes. This study in particular, figure one I think really demonstrates that hypoxemia definitely causes air hunger in a way that's quite similar to what we see with elevated CO2.

Q. And, Doctor, based on this study and your own clinical and research experience, do you have an opinion on whether hypoxia in the absence of carbon dioxide elevation can cause suffering?

A. Yes. This is a very definitive study in that regard.

Q. Doctor, I want to shift gears. Can patients experience dyspnea and dyspnea-related suffering even when not conscious?

A. Yes. I believe that the studies that are emerging now really give us that conclusion, that people can have dyspnea even when they're not awake.

MR. CLINE: If we can pull back up Plaintiff's Exhibit 55, which we looked at earlier this morning.

Q. Let me know when you find that in your binder.

A. Yes, I have that up now.

Q. This is the ERS consensus statement that you co-authored; correct?

A. That's correct.

Q. And if you turn to page 3 of this consensus statement, in the second paragraph, the paragraph right before you get to table one, you and your coauthors refer to signs of respiratory distress that may indicate the presence of dyspnea. Can you explain what that refers to.

A. The term sign in medicine is something that we observe. So it's some action or visible element of the patient that we're observing that gives us information about underlying symptoms that they're having or pathophysiologic processes occurring in the patient.

Q. And, Doctor, further down in the next sentence, what did you and your co-authors mean when you write, "The inability to verbally or physically report a symptom does not mean that its source is not present and does not cause suffering, as clearly acknowledged about pain"?

A. So, again, we look at a patient who is demonstrating various things to us that are equivalent, that we notice when we have patients who can communicate to us, that is associated, for example, with shortness of breath or air hunger. So when we see this in a patient who cannot communicate, we are inferring that they're experiencing the same suffering that a patient who could tell us about it is experiencing.

Q. And, Doctor, in the middle of table one there's a term, respiratory-related brain suffering. What is respiratory-related brain suffering?

A. Well, again, as they define it -- and, again, this was a group consensus -- it's an ensemble of brain responses to abnormal or abnormally interpreted respiratory related messages. So in other words, I'm short of breath. I'm getting this information back from all these receptors in the body that we're referring to. And even though the patient is not awake and can't communicate, the brain is processing this. The brain is experiencing suffering. Our brain -- it's what we all experience, even though the individuals cannot communicate that to a physician.

Q. And can you explain what you and your co-authors meant in the third bullet there under respiratory-related brain suffering.

A. So dyspnea is disassociated from clinical radiologic or physiologic abnormalities. As a result, dyspnea should be the

primary guide of clinical management when it can be evaluated.
So what that means is I could look --
Q. Just hold that thought for a second. I was asking you about the third bullet in that shaded box that starts, "A clinical appearance."
A. Oh, I'm sorry.
Q. That's okay. What did you and your co-authors mean when you wrote that sentence?
A. So an ensemble of brain responses to abnormal -- abnormally -- are you looking at the first bullet in that --
Q. No, the third bullet --
A. Yes.
Q. -- under respiratory-related brain suffering. Starts with "A clinical appearance."
A. "A clinical appearance of unconsciousness cannot exclude respiratory-related brain suffering.
Q. Can you explain that, please.
A. So just because someone is unconscious -- and, again, to me what I referred to there is they're not awake, just because of colloquial ways that people think of consciousness, but if they're not awake, colloquially unconscious -- we cannot exclude respiratory-related brain suffering. You are not awake, you cannot tell me you're short of breath, but I know from other things that are going on with you that you are short of breath.
Q. Do you and your colleagues discuss in this consensus

statement any data that supports your opinion that respiratory-related brain suffering can occur in patients apparently unconscious?
A. Yes. There are studies emerging now of patients who have had acute respiratory failure. They are treated with mechanical ventilators to save their life. We have to use these small breaths for them to manage their shortness -- or manage their respiratory failure without injuring the lung. And these individuals, many of them, will subsequently -- if they survive the episode of acute respiratory failure, will have mental health problems, including post-traumatic stress disorder, which is felt to be attributable to the suffering they experienced during mechanical ventilation.
Q. In your clinical practice treating patients how, if at all, do you incorporate this idea of seemingly unconscious patients being able to experience and process respiratory-related suffering?
A. There are two major things, and I was in the ICU last week and was employing some of these even during that week. One is to ensure that a patient who is being treated with mechanical ventilation gets analgesia. We don't even have a word, frankly, because of misunderstandings about this for drugs that just relieve dyspnea, but it turns out that opiates, which relieve pain, also relieve dyspnea. So we give them analgesics.
Historically patients were primarily given sedation. Not

analgesia, but sedation. They are different. There have been studies now that show that if I give someone sedation, and they look totally fine, they look totally comfortable, and I give them -- studies were done with a painful stimulus on the arm. And they put them in an FMRI scanner to see if the brain does anything when I do this, and they're sedated, they're not showing anything, and those brain areas we refer to before light up. They are processing the pain, even though you look at the patient, and they look totally comfortable with sedation. So we ensure now that we give them analgesia in addition to the sedation. So that's one area that I've changed.

The second area is what I do when I talk to families of their loved one who has had respiratory failure and is placed on a ventilator. Early in my career, before I did the research and others have done research like we've been describing, I would tell the family, don't worry. We will keep your loved one comfortable. And I no longer say that. I say, we will do our best to keep them comfortable, but I cannot guarantee that they will be comfortable. I cannot guarantee that they will not suffer these kind of mental health problems afterwards as a result of being on a ventilator.

We have to do this because of the other data that suggests, you know -- otherwise the lung injury might kill them, but nonetheless, I have to make them aware that I'll do my best to keep the patient comfortable, but I can't guarantee it.

Q. Doctor, do other doctors with experience treating patients with dyspnea take a similar approach to the unawake patient?
A. Many of these articles we've been talking about are relatively recent. Certainly in the history of medicine, they're very recent. And many doctors who trained and don't follow this literature commonly are not aware of these things. So, yes, this is something that I teach about and write about. It's part of why I do all this, because one of my goals as a physician is to alleviate suffering. And so I view this very personally in some ways as well as professionally, that this is something that I have to do at the bedside, but I want my colleagues and I want the people I'm training to do this when they take care of patients as well.
Q. Thank you, Doctor. We can take Plaintiff's 55 down.
Doctor, I want to shift gears again. Now, you've told us about dyspnea, and you've told us today how bad it is and that patients can suffer even while unconscious. Is that what's happening in these executions by nitrogen gas?
A. Well, again, my phrase for it is they're not awake. But because people sometimes say consciousness means I can't appreciate anything going on, and these data show that people who are not awake, in fact, are experiencing things and have sequelae; have complications later. So I refer to it as in the unawake state, these patients still experience these things. And this is part of what the literature is telling us.

Q. But, Doctor, before we even get to that state, I want to put this all together now. We've talked a little bit today about dyspnea, we've talked about how bad that can be, and we've talked about your demonstrative demonstrating air hunger as hypoxemia sets in.

MR. BUTTS: Objection, Your Honor. Leading.

Q. Doctor, is that what's happening --

THE COURT: Why don't you rephrase your question. Sustained. Rephrase your question.

MR. CLINE: Fair enough.

Q. Doctor, can you tell us, in your opinion, what's happening in these executions by nitrogen gas?

A. So for me, there's almost a straight line correlation between all the physiology that I've been talking about here in terms of what we understand about the multidimensional profile, the emotional and affective responses people have to dyspnea, the physiology of the way hypoxemia works when I get below critical values, I stimulate hypoxia, the studies by Banzett, et al., and Moosavi telling us that hypoxemia alone causes shortness of breath, certainly stimulates ventilation, all of these things lead up to this notion that somebody who is asphyxiating with nitrogen inhalation is experiencing air hunger, the worst form of shortness of breath, of dyspnea, and that this is a form of intense suffering, suffocation, that people could have.

Q. But Doctor, what about the fact that there may not be a rise in an inmate's carbon dioxide levels?
A. Again, carbon dioxide -- in the literature that predates a lot of this as well as the more recent literature, it's not necessary for somebody to have shortness of breath. That was a common understanding in earlier years, but that's really been shown, I think, definitively now by the Moosavi study that you do not need CO2 with hypoxia for hypoxia to cause shortness of breath. The hypoxia alone is sufficient to cause shortness of breath equivalent to CO2 and characterized by air hunger, the most severe form of shortness of breath.
Q. Doctor, do you have an opinion on how long it takes for the brain to stop processing respiratory-related suffering in inmates who are executed by nitrogen asphyxiation?
A. It's hard to be totally certain, but I think we're probably talking at least three to five minutes for that to still be aware, even after the patient is unawake.
Q. And, Doctor, referring back to your demonstrative that you walked through with us, as we think about what is happening to these inmates once the nitrogen gas starts flowing, can you explain where they fall in the context of that figure?
A. So they're in the far left-hand part of that figure where the curve of the figure changes -- and, again, we're talking about the left-hand figure there -- when I get below 60 and suddenly that line takes off, ventilation, again, which is on

the Y axis, goes from five liters a minute up to 50, 60 liters a minute, depending on how far down you go on the hypoxia.

Now, they go down to zero ultimately in the protocol, so that -- it's not even shown there because nobody has ever probably taken them down that level in the study, but the ventilation could be 70, 80 liters a minute, perhaps, if they could actually manage that physically.

Q. Doctor, is there anything about the way these nitrogen asphyxiation executions are carried out that exacerbates the sensations provoked by air hunger?

A. So I've been referring periodically to this notion of constraining or restraining chest wall motion, upper abdominal motion. Again, when the brain says, I want a breath of this size, and I don't allow you to do that, whatever air hunger I would have had with the larger breath becomes more intense when I constrain the ventilation.

Q. Now, Doctor, as part of your involvement in this case, have you seen photos of the gurney and the restraints used by Alabama?

A. Yes, I have seen some photos.

Q. And if you could look in your binder -- if you look briefly at your binder, Exhibits P-100 -- we don't need to pull these up. These have been marked as highly confidential: P-100, P-101, 103, 108, and 110. Just want to confirm that you have those in front of you.

A. Yes.
Q. Are these the photos of the gurney that you've seen?
A. Yes.
Q. Doctor, in your opinion, do the restraints used in nitrogen asphyxiation executions pose a unique problem in nitrogen executions that they would not pose in other methods of execution?
MR. BUTTS: Objection, Your Honor.
THE COURT: What's your basis?
MR. BUTTS: Speculation. He has no basis to know how tight the strap he's viewing in the picture is, and there's been no foundation laid for that basis.
THE COURT: You can cover that on cross-examination. Overruled. Go ahead.
Q. Would you like me to repeat the question, Doctor, or do you have it?
A. I have the pictures here.
Q. Do you have my question? Let me reask it.
A. Yes. Rephrase again. Yes. Thank you.
Q. Based on your review of the pictures and your understanding of constraining breathing, do the restraints used in nitrogen asphyxiation executions pose a unique problem in nitrogen executions that they would not pose in other methods?
A. Yes. It's my understanding that these are placed in order to keep the patients supine or lying flat on the gurney, and

that the inverted triangle over the chest would restrict anterior/posterior motion of the thorax, which would restrain tidal volume. And possibly the bottom level of that with the two other cords coming from the sides just above the umbilicus might restrain the abdominal expansion. So, again, when your diaphragm moves down, your abdomen has to move up. Obese patients, as an example, compress their abdomen as part of the shortness of breath that patients with central obesity have, and this looks like that might well mimic that by restraining the abdominal motion.

Q. Doctor, a condemned inmate facing execution by any method is going to experience some fear and anxiety. Can we agree on that?

A. Yes.

Q. Is the primal fear and panic that you've described as associated with air hunger, is that any different from that generalized fear that an inmate might have facing execution?

THE COURT: What's the basis of your objection?

MR. BUTTS: Leading.

THE COURT: Overruled. You can continue.

A. We all have anticipatory anxiety of something challenging ahead of us, something bad might happen. We have that kind of anxiety. The anxiety we talk about in the multidimensional dyspnea profile is different. It's anxiety evoked by the underlying problem, the shortness of breath, the air hunger that

they have.

And I know that this is different because if you're anxious about something you're going to do tomorrow, I can give you benzodiazepines, Valium-type drugs, Ativan. That reduces anxiety that we all sort of experience in anticipating something bad. Benzodiazepines have been studied extensively as a treatment for dyspnea. They do not work. They do not work.

So to the extent that anxiety is described as an associated part of what's evoked by the shortness of breath in the multidimensional dyspnea profile studies, this is a different anxiety, I believe, than what is experienced by all of us at times when we anticipate something that might be challenging or difficult for us. So it's based on those kinds of studies that I feel this is a very characteristic -- specific characteristic of the dyspnea itself, not the traditional anxiety that we have on a day-to-day basis potentially.

Q. Doctor, before we go any further, I wanted to ask, do you have a personal view one way or the other about the death penalty generally?

A. I have mixed feelings about the death penalty. On the one hand, as good as our justice system is, we sometimes make mistakes. And if someone's been executed, there's no way to rectify that if it turns out they were not guilty of whatever they were charged with and convicted of. On the other hand, I know that people who are sentenced to life in prison without

chance of parole, at least by some things I've read, can be very challenging for the correctional system to deal with. So I, frankly, don't have a specific opinion about the death penalty. I continue to go back and forth in terms of these different elements.

Q. Doctor, to what extent does your mixed feelings about the death penalty in general impact your opinions about using nitrogen gas as a form of execution?

A. It really hasn't been relevant at all. As I alluded to earlier, as a physician whose job it is to alleviate suffering, I feel -- and all this research and clinical work I've done on dyspnea, I think this is an incredibly significant issue, not well appreciated by many physicians. And it is part of my job I believe as a physician in order to alleviate suffering to make this better known, and my participation in this was really largely geared around that construct.

Q. Doctor, I want to switch gears again. There have been studies published in the literature on aviation pilots that suggests hypoxia results in rapid loss of consciousness without any suffering. How do you square those studies in pilots with your opinions about execution by nitrogen asphyxiation?

A. So in those studies, which are usually done at high altitude or pressure chambers that mimic that, the pressure in the alveoli, those gas sacs, is actually less than the pressure in the blood -- of the oxygen in the blood. So the oxygen isn't

just being consumed by the metabolism of the body to cause hypoxemia. It's actually leaving the blood as it perfuses or goes past the alveoli, the air sacs, moving in the opposite direction to what it normally does. So even faster development of hypoxia than you would have. And again, these are pilots, well-trained individuals, young, healthy otherwise. So correlating that with some of the things that might happen to patients, of course, is different, and depending on the individual convict, might be different as well.

But the main thing is that these are -- it's a system -- low-pressure scenario where oxygen is actually leaving the blood at the level of the air sac, which is different than what we're really talking about here.

Q. Doctor, there have also been published case reports describing helium and nitrogen gas suicides that suggests consciousness is, again, rapidly lost. How do you square those suicide reports with your opinions about nitrogen executions?

A. Suicide is a challenging issue, certainly. Helium as a gas is a lower density than oxygen and nitrogen. Its flow characteristics are different. There's less turbulence in the airways at all the branch points. How that might affect gas mixing and other things, you know, is speculative to some degree. I'm not sure of any studies of that. But we know we use helium and oxygen together for people with airway obstruction because of its characteristics as a low-density gas

that doesn't create turbulent flow. So helium is inherently different from oxygen and nitrogen in that way or from nitrogen in that way specifically.

And then people who want to die, these are usually chronically ill patients who have been suffering from their chronic illness and they want to die. In my experience as a clinician over decades of practicing, when I have a patient who tells me they want to die, it scares me incredibly because it's like no matter what I do, they will die. It is some kind of interaction between the brain and the body that I can't characterize more specifically in terms of physiology. I've never seen anything on it. But people who have made up their mind that they're going to die, they will die. And so I think that some of these stories about assisted suicide are a little bit different than what we're talking about with somebody who's not intent on dying.

Q. Finally, Dr. Schwartzstein, there are OSHA occupational and safety incident reports relating to workplace fatalities due to nitrogen exposure. How do you square those reports with your opinions about nitrogen asphyxiation executions?

A. So the reports that I've seen on this, no one has observed what's going on. Someone connected themselves to the wrong gas line, and we don't know, really, what happened to them. We don't know at what point their thinking was clouded in some way so that they couldn't get themselves out of this situation or

take their mask off or whatever.

So they're interesting reports. It's unfortunate, of course, that these things happen. I'm not sure that it really informs me at all about comparing this, say, to a nitrogen asphyxiation scenario.

Q. Doctor, is your opinion on nitrogen asphyxiation executions that you've provided today one that you formed before or after you agreed to be an expert in this case?

A. Well, I agreed to co-author a paper about this before I was ever approached about participating in this proceeding.

Q. And can we -- what can you tell us about that paper?

A. So this was a paper put together largely by European physiologists and respirologists. They knew about my work on dyspnea and asked me to contribute to the publication about this notion of basically smothering somebody as a way of executing them.

Q. Let's put up Exhibit P-45. That should also be in your binders.

A. Yes, I have that.

Q. Is this the article that you mentioned that you co-wrote with other colleagues?

A. Yes, it is.

Q. What's the title of this article?

A. The title is Breath to Death: Nitrogen Asphyxiation For Execution and Assisted Suicide.

Q. And where was this article published?
A. This was also published in the Journal of Applied Physiology, which I mentioned before is peer reviewed and probably the leading journal for physiologists in the world.
Q. Was your article peer reviewed?
A. Yes, it was.
Q. Doctor, if you would turn with me to the last paragraph. Can you read what you and your co-authors concluded about nitrogen asphyxiation.
A. The last paragraph reads, "Ultimately the use of nitrogen asphyxiation for execution or assisted suicide rests on a profound misrepresentation of human physiology. Far from being humane, painless, or peaceful, it provokes dyspnea, panic, suffering, and an unnecessarily violent death."
And I would note that this notion of profound misrepresentation, to me that gets back to this issue that I alluded to earlier about the misunderstanding and hence misrepresentation about what hypoxia can do, both to stimulate the drive to breathe as well as causing shortness of breath or air hunger.
Q. Doctor, based on your knowledge of the literature and your clinical and research experience, do you have an opinion on whether there is a substantial risk that an inmate executed by nitrogen asphyxiation will experience dyspnea, panic, and suffering?

A. Yes. I think that it is highly likely that individuals succumbing to this protocol will experience severe air hunger, possibly in their unawake state, but they will experience that. The brain will process that, and they will have that intense suffering, smothering feeling akin to drowning, if you will, to something that we often can relate to as individuals who are otherwise healthy before they die.

Q. Thank you, Dr. Schwartzstein.

MR. CLINE: Your Honor, I don't have any further questions at this time.

THE COURT: All right. Cross-examination.

MR. BUTTS: Your Honor, may we take a brief recess?

THE COURT: Yes. Certainly. It's 10:31. We will take a recess until 10:45.

(Recess was taken at 10:31 a.m. until 10:46 a.m., at which time the proceedings reconvened, as follows:)

THE COURT: Cross-examination.

MR. BUTTS: At this time, I do also have some prepared binders I would like to hand out to Your Honor and the witness and plaintiff's counsel.

THE COURT: All right. Go ahead.

MR. BUTTS: There are some of the already stipulated -- prepared -- or preadmitted exhibits from plaintiffs as well as stipulated preadmitted exhibits from defendants. At this time, I would like to proffer that on the record that they're

preadmitted.

MR. CLINE: What are they? Can you identify which ones they are?

MR. BUTTS: They're numbers -- they're Defendants' Exhibits 16, 18, 19, 22, 23, 24, 30, 33 through 38, 40 through 41, and 45.

MR. CLINE: No objection.

THE COURT: They're admitted.

MR. BUTTS: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. BUTTS:

Q. Good morning, Dr. Schwartzstein.

A. Good morning.

Q. So, Doctor, you stated earlier that you are one of the co-authors of the Breath to Death: Nitrogen Asphyxiation For Execution and Assisted Suicide article; correct?

A. Yes.

Q. Now, plaintiff's counsel walked through that as its own exhibit, but you actually appended that piece to your expert report in this case, correct, as Appendix C?

A. I believe so, yes.

Q. If you'll turn with me to your report, it's that first Exhibit 41 in the binder. If you'll turn to Appendix C, let's look at Breath to Death together.

Now, that article was submitted for publication on September

11th, 2025; correct?
A. Yes.
Q. And it was accepted for publication on October 22nd, 2025; correct?
A. Yes.
Q. So the Boyd execution, which is the execution that you discuss in your report, occurred on October 23rd, 2025; correct?
A. I don't have the exact date in front of me.
Q. Well, you actually do in your expert report. Let's turn here to paragraph 36 on page 11 of your report. Are you with me, Doctor?
A. Yes.
Q. And do you see there the second sentence of that paragraph?
A. Yes.
Q. Could you read that sentence aloud for me.
A. "According to news reports in Alabama's October 23, 2025, execution of Anthony Todd Boyd by nitrogen asphyxiation, there appeared to be a 25-minute period between the initial flow of nitrogen gas and cessation of cardiac activity."
Q. Thank you, Doctor. So Anthony Boyd's execution was on October 23rd, 2025, a day after Breath to Death was accepted for publication; correct?
A. Yes.
Q. So you had not been able to review the Boyd execution accounts at all prior to the acceptance, publication, and the

authorship of Breath to Death.
A. That's correct.
Q. And you were retained to provide expert opinions in this case in late 2025 or early 2026, thereabout?
A. It was early in 2026.
Q. And so the Breath to Death article was completed and accepted before you were retained as an expert in this case?
A. That's correct.
Q. So look with me at that article, if you will. In Breath to Death, the last sentence of the second paragraph on the right column of page 1. Do you see that, Doctor?
A. The sentence beginning with "We vehemently"?
Q. That's correct.
A. Yes.
Q. Will you read that sentence, Doctor.
A. "We vehemently oppose using inhaled nitrogen for these and related purposes, as stated previously, grounding our arguments in well-established physiological rationale and empirical studies as opposed to speculative emotion and unfounded beliefs."
Q. So that was your published position before -- excuse me. Strike that.
You wrote that with your co-authors; correct?
A. Yes.
Q. So that was your published position before you were retained

as an expert in this case?
A. Yes.
Q. And the stated purpose of the article is to offer, quote, Timely and constructive collective opinion, end quote, that you hope will, quote, resonate with policy makers, physicians, bioethicists, and physiologists, end quote. Correct?
A. Yes.
Q. In other words, the primary goal of that article was to influence policy on nitrogen executions as a method; correct?
A. As stated there, yes.
Q. So turn with me, Doctor, to the -- to Defendants' Exhibit 41 in your binder. This is Air Hunger and Psychological Trauma in Ventilated Patients with COVID 19: An Urgent Problem. Do you recognize this?
A. Yes. Did you say tab 41?
Q. Excuse me, Doctor. Yes. Tab 41, the last -- the second tab 41. This is the Defendants' Exhibit 41.
A. Yes.
Q. And this was published in the Annals of the American Thoracic Society 2020; correct?
A. That's correct.
Q. And you are a co-author there with Christopher Worsham and Robert Banzett?
A. That's correct.
Q. And those American Thoracic Society dyspnea consensus

statements that you cite, the 1999 and 2012 statements, I believe you discussed with plaintiff's counsel, you were a co-chair on those committees that produced those reports; correct?
A. That's correct, yes.
Q. And so a significant portion of that scientific support for your opinions in this case trace back to your own research and that of your fellow co-chairs and co-committees and so forth; correct?
A. Yes. The scientific foundations, yes.
Q. So, Doctor, you have expressed that you have mixed feelings about capital punishment; correct?
A. Yes.
Q. And you've said that those mixed feelings are primarily rooted in concerns about wrongful convictions, both on a systemic level and an individual innocence level; correct?
A. Yes.
Q. So you also believe that if capital punishment exists -- and I'm quoting your deposition testimony here -- quote, we should not be torturing people as part of that process, end quote. Did you say that?
A. Again, I don't have the -- right in front of me now, but if you're reading from the deposition, I'm assuming I said that.
Q. Do you agree with that statement here today?
A. Can you read it to me one more time?

Q. As part of -- as part of capital punishment, if it should exist, you would, quote -- you would agree that, quote, we should not be torturing people as part of that process, end quote.
A. Yes. I still believe that.
Q. And torture is not a medical classification or a medical diagnosis, is it, Doctor?
A. No, it's not a term we use in medicine.
Q. And you have never met Jeffery Lee, have you, Doctor?
A. Mr. Lee? No, I've not met him.
Q. And so have you ever spoken with Jeffery Lee?
A. No, I have not.
Q. Have you ever reviewed his medical records?
A. No, I have not.
Q. And at your deposition, you were not aware that Mr. Lee has testified under oath that he would not hold his breath during an execution; correct?
A. I am not specifically aware of that, no.
Q. Okay.
MR. BUTTS: Your Honor, I have a copy here of Dr. Schwartzstein's deposition testimony. May I approach so he can refresh his recollection?
THE COURT: You may.
Q. Doctor, if you'll turn with me here to page 164 of your deposition transcript. It is in the top right quadrant of this

condensed version of the testimony.
A. Okay. 164? Yes.
Q. Can you read the first question there to yourself and your answer.
A. "Are you aware that Jeffery Lee has testified that he would not hold his breath" --
THE COURT: I think he wants you to read it to yourself. Just read it to yourself.
THE WITNESS: I'm sorry. Okay.
MR. BUTTS: Thank you, Your Honor.
Q. Have you refreshed your recollection?
A. Yes.
Q. So are you aware, Doctor, that Jeffery Lee has testified that he would not hold his breath during his execution?
A. Yes.
Q. And every opinion that you offer about how Mr. Lee will experience his execution is based on general physiology, not on any individualized patient-doctor-based relationship or assessment; correct? With Mr. Lee, that is.
A. Not Mr. Lee specifically, but with other patients that I've cared for and extrapolated from their conditions and the physiology.
Q. And no patient of yours has ever been a condemned felon in an execution protocol of any kind, have they, Doctor?
A. No. I have never had a patient who has been condemned to

death.
Q. And you've never had a patient that has been condemned to die via nitrogen hypoxia, have you, Doctor?
A. No, I have not.
Q. So, Doctor, in your field, data are derived from research studies, observations that help formulate hypotheses, which can then be used -- or tested and used. So is there a distinction between those observations and data?
A. I'm not sure I understand the question.
Q. You would agree that there are distinctions between research studied data and lay witness observations; correct, Doctor?
A. Lay witness observations, yes, I think there are differences often between those and the actual data from controlled studies.
Q. And that being said, eye witness accounts of prior nitrogen executions are not data, they're observations; correct?
A. Yes, they're observations, which we may then try to integrate with studies and other things that we observe -- or know from studies.
Q. The Luft 1951 aviation study, is that data?
A. Can you -- I know you have it somewhere in the binder.
Q. In the binder, yes. Yes, Doctor. In the binder before you, it is Defendants' Exhibit 18.
MR. CLINE: Your Honor, I don't mean to interrupt. Does defense counsel have a binder for opposing counsel? Thank you. Thank you, Your Honor.

Q. Are you with me, Doctor, on the 1951 Luft?
A. Yes.
Q. So this is a research study; correct?
A. I'm just reviewing it quickly, if I may have a moment.
What I'm looking for to assess this is a description of the methods, the methods section, which does not exist in the study, nor is there a specific results section. It's describing some experiences that he witnessed, and it's not -- I would not call this a formal research study, no.
Q. In your prior testimony with plaintiff's counsel, you did credit the results of the study, though, didn't you, Doctor? You just distinguished them as being different because, well, this is dealing with partial pressure related to changes in the atmospheric pressure to simulate pilots and so forth, but you credited the time to loss of consciousness that they found in this study; correct?
A. I helped to -- at that time to explain what I thought was being seen here. But your question to me just now is, is this a research study, and I do not classify it as a research study.
Q. And you wouldn't classify layman testimony of reporters viewing an execution as research studies; correct?
A. That's correct.
Q. And the Breath to Death article that you co-authored, it has right at the top in all capital letters, I believe, perspectives. Now, a perspective piece, that is different from

a typical research study, isn't it?
A. That's correct. A perspective is not a research study. It represents views of the authors for an academic journal, like the Journal of Applied Physiology, drawn from other published work -- high-quality published works. That's how you get this sort of thing accepted for peer review through a peer-review process.
Q. So ultimately, Doctor, this is an opinion and advocacy piece that you have included citations in; correct?
A. It's a perspective of -- as an interpretation of the literature, which is viewed as quality literature, and then drawing conclusions from it and making recommendations based upon that. That would be the way I would characterize a perspective.
Q. So you would disagree that it is your opinion?
A. If I wrote a paper that just said, this is my opinion, it would not be published in a peer-reviewed journal. So this, again, is an informed statement of the literature, what the literature is telling us, and making recommendations. Other people could make different recommendations, so in that -- to some extent that reflects the views of myself and the coauthors here. But it is different from just saying, this is my opinion about something.
Q. So in Breath to Death, you and your coauthors discuss thrashing, violent jerking, heaving and retching, gasping, eye

witness testimonies, essentially. And you've agreed that those eye witness testimonies are not data; correct?
A. That's correct. Eye witness testimony is not data from a controlled study.
Q. So you are relying on more in Breath to Death than peer-reviewed, research-studied data; correct?
A. We put in those kind of descriptions because there were other observations claiming people looked comfortable somehow during it. So this was really just to say, well, there are those observations, there are these observations, but ultimately the perspective was based on physiologic data and studies.
Q. So what observations are you referring to there, Doctor, that people testified -- I'm not sure where that's coming from. Did you cite where people said they felt comfortable in Breath to Death somewhere?
A. I think there were -- again, I'd have to go back and look specifically at the paper if you would give me a moment. Again, if you could just refresh my memory on where that reference is in your binder. Do you have the tab number for Breath to Death?
Q. In your binder, it is Plaintiff's Exhibit 41 there at the front, Appendix C. It is the piece that you appended to your expert report in this case.
A. Okay. All right. 41 is the Worsham article.
Q. It will be the first 41 in your binder.
A. So 41 is my deposition in the binder you've just given me.

Q. It's the large binder, Doctor. Yes, sir.
A. So 41 -- the first 41 is my deposition. The second 41 --
Q. The first 41 should be your expert report.
A. Yeah.
Q. And then if you turn all the way towards the back, at Appendix C, this is the version --
A. Okay. I have it now. Thank you.
Q. -- that is appended to your expert report.
And so there's nowhere cited in this piece that relates to any testimony or assertion that it is comfortable, but you've testified here that the eye witness reports in this piece were in response to assertions that nitrogen asphyxiation is comfortable; correct?
A. Right. We make this statement about contrary to claims, but didn't provide citation for that.
Q. So, then, you are discrediting other potential eye witness reports in favor of eye witness reports that align with your opinion; correct?
A. No. The basis for this paper was from, again, our understanding of the physiology. The inclusion of that was merely as a counter to somebody saying, well, but there are these reports that patients looked comfortable. So we put that in really to counter those reports, but the ultimate basis for this was about the underlying physiology.
Q. So there in paragraph two, will you read the last sentence

of paragraph two for me there on the left column of the first page.
A. First sentence or the last sentence --
Q. Last sentence of the second paragraph.
A. "The misinformed notion that nitrogen asphyxiation is peaceful or humane continues to circulate in public debate, policy discussions, and even legal frameworks, necessitating a concerted scientific and ethical response."
Q. And so the Breath to Death piece, none of it reckons with any of the research or support or bases that people may have for what you claim to be a misinformed notion; correct?
A. Again, I'm not sure I totally understand the question.
Q. In the Breath to Death opinion piece, you have only cited research that aligns with your opinion that nitrogen asphyxiation is painful; correct?
A. I'm not aware of any research that shows that it's not associated with suffering.
Q. Okay, Doctor. The Moosavi study, you have said that that is the primary study for your opinion that dyspnea is caused by hypoxia alone; correct?
A. That is the best study that I know of recently that specifically looks at hypoxemia in a very controlled way to analyze whether it is producing shortness of breath or dyspnea.
Q. And the subjects in the Moosavi study were healthy volunteers; correct? If you would like to turn with me, it

is Exhibit 37 in the binder in front of you, Defendants' Exhibit 37.
A. Yes. Thank you. These were healthy subjects. Yes.
Q. None of the subjects were prisoners or restrained physically or facing an execution; correct?
A. They were not prisoners. They did a piece of the experiment where their ventilation or the size of their breath, rather, was restrained.
Q. And that part of the experiment, their breath was restrained via intubation and a mechanical ventilator; correct?
A. No. They were restrained by breathing from a bag, an anesthesia bag, that was limited in its volume.
Q. Okay. So they had an external bag that was simulating a lung with a limited volume of air; correct?
A. Right. It was looking at this notion of if I don't get the breath size that I want, that my brain is telling me I need, what will that do to the shortness of breath intensity? And it showed that it markedly increased the intensity of the dyspnea.
Q. And those subjects, they could communicate verbally at any time; correct?
A. They were breathing on mouth pieces and things, but they could take it out and communicate, yes.
Q. And so by virtue of being a subject in this type of study, they could stop at any time if they wanted to?
A. Yes.

Q. And none of the subjects ever reached unconsciousness; correct?
A. That's correct. They were all awake during this study.
Q. So in the Moosavi study, CO2 was carefully maintained at hypocapnic artificially low levels; is that correct, Doctor?
A. In the Moosavi study, they were in the low thirties, I believe. Yes.
Q. So the Moosavi study just has no data at all on what subjects would have experienced once they became unconscious if they had; correct?
A. No. This study does not address experiences when not awake. We rely on other studies for that conclusion.
Q. So the Moosavi study does not directly address the unconscious phase of nitrogen asphyxiation at all; correct?
A. No. I think the studies of mechanically ventilated patients provides us with information related to experience of dyspnea when unawake.
Q. The other studies you're referring to; correct?
A. The Demoule study. Yes.
And I would add to that the study of -- the FMRI study of somebody who is made uncomfortable with a stimulus while they were sedated as well and unawake and that their brain imaging lit up. So that's another example of how one can perceive noxious experiences even when not awake.
Q. What MRI study are you referring to?

A. This is the FMRI study that looked at people sedated with propofol and given a noxious stimulus and put in the FMRI scan to look at whether the brain was activated during that time that they were sedated.
Q. Did you cite that study in your expert report or rebuttal?
A. I don't specifically recall that now.
Q. Do you know the name or who authored that study?
A. I'm sorry. I don't recall the author's name at this moment.
Q. Do you recall the title of the study?
A. No, not at the moment.
Q. Do you recall the year the article was published?
A. It was relatively recent, in the last ten years, but I don't remember the exact year.
Q. So you have your expert report there in front of you.
MR. BUTTS: Your Honor, may I have a moment to confer?
THE COURT: You may.
(Brief pause in the proceedings.)
MR. BUTTS: Thank you, Your Honor.
Q. Doctor, if you will turn with me on paragraph 32 -- I believe I know where you're referring to in your report. Can you read paragraph 32 of your expert report for me. Again, that's at the front of the binder, Plaintiff's Exhibit 41. It's page 9 of your report.
A. Paragraph 32 did you say?
Q. Yes, Doctor, if you'll read it.

A. "Healthy patients sedated in an experimental setting with the drug propofol, for example, have been shown to have functional magnetic resonance imaging, FMRI, patterns of conscious activity in the areas of the brain that process noxious stimuli and control adverse emotions such as fear, despite being rendered completely unconscious by propofol." Huang, 2018.
Q. And that Huang 2018, is that the source that you're thinking of?
A. Yes. That was the one in addition to the ventilator studies. Yes.
Q. And you don't recall the title of that source, do you, Doctor?
A. No, not off the top of my head right now. No.
Q. Is it in the materials you relied upon in your report?
A. Well, this is in the report, so it's one of the things that informed me about this and influenced my writing of the report.
Q. Well, that's -- Doctor, I'm asking, is the specific title, the publisher, the full name of the authorship, are those included in your report anywhere? I'm trying to find it here myself. If you want to turn with me to Appendix B, we've got your materials considered list.
A. I mean, it's referenced there with the name and the author's name and the -- the year, so I'm assuming it's in the reference list that went along with the report. What you've given me here

doesn't include the reference list, the citation list.
Q. Are you at Appendix B of your report?
A. Appendix B is my curriculum vita, I think. Is that not -- no. Here it is. 18. I'm sorry. Huang.
Q. Let's go page by page, Doctor. Do you see it there on the first page, items one through nine of your materials considered?
A. It looks like it was somehow left out of the reference list.
Q. So you confirm you do not have a full citation to the Huang 2018 study anywhere in your expert reports?
A. I do not see it in this expert report that's in this binder, no.

MR. BUTTS: Your Honor, at this time, I'd like to move to strike all testimony related to any of the FMRI imaging that the Doctor has been referencing, because he has not provided a source.

THE COURT: What's your response?

MR. CLINE: Your Honor, we would object. We went through a number of articles with Dr. Schwartzstein earlier today, including the consensus statement by the European Respiratory Society, which he was a co-author on, and we looked at specific quotes and sections in that article that talked about MRI imaging studies. Dr. Schwartzstein provided testimony about those imaging studies and how he was aware of them in the context of how you put a consensus statement like that together. And there are citations in the ERS consensus statement about

these very MRI imaging tests that he's now being questioned about. So I think it's clear from his testimony earlier today, being a co-author on this article, which he relied on and which is on his reliance materials, that he's familiar with those studies, he's familiar with that data, and he should be competent enough and is competent enough to testify about them.

THE COURT: What's your response?

MR. BUTTS: Well, Your Honor, it is one thing if he did actually cite it in one of the studies, but I would like the citation. So if it's kind of -- kind of hidden under some bolstering, then we need to know that citation to be able to have confidence that he's an appropriate expert on this.

MR. CLINE: I can make a representation to you, proffer to you what the citation is, or I can do it on redirect, however you want to proceed --

MR. BUTTS: If you'll proffer --

MR. CLINE: -- or however the Court wants to proceed.

MR. BUTTS: Deference to the Court, of course, Your Honor, but if --

THE COURT: If you can proffer the citation, why don't you do so on the record now.

MR. CLINE: Yes, Your Honor. And just so the record is clear, in Plaintiff's Exhibit 55, the ERS statement of which Dr. Schwartzstein is a co-author, reference 26 in that paper is a study by -- I'm going to butcher this -- first name Hofbauer,

et al., Dose-Dependent Effects of Propofol on the Central Processing of Thermal Pain. And that's in Anesthesiology, Journal of Anesthesiology, 2004, volume 100, page 386 to 394.

MR. BUTTS: Is that the only source?

MR. CLINE: I would submit there are multiple citations in the ERS statement which he co-authored and relies on related to that very same topic.

MR. BUTTS: Okay.

MR. CLINE: Would you like me to continue?

MR. BUTTS: Well, I will state for the record that the Hofbauer, R.K., Plourde, G., Dose-Dependent Effects of Propofol that plaintiff's counsel is referring to, it's published in 2004. I do not see Huang or a publication date of 2018. So for the record, that is not cited specifically in his expert report.

MR. CLINE: Your Honor, they've stipulated to his qualifications as we went through today. Dr. Schwartzstein has extensive qualifications. He's a co-author of not only this statement, but the ATS statement, which I believe also talks about how regions in the brain -- the same regions in the brain are stimulated by both dyspnea and pain and discussion about that statement and also --

THE COURT: Well, let me stop you. He's moving to strike the testimony based on the fact that the defense doesn't have any reference to that study. Do you have authority for the fact that absent having the underlying study, he can testify

about the study?

MR. CLINE: No, Your Honor. Not specifically about that study. But as we mentioned, he did rely on articles that discuss that and other studies as part of his work on these -- the ERS consensus statements.

MR. BUTTS: And, Your Honor, we would state for the record that we have not stipulated to Dr. Schwartzstein's qualifications as an expert in MRI imaging. That's not part of the stipulation to his expert qualifications.

THE COURT: All right. In the absence of them being able to have the study, and he is not being offered as an expert on MRIs, I'm going to strike his testimony as to that aspect of the FMRI imaging, unless you can rehabilitate him with respect to that on redirect.

MR. CLINE: Understood, Your Honor.

THE COURT: All right. Go ahead.

MR. BUTTS: Thank you, Your Honor.

Q. While we're still working through your expert report, Doctor, if you'll turn with me to page 27 of your expert report. You wrote that a prisoner's conscious knowledge that he cannot take steps to rectify the underlying cause of his shortness of breath, end quote, that that is an independent factor that amplifies the alleged suffering. You wrote that; correct?

A. You're referring to my report now, which only goes 14 pages. You said page 27?

Q. Paragraph 27, Doctor, that first sentence: "The first factor exacerbating dyspnea is the conscious knowledge that he cannot, the prisoner, take steps to rectify the underlying cause of his shortness of breath."
A. Yes.
Q. You wrote that?
A. Yes.
Q. And so your theory is that this conscious knowledge that you're referring to in your report, that that causes increased anxiety; correct?
A. Yes.
Q. And that increased anxiety feeds back and worsens the dyspnea almost cyclically; correct?
A. Yes.
Q. So that feedback loop, the anxiety-amplifying dyspnea, the dyspnea-amplifying anxiety, that requires the prisoner to be consciously aware of that situation; correct?
A. This is a first factor exacerbating dyspnea. It's not the only thing that's contributing. If I'm fearful about something about to happen, it may well further the intensity of the actual experience that they're doing.
Q. Yes, Doctor. So for this factor, conscious awareness is necessary?
A. Not necessary for them to be short of breath. It's just going to further exacerbate the intensity of the dyspnea.

Q. So the sentence reads: "The first factor exacerbating dyspnea is the conscious knowledge." So, Doctor, the factors we're talking about here are those which exacerbate dyspnea; correct?
A. Yes. But I might have a dyspnea level of ten, and with the anxiety it's 11. So, you know, it's already intense, and it may be even more intense based on an anxiety of knowing that I'm about to suffer from this and die.
Q. And that anxiety is conscious knowledge; correct?
A. Yes.
Q. But if the prisoner was fully unconscious, they would have no conscious ability -- no conscious knowledge of that inability to breathe; correct?
A. Yes. But that's, again -- it's a small factor that may make that sensation worse, but it doesn't mean that in the absence of that, I'm not going to have dyspnea, which seems to be an implication of the question. So I just want to be clear that this is a minor issue. It is an exacerbating factor, but the underlying protocol is what's causing somebody to be extremely short of breath and suffering from this.
Q. So there in that part four of your expert report in paragraph 27, we've been discussing the first factor of conscious knowledge, which exacerbates dyspnea. In 28 you have the second exacerbating factor, the presence of physical restraints. Those are the only two factors that you give in

your report of exacerbations of dyspnea; correct?
A. Of exacerbation of the dyspnea. Yes.
Q. And so would you say, one, 50 percent of the two exacerbating factors is small? Would you agree with what you've just stated?
A. Well, the conscious knowledge part is small. I think the restricted tidal volume is significant -- is very significant.
Q. And so if the prisoner just has no conscious knowledge, that amplification situation you're talking about in paragraph 27, one of the exacerbating factors, that's not going to happen while they're unconscious; correct?
A. I mean, in general, an unawake person is not predicting what's going to happen to them. But this is -- they don't lose their consciousness -- their wakefulness at the early part of the protocol. So this is relating to the fact that in the early part of the protocol, it hasn't been started yet. I know that they're going to do this thing that's going to make me intensely short of breath. And, yes, that preconceived notion, that anxiety associated with that, will contribute to it. And so that's the part of the protocol that we're referring to here -- that I'm referring to here.
Q. And the prisoner also is going to reasonably have anxiety about their impending death; correct?
A. Yes. But as I noted, that's an exacerbating factor, but it's different from the anxiety that's associated with the

actual dyspnea itself.
Q. And the fact of the matter is you actually -- you have no basis with which to extricate those two components, though.
A. I do have a basis, based on what I noted in my testimony about benzodiazepines and their effect on anxiety and the way we typically think about it for predicting some activity we're engaged in or something that's going to happen to us versus the anxiety associated with dyspnea. One is responsive to benzodiazepines, the anticipatory anxiety; one is not responsive to benzodiazepines, the anxiety associated with shortness of breath.
Q. And in those studies you're referring to, they were conscious patients?
A. Yes.
Q. And they were not subject to impending execution?
A. No, they were not.
Q. So, Doctor, we talked a lot about this in your deposition. You have this theory of unwakefulness. So you have testified that even though someone may have no conscious knowledge while they are totally unconscious, that they nevertheless suffer dyspnea while not awake; is that correct?
A. That's correct. And it isn't just my theory. Again, we reviewed this earlier this morning. The statement from the European Respiratory Society and the European intensive care medicine -- European Society of Intensive Care Medicine, this

notion of brain suffering where they also delineate throughout that paper this notion of going from wakefulness to unwakefulness and still having activity and processing and experience of the brain that leads to brain suffering.
Q. And so what source are you speaking to there, Doctor?
A. That was one of the other sources we mentioned -- came up within our -- and I'll try to look for it if you want. It will take a few minutes to try to find it.
Q. What are the kinds of studies that are used in the piece you're talking about?
A. So just to get back to your first point, the discussion about brain suffering is in Dyspnea in Acutely Ill Mechanically Ventilated Adult Patients, the ERS/ESICM statement.
Q. Okay. I've got it here.
THE COURT: Can you state for the record what exhibit number that is?
MR. BUTTS: That is Plaintiff's Exhibit 55.
A. And in table one, they describe respiratory-related brain suffering. An ensemble of brain responses to abnormal or abnormally interpreted respiratory-related messages. And go on to describe other elements of respiratory-related brain suffering.
Q. I see where you're at there on page 3, Table 1.
A. Yes.
Q. I believe the citation there is pointing to end note 12; is

that correct?
A. Yes, that is the citation that they're using in the paragraph above. "The nature and the very existence of dyspnea as a symptom depend on a complex series of processes linking its expression to the underlying phenomena, including past experiences and the associated expectations." And they reference number 12 as you just noted.
Q. And number 12 there on page 19 looks to be by Marlow, Faull, and Finnegan, titled Breathlessness and the Brain: The Role of Expectation, published in Current Opinion Support Palliative Care in 2019; is that correct?
A. Yes.
Q. And you were not a co-author on that study; correct?
A. No.
Q. And you did not participate in that study in any capacity; correct?
A. That's correct.
Q. And so part of your basis there of the PTSD studies, those do include the Worsham, the Banzett, and your own Breath to Death paper; correct?
A. Yes.
Q. Excuse me. I'm referring to, actually, Defendants' Exhibit 41, the Air Hunger and Psychological Trauma in Ventilated Patients with COVID 19, which Dr. Schwartzstein was the co-author of.

A. We're also talking about the Demoule paper which was referenced earlier today as well. Yes.
Q. That would be the 2024 Demoule paper?
A. I can't swear to the year, but let me try to find it.
Q. It should be at the front of your binder, Plaintiff's Exhibit 55.
A. Yes. Yes. Well, no, there's another study -- I'm sorry. There's another study that was done by Demoule that is the actual study that collected the data on which the statement was partly based.
Q. Focusing on the Demoule study --
A. Well --
Q. -- you've relied on that for that proposition that dyspnea causes suffering, even in this unwakeful state and/or apparent unconsciousness; correct?
A. Just to be sure we're in the same place here, this is a study, Prevalence, Intensity, and Clinical Impact of Dyspnea in Critically Ill Patients Receiving Invasive Ventilation. That's Alex Demoule. He's a European, well-respected pulmonary critical care doctor. This was published in the American Journal of Respiratory and Critical Care Medicine, 2022. April 15th, 2022.
Q. So I'm looking at Plaintiff's Exhibit 55, the 2024 published Demoule, Dyspnea in Acutely Ill Mechanically Ventilated Adult Patients in ERS/ESICM statement. It is tabbed 55 at the front

of your binder.
A. I'm sorry. Yes. Sorry. Lots of studies here.
Q. But you did rely on this study; correct, Doctor?
A. Yes. Where they demonstrated increased mental health issues and PTSD following intubation for acute respiratory failure.
Q. And so all of the patients and subjects considered in that study, they were mechanically ventilated ICU patients; correct?
A. I believe so, yes.
Q. And they were not prisoners experiencing nitrogen hypoxia; correct?
A. That's correct. But they were, again, experiencing intense shortness of breath with appearance of being unawake, and yet experienced -- processed this experience in a way that led to mental health issues, including post-traumatic stress disorder. So when you asked me originally why I believed that people who are unawake may be, in fact, experiencing distress, this was some of the information that I rely upon for making that conclusion.
Q. Okay. So every person in those PTSD studies that you rely on, they necessarily subsequently regained consciousness, and they were then able to communicate their experience; correct?
A. Yes. They were able to communicate the experience and give us insight into what was happening to them when they were unable to communicate their experience.
Q. And there's no way to diagnosis PTSD or confirm suffering

from dyspnea until after somebody is awake and conscious and able to communicate, is there?
A. That's correct. But if we know those experiences that are associated with PTSD and someone goes through those experiences, I think we can make a prediction that there's a high probability that they will also experience this kind of a consequence.
Q. But that kind of experience is necessarily different from a nitrogen hypoxia execution where unconsciousness is rendered, brain death follows, and subsequently the death of the person; correct?
A. I'm sorry. Could you repeat the question?
Q. These PTS studies of mechanically ventilated adult patients that wake up after their period of being mechanically ventilated, that is necessarily different from someone who is rendered unconscious as fast as possible by objective, leading to brain death and ultimate death of the person; correct?
A. No. With respect to the comparison that I'm making, which is, are they experiencing potentially severe air hunger and suffering from that in the unawake state, I think they are comparable.
Q. And you have never talked with anyone that has experienced a nitrogen hypoxia execution, have you?
A. That is correct.
Q. And you've never talked with anyone that has survived nitrogen hypoxia?

A. That is correct. I believe there are no survivors of it. Are you aware of any? I'd love to talk to them.
Q. Mr. Jeffery Lee will not regain consciousness after his nitrogen execution to report anything, will he?
A. I believe that's correct.
Q. And you do not know and cannot state with any medical certainty that he experiences any pain; correct?
A. I believe we have sufficient data here to indicate that there will be brain suffering here and that there is intense dyspnea, even when he is in the unawake state.
Q. So that entire evidentiary bridge between brain activity during sedation or unwakefulness or unconsciousness and reportable suffering in all of the PTS studies, it nevertheless depends on the patient surviving to describe it; correct?
A. It depends on a patient's surviving to tell me that they had the experience. It doesn't require them to survive it to have the experience. If you fell off a mountain and got crushed and died, you had this experience, and you may not be able to tell anyone about it.
Q. So, Doctor, this is not falling off a mountain; correct?
A. Correct.
Q. And all of the patients in these PTS studies, they did not undergo precipitous hypoxia; correct?
A. I'm sorry. In which studies, now, that you're referring to?
Q. The Demoule 2024 and those akin to it that you have relied

on for your PTSD position.
A. They may have been hypoxemic before they were intubated and placed on mechanical ventilation. We certainly try to prevent severe hypoxemia during mechanic ventilation.
Q. But they were all conscious when they were mechanically ventilated?
A. No. Well, they were not awake. Again, I -- I'm sorry about parsing out a little bit about the term consciousness, because it's used by many lay people to just say you're not awake, and so you're unconscious. But I believe that they can be asleep or not awake and still have their brain functioning and experiencing stimuli.
Q. So your expert report simultaneously argues that conscious knowledge amplifies suffering, like we looked at paragraph 27, and that suffering occurs without consciousness in paragraph 33; correct?
A. What I'm saying in paragraph 27 is that with anticipatory anxiety about the event, that that will be an exacerbating factor for dyspnea.
Q. And that anticipatory anxiety is necessarily a conscious experience; correct?
A. I believe so, yes.
Q. And then in paragraph 33, you make reference to, quote, patients who survive episodes of acute respiratory failure treated with mechanical ventilation who appear comfortable with

sedation and analgesia, nevertheless frequently suffer from mental health issues, including PTSD, attributed to the dyspnea experienced during mechanical ventilation." Citing to Worsham, et al., Demoule, et al., 2022, Demoule, et al., 2024. This is evidence that individuals can experience distress from dyspnea even in a state of apparent unconsciousness.

Those are both of your opinions; correct?

A. Yes.

Q. And the character of the unconsciousness of all of those subjects and patients in those studies was such that they could wake up; correct?

A. To the extent that they survived their acute respiratory failure, yes, they could wake up.

Q. And so they had not suffered brain damage to the point where they were incapacitated from relaying that conscious experience retrospective; correct?

A. We don't really know that because they died is what you're saying. They didn't wake up.

Q. The PTS study subjects all died?

A. Sorry. You're -- repeat your question. I may have misunderstood.

Q. Doctor, I'm talking about the PTSD studies --

A. Yes.

Q. -- and those subjects that were studied therein.

A. Yes.

Q. They all necessarily woke up; correct?
A. Yes.
Q. And they all necessarily had not suffered a state of unconsciousness which resulted in any brain damage; correct?
A. I don't know whether every one of those patients survived without having some brain dysfunction --
Q. So all of those patients were able to convey consciously, in a coherent fashion, to the authorship of those studies; correct?
A. Yes. They were able to communicate after being extubated.
Q. And so the -- once Jeffery Lee is fully unconscious, the only empirical basis that you have for claiming suffering continues is a PTSD analogy to patients who have survived and not suffered hypoxic brain death, so it is unlike Mr. Lee; correct?
A. Right. I am extrapolating that in the unawake state, as these patients were --
Q. Thank you, Doctor.
A. -- they have experiencing dyspnea --
THE COURT: Let him finish his answer. Go ahead.
A. That being unawake does not prevent you from experiencing dyspnea and the associated suffering.
Q. In your expert report, paragraph 28, we've got the second exacerbating factor of dyspnea as you've alleged, which is the presence of physical restraints; correct?
A. Yes.

Q. And the primary study that you've cited for that proposition is your 1995 paper you co-authored with Manning that is Plaintiff's Exhibit 70; correct?
A. Yes.
Q. That is The Pathophysiology of Dyspnea, Plaintiff's Exhibit 70.
A. Yes.
Q. And in that study, the subjects were quadriplegic patients on mechanical ventilators; correct?
A. Yes.
Q. And their tidal volume was constrained externally by the ventilator settings; correct?
A. Yes.
Q. So the machine was programmed to limit how much air it delivered; correct?
A. Yes.
Q. That is a different physiological mechanism from a seat belt, isn't it, Doctor?
A. It's a different physiological mechanism? Is that what you asked?
Q. Yes, Doctor.
A. No, it's a similar physiological consequence.
Q. So a strap that you're wearing normally akin to a seat belt in a vehicle, is your breathing restricted when you drive?
A. It depends on where the seat belt is and what the nature of

your abdomen is.
Q. And the nature of the abdomen, that refers to your comparison to obese subjects; correct?
A. Yes.
Q. And how they may or may not fit well to a strap?
A. Yes.
Q. Have you ever seen the straps that are used in Alabama's protocol, Doctor?
A. I've seen the pictures of them. I have not seen them directly.
Q. So you have not seen the straps in person?
A. No.
Q. And you have never worn the straps; correct, Doctor?
A. That's correct.
Q. So you have no basis to opine on how tight the straps may or may not be; correct?
A. I have no primary knowledge of that.
Q. And you have no primary knowledge if the straps impede the tidal volume of the condemned on the gurney in any way; correct?
A. No.
Q. So you've asserted that physical restraints can mechanically drive increased respiratory distress independent of consciousness; is that correct?
A. Yes.
Q. So your assertion is that, well, it doesn't matter if

they're unconscious, the straps could still be limiting tidal volume and thus increasing suffering; correct?
A. Yes. We believe that's a key part of the study by Demoule with mechanical ventilation.
Q. So the key part of your theory that unconscious people would suffer is the chest restraint, correct, because it's limiting that mechanical ventilation, even though they're unconscious?
A. You're talking about in the nitrogen asphyxiation --
Q. Yes, Doctor.
A. -- protocol? Yes, it appears that that may be restricting tidal volume at a time when their drive to breathe is exceedingly high from the hypoxia.
Q. And so would it be your opinion that some of the same observable symptoms of increased respiratory rate, heaving and gasping, that even if the person is unconscious, that it could be the restraints causing that?
A. I think the restraints would exacerbate it, not be the direct cause, but would make things worse. So you need to have something that's stimulating your respiratory centers, control centers, telling you to take larger breaths.
Q. So, Doctor, in your rebuttal report, paragraph four, you argue that "Coordinated, purposeful movements observed across nitrogen executions, such as the pulling against restraints, coordinated extremity movements, repositioning, hand gestures, et cetera, are qualitatively different from the tremors and

extensions in the Ogden helium reports."
A. I'm sorry. Can you tell me which paragraph in the rebuttal that you're looking at?
Q. We're looking at paragraph four of your rebuttal.
A. Okay. Yes. Redirect me to exactly what you were asking about. I'm sorry.
Q. So you argued that alleged coordinated, purposeful movements observed across the executions, that those are different from the Ogden movements; correct?
A. Yes. That's what I've written here. Yes.
Q. And so to make that conclusion categorically in a reliable fashion, you would have to rule out any involuntary neurological symptoms; correct?
A. I'm sorry. I would have to rule out any -- I'm not sure I'm understanding the question.
Q. You have ruled out categorically the movements of the Ogden studies, correct, as being dissimilar?
A. As a physician, I tend not to do categorical things. But I said here, to read what I said, "are not consistent with the movements observed in the dissimilar studies." Is that what you're referring to?
Q. Yes, Doctor. And then you go on to state, "For example, Ogden and others describe tremors and leg/arm extensions in the case reports of helium suicides. These are very different from the coordinated and purposeful movements, e.g., pulling against

the restraints, coordinated movements of the extremities, repositioning of the body, hand gestures, et cetera, observed in prior nitrogen executions."
A. Yes.
Q. You go on to state, "As stated in my expert report, coordinated muscle movement as described in the accounts of prior nitrogen executions is indicative of some degree of consciousness and consistent with attempts to relieve air hunger."
A. Yes.
Q. And you said that?
A. Yes.
Q. So that's -- to make that statement, you would have to categorically rule out any neurological symptoms; correct?
A. I'd have to categorically rule out any neurological symptoms. What type of neurological symptoms?
Q. To make that opinion in paragraph four of your rebuttal report, you had to have ruled out any postural reflexing, any other neurological symptoms that come from brain damage and brain death; correct?
A. Certainly there are people who, in the process of dying, may make movements, but these look like coordinated movements. And so to me that indicated that there was enough working, functioning brain activity to do that. Was there some part of the brain that may have been damaged before that? I can't

categorically exclude that. But what I'm saying is I'm observing something that looks like there was sufficient brain activity to do coordinated movements.
Q. But you would not know what kind of brain activity or to what degree; correct?
A. No, I wouldn't be able to tell the totality of brain activity at that point.
Q. So, Doctor, are you familiar with hypoxic myoclonus?
A. Yes.
Q. Can you explain the specific mechanism of that? Because in your deposition you were not familiar, if I recall.
A. I think they're spasmodic movements. I'm not particularly -- I can't tell you a lot more about them in terms of the neurological processing.
Q. So with the degree of understanding that you do have of it, hypoxic myoclonus is characterized by sudden muscle spasms and jerks caused by lack of oxygen to the brain; correct?
A. Yes.
Q. And so these movements can appear coordinated or purposeful, even though they are involuntary; correct?
A. Myoclonus generally does not look like purposeful movement. I'm using this in terms of general activities of myoclonus.
Q. Did you rule out hypoxic myoclonus as explanation for the movements across the execution accounts before forming your categorical conclusion that these weren't indicative of brain

damage?
A. I'm not sure I would phrase it the way that you're talking about. What I'm saying is the reports were evidence of coordinated movements, which meant that there was still functioning brain activity to lead to those movements. If I want to try to get these restraints off, I want to do something to get me out of this. I talked about the anxiety associated with severe air hunger. I must do something to change the environment, or I will die. And so this is the kind of activity I think that would be associated with what these patients are telling us on a regular basis when we inquire about their dyspnea.
Q. So that's all conscious experience; correct?
A. I think they're doing it -- the people are doing this -- conscious implies to me a little bit, the way you're using it, as I'm specifically thinking I need to do it. This is what the body reaction is to it and response to, I have to change this because I am suffering. I am dying. Those words that I used this morning from the patient reports. So this is the body's response to that awareness of suffering.
Q. So if it's the body's response without any conscious thought, it would be involuntary; correct?
A. I'm making a distinction here, just because these -- we're using words here that have different meanings to different people. Conscious is, I have this thing, I need to do this, I'm

moving my arm now to do that. A coordinated conscious activity. I think the reactions that people make when they're under incredible duress are not quite that planned out. I'm doing something to change this situation that I'm in; to relieve this horrendous suffering that I have. So is that conscious in the sense of I'm picking here to do this? That? I'm not sure it's that kind of conscious. We're using it in the sense that this is my response to my life being in endangered by this intense suffering. Yes, that's conscious if you want to use it that way.

Q. So is it your opinion -- are you referring to subconscious movement? What exactly are you referring to, Doctor, between consciousness -- you're using possessive pronouns, my response to being strapped down, things of that nature. So is it your opinion that there is wakefulness or not in nitrogen hypoxia?

A. I think there is wakefulness until there isn't. They're not awake the entire time, but they're awake for part of the time and then not awake.

Q. And any inmate would be awake for part of the time of any execution method; correct?

A. Yes. They're awake for part of the time of the execution. Yes.

Q. Are you familiar with the Lazarus reflex, Doctor?

A. Somewhat.

Q. I remember we discussed it in your deposition, and you were

not familiar with it then. It's a phenomenon where patients have brain stem only function, correct, based on your understanding of it? And so they have no cortical activity; correct?
A. Yes.
Q. They produce coordinated appearing arms crossed and raising upward type of movements; correct?
A. Yes.
Q. Like Lazarus rising up; correct?
A. Yes.
Q. And you weren't familiar with that reflex when I asked you about it at your deposition, were you?
A. No. I looked it up after the deposition.
Q. And so you did not rule out that class of brain stem only reflexes as an explanation of coordinated movements in the execution accounts either, did you?
A. No. But in retrospect, I don't think that's what's being described with them.
Q. Lifting up against the straps?
A. Not with your arms crossed like that, no. I'm trying to get a deep breath, and that's -- my response to it is very similar to that. So I think that's more likely what we were seeing.
Q. And their arms are strapped down in the protocol; correct?
A. Right.
Q. So the lifting of the arms could be the arms attempting to

cross; correct?
A. I suppose it's possible.
Q. So, Doctor, you've mentioned subconscious and -- subconscious movements. Those types of subconscious movements, they would -- they could not have occurred without the prisoner being consciously aware; correct? If the prisoner is experiencing a subconscious movement, that necessarily means that it was not a conscious movement; correct?
A. Again, I'm making the distinction between awake and not awake. We do a lot of movement around when we are sleep, for example, to relieve pressure areas in our body. These are not things you remember in the morning. These are not things that are conscious in the sense of I'm awake and I'm deciding to roll over. We do this all the time in unawake states.
Q. So looking at paragraph 37 of your expert report, you stated, quote, "While other physiological processes may explain some of these movements, all of these listed movements are consistent with movements taken either consciously or subconsciously in an effort to relieve sensations of dyspnea or air hunger." Those are your words; correct?
A. Yes.
Q. So you categorically discredited any potential neurological symptom of movement in that opinion; correct?
A. Again, I did not use the term categorically here. I'm describing what are most consistent movements or consistent with

movements taken consciously or subconsciously in an effort to relieve sensations of dyspnea or air hunger.
Q. So, Doctor, the raising of the arms appears coordinated and purposeful, does it not?
A. Yes.
Q. And the crossing of the arms over the chest would appear coordinated and purposeful, doesn't it?
A. It may, yes.
Q. And the lifting up with the arms crossed across the chest would appear purposeful and coordinated; correct?
A. Yes.
Q. And all of those symptoms are part of the Lazarus reflex; correct?
A. Yes.
Q. And the Lazarus reflex is strictly a symptom of brain stem only neurological functioning; correct?
A. Yes.
Q. Which is to say the cortical part of the brain that is responsible for conscious experience has died; correct?
A. Yes, if you're talking specifically about that reflex. Again, I think there are other explanations for this, as I outline here.
Q. So, Doctor, you also opine that Grayson lifting both legs to 45 to 50 degrees indicated consciousness and consistent -- was consistent with attempts to relieve air hunger; correct?

A. Yes. Consistent with that.
Q. And you base that primarily on Dr. McAlary's declaration; correct?
A. Can you refer me to the paragraph you're looking at right now?
Q. We're looking at paragraph 38 of your report.
A. Yes.
Q. And you cite there to the declaration of Dr. Brian McAlary, Exhibit 4 in the Boyd case, which has been preadmitted in this case as Defendants' Exhibit 16.
And so, Doctor, I remember from the deposition, you are familiar with decorticate and decerebrate posturing; correct?
A. Yes.
Q. And those are known as postural reflexes that are brought on by brain damage; correct?
A. Yes.
Q. And just like the Lazarus raise, the Lazarus cross, that can appear coordinated as well; correct?
A. It can. I would say many of them are quite distinctive and are not typically associated, obviously, with conscious efforts.
Q. Brain damage likely -- strike that. Brain damage begins at minimum at approximately three to four minutes of pure nitrogen inhalation; correct?
A. Yes. That's probably a reasonable time interval for it.
Q. And you testified to that in your deposition; correct?

A. Yes.
Q. The Grayson leg raise occurred at approximately three to five minutes after nitrogen flow began, precisely when brain damage was beginning by your own assessment; correct?
A. Yes.
Q. And you acknowledged in your deposition that a postural reflex explanation for the leg raise was possible; correct?
A. Yes.
Q. And you couldn't rule it out; correct?
A. Yes.
Q. If it's possible that the leg raise was a postural reflex caused by brain damage -- if it is possible -- scratch that. If it is possible that the leg raise was a postural reflex caused by brain damage, then it's not reliable evidence of consciousness; correct?
A. So my testimony is built on the combination of what we understand about the physiology of these processes as well as some of these observations. So while, yes, I can't say with 100 percent certainty about some of the things you're raising now as to what the cause is, when I look at the totality of what's going on, I think that the descriptions -- most of the descriptions that we've seen, certainly in those first three to four minutes, are likely responses to the severe distress that these patients are experiencing, and that was what the basis of the testimony was in the report.

Q. But here today, you cannot state one way or the other that Grayson's leg raise was a conscious movement or an involuntary postural reflex brought on by brain damage?
A. My testimony is about probabilities and things that are consistent with what we understand physiologically. I try not to deal with absolutes. I think those are very challenging in medicine.
Q. So your characterization in paragraph 39 of your report of Boyd rolling to his side and shifting as a, quote, conscious, coordinated effort to relieve air hunger, end quote, that is based on Sarah Clifton's news articles in the Montgomery Advertiser cited in footnote 11 of your report; correct?
A. That's correct.
Q. First sentence of paragraph 39; is that correct?
A. Yes.
Q. And Ms. Clifton is a journalist, not a clinician or a medical observer; correct?
A. Yes, I believe so.
Q. And she was observing from the viewing chamber, not at Boyd's bedside; correct?
A. Yes.
Q. And you testified in your deposition that you would be, quote, even more suspect, end quote, making a clinical claim based solely on a lay person's description; correct?
A. I believe I said that, yes, and I'm sure you're reading from

the deposition.
Q. Would you like to refresh your recollection?
A. Sure, if you can direct me to that.
Q. Okay. That is page 156 of your deposition, if you will turn there with me.
A. Which tab is the deposition?
Q. The deposition is the small notebook.
A. I'm sorry. And the page again?
Q. It's page 156, which is the upper right quadrant. And while you turn there -- well, strike that. Let me know when you have it.
A. So I'm looking at page 156.
Q. Right there on the first question --
A. Yes.
Q. -- in the middle of the quadrant, can you read that question and that answer silently to yourself.
A. Are you referring to the issue of a resident meeting the bar -- I mean a lay person off the street? I'm sorry. I may not be in the same place you are.
THE COURT: Could you speak a little more directly into the microphone? Thank you.
A. I'm sorry. I'm looking at page 156. There is a question: Okay. So a resident would meet the bar, but I mean a lay person off the street --
Q. Doctor, excuse me. Don't read the deposition.

A. I'm not sure I'm in the same place --

THE COURT: Give him the line number -- page and line number.

MR. BUTTS: Thank you, Your Honor.

Q. Line number 16 through 19 is your answer. Can you read that silently to yourself.

A. Yes. So I've read that.

Q. Having read your answer there, I will repeat my question. You testified that you would -- that you would be, quote, even more suspect, end quote, making a clinical claim based solely on a lay person's testimony. Does that answer from the deposition comport with that question request?

A. Yes. This was in the midst of a large discussion we were having during the deposition about observations and how doctors interpret observations in terms of associating the observations with underlying pathophysiologic processes. So it was in that context where I made the comment that a lay person off the street, I would be, you know, potentially suspect about conclusions that they drew necessarily, as opposed to what I may conclude or interpret based on the actual description of what was going on.

Q. Okay. And Ms. Clifton's account is a lay person's account; correct?

A. Yes.

Q. And you offered your opinion about Boyd's conscious state to

a reasonable degree of medical certainty based on that lay person's account; correct?
A. That's correct.
Q. All right, Doctor. So at a strictly brain stem only functioning, where the cerebral cortex is no longer operating, there is absolutely no consciousness whatsoever; correct?
A. If we're talking about purely brain stem function, yes, there's no processing probably going on in the cortex.
Q. Okay, Doctor. So in hypoxic brain damage, it is the conventional medical understanding that the cerebral cortex suffers damage before the amygdala and the brain stem; correct?
A. That's correct.
Q. It is the first to fail; correct?
A. Death is not the first effect. Disorientation, other things go on before the --
Q. Excuse me, Doctor. It is the first to fail? The cortical cortex fails first?
A. The location of the first effect is on the cortex, yes.
Q. So in order for people to have a conscious experiential perception of noxious stimuli, you cannot confirm as a fact the amygdala can produce that perception without communicating with the cerebral cortex, can you?
A. There has to be interactions, yes, between different parts of the brain. Yes.
Q. And whether the cerebral cortex is the part of the brain

that allows for conscious experience, has that been firmly established to your satisfaction?
A. I'm sorry. Has the -- repeat the question again.
Q. Whether the cerebral cortex is the part of the brain that allows for conscious experience, has that or has that not been firmly established to your satisfaction?
A. I think that our experiences are interaction between different parts of the brain, and that includes the cortex.
Q. And you have done no brain imaging studies, have you, Doctor?
A. Personally, no.
Q. And you have never been a co-author of any brain study, have you, Doctor?
A. No.
Q. So putting those together, the cortex fails first in hypoxia. The cortical failure ends consciousness. Brain stem only function means no consciousness at all. You've agreed with each of those, haven't you, Doctor?
A. Other than the fact that the way you're stating it is an all-or-none sort of thing. So people go through stages before death occurs, so to speak, in any particular tissue.
Q. And so you have testified that you can't confirm that amygdala activity alone produces any conscious awareness without the cortex; correct?
A. I'm not aware of any specific studies on that, no.

Q. And so in your rebuttal report, paragraph six, you invoked the International Association for the Study of Pain's definition of pain. That's the rebuttal report, Plaintiff's Exhibit 41, paragraph six.
A. Is that the second 41 tab?
Q. Excuse me. Plaintiff's Exhibit 42, the first 42 tab.
A. Okay. And which paragraph are we in?
Q. And please look to paragraph 67 on page 3 of your rebuttal.
A. Okay.
Q. And the International Association for the Study of Pain defined pain -- or defines pain as, quote, An unpleasant sensory and emotional experience associated with or resembling that associated with actual or potential tissue damage, end quote; correct?
A. Yes.
Q. So the experience in the clinical sense that that definition is using implies some form of subjective awareness; correct?
A. That's not defined in that terminology, no.
Q. So it's not defined one way or the other. Is that fair?
A. Yes.
Q. And a fully unconscious person with no cortical functioning under that definition is not having a sensory and emotional experience in the way contemplated by the definition; correct?
A. So your question is if a brain is not functioning at all, can you have this experience? No. If we're saying, again, if

you're not awake, can you have this experience? I don't think this definition addresses that.
Q. Well, in the definition, it is a tool that's designed for use with patients who can report their experience; correct?
A. To measure a symptom, one has to have a report from the patient. To measure the impact of experiences as was represented in the studies of the patients on ventilators, they had that experience even during times when they can't tell you about it.
Q. And so the definition is not contemplating what a dying, unconscious person is experiencing; correct?
A. Again, depends on your use of the term unconscious. Again, I prefer unawake, and I think this doesn't address that. But, again, this was in response to something in the other expert's report, Dr. Antognini's report, so I just really was making the point here that by the -- he indicated that dyspnea is not pain, and by this definition of pain, dyspnea would be considered pain. You're extrapolating this from other issues. That was intended here specifically in response to one of the claims by Dr. Antognini.
Q. But the IASP definition, it's not designed to be asked of someone who has been rendered unconscious and subsequently passes away before ever regaining consciousness; correct?
A. I think this -- let me just check on this one second. I don't have the reference here. It's 2020, so this is before the

studies that we were talking about this morning, earlier this morning, on the ventilated patients. So it's a definition that comes before other data that inform us differently. And if one were making a definition now, it might be written in a different way. Medicine evolves.

Q. Would you make a definition to ask someone who has perished from unconscious --

A. The question is not whether someone who is dead can tell you about whether they had pain. The question is when somebody is in a dying process, are they experiencing suffering? And that's what we were -- I've been trying to address.

Q. So your opinion is that unilaterally the dying process for someone that wakes up -- that is -- that wakes up from this kind of experience is necessarily the same as someone who perishes as a result?

A. The experience -- while that -- for the person who died, the experience they had before they finally died may, yes, be very similar to the person who somehow survives and wakes up. Yes.

Q. And you have no way to know what that experience was prior to their death?

A. I don't need -- I don't have a way to know of that specifically for a given individual; but extrapolating, again, from the information we have from these ventilator studies, I think we can project that these patients would have experienced -- or these individuals would have experienced this

prior to their death.
Q. But you would agree with me, though, Doctor, that the extrapolation is necessarily different where it does not result in death versus a precipitous hypoxic situation that does result in death; correct?
A. I don't know that I'm making -- no. I'm not sure I would make that distinction.
Q. So they're the same in your expert opinion?
A. I think that someone who's going through a stage -- stages of an event and are suffering, and that ultimately leads to death for one person, but the other person for whatever reason is saved, that the experiences prior to that final event may well be the same. Yes.
Q. And you've cited studies in your rebuttal report that show dyspnea activities activate similar regions as pain; correct?
A. Yes.
Q. But you've never conducted such studies yourself; correct?
A. No. That's correct.
Q. And you've never co-authored any papers reporting the --
A. No. This is based on review of the literature. Yes.
Q. And you're not a neurologist?
A. No, I'm not.
Q. And you're not a neuroanatomist -- anatomist?
A. No.
Q. And you cannot give us the specific neural pathways that

would be involved in postural reflexing of the decorticate or decerebrate posturing; correct?
A. No.
Q. And you wouldn't be able to interpret EEG readings to distinguish between cortical and brain stem only functioning; correct?
A. No.
Q. And has the question of whether the cerebral cortex is required for conscious experience, has that been firmly established to your satisfaction?
A. There are a number of studies coming out now that are raising questions about that issue. I think that has been the historical view, though.
Q. And in your deposition, you actually testified that that question had not been firmly established.
A. And it hasn't been, but I've been seeing since the deposition additional articles that have come out that are talking about a more complex understanding of this process. And it is unsettled at this point, I would agree, but there is certainly interest in this issue with studies being done.
Q. And you've never observed any nitrogen hypoxia in any human subject; correct?
A. No, I have not.
Q. You've never observed a nitrogen hypoxia execution; correct?
A. That's correct.

Q. Have you observed any inert gas asphyxiation at all?
A. No, I have not.
Q. And in your clinical practice, you've actually never seen a patient arrive at the hospital with an oxygen saturation below around 80 percent; correct?
A. Other than in cardiac arrest patients.
Q. And your only publication directly addressing nitrogen asphyxiation as an execution method is the Breath to Death prospectus piece?
A. That is correct.
Q. Which is an advocacy piece; correct?
A. It was a piece designed to inform the public about the physiology -- the public -- the medical community about the physiology underlying these processes and what we believed to be the suffering experienced by people subjected to this process.
MR. BUTTS: Your Honor, may I have a brief moment to confer?
THE COURT: You may.
MR. BUTTS: Thank you, Your Honor.
(Brief pause in the proceedings.)
THE COURT: Thank you. Is now -- are you continuing?
MR. BUTTS: I just have a brief close, and then I'll --
THE COURT: Sorry. I thought you were finished. Go ahead.
Q. (Mr. Butts, continuing:) So, Doctor, just to clarify, your

best study is the Moosavi study; correct?
A. The best study demonstrating that hypoxia causes increase in ventilation and dyspnea, that is I think the best study that's been done, yes.
Q. And the Moosavi study contains no data on the unconscious phase of nitrogen asphyxiation; correct?
A. That is correct.
Q. And every PTSD study you rely on involved patients who survived and woke up to report the experience; correct?
A. That's correct.
Q. Which is necessarily unlike Mr. Lee after undergoing an execution.
A. It's unlike the fact that a person who's executed can't report it. It doesn't mean that the experience is dissimilar.
Q. And brain stem only functioning, there's no consciousness whatsoever; correct?
A. Brain stem only, yes, I would say that that's an appropriate way to describe it.
Q. And so in your own report, paragraph 37, you wrote that those movements, they could have occurred subconsciously or consciously; correct?
A. They could be consciously or unconsciously, yes.
Q. And you published your, quote, vehement opposition, end quote, to using inhaled nitrogen for execution, Defendants' Exhibit 29, before you were retained as an expert in this case;

correct?
A. That's correct, yes.
Q. And you have never met, examined, or reviewed any of Jeffery Lee's records individually; correct?
A. No, I have not.
MR. CLINE: Objection. This has been answered. He's going back over questions.
THE COURT: Yes. This feels like wrap up.
MR. BUTTS: Nothing further, Your Honor.
THE COURT: I want to give you an opportunity to redirect, but it is after 12:30, and we've been going for over an hour and a half. I feel like now is a good time to stop for a lunch break.
Is there any objection to stopping for a lunch break?
MR. CLINE: No objections, but just so you understand, I have one or two questions.
THE COURT: All right. Well, let's finish up with this witness, then.
MR. CLINE: Thank you.

REDIRECT EXAMINATION

BY MR. CLINE:
Q. Dr. Schwartzstein, you were asked some questions about what I believe was the Huang study. Do you remember those questions?
A. Could you refresh my memory? I'm sorry.
Q. Yes. I believe the Huang study was an MRI study --

A. Yes.
Q. -- that you were asked some questions by Mr. Butts about.
A. Yes.
Q. For your opinion on the experience of the unawake patients and what they can suffer, were you relying on that one study, the Huang study, or other studies?
A. I was relying on multiple studies. This was just one of them that had an interesting approach to demonstrate the neurological processing. But it's certainly not the only study that forms my opinions.
Q. And as part of your work on the European Respiratory Society consensus document, were you involved in this extensive literature review that you described earlier today?
A. Yes. Literature review and the ensuing discussions that occurred that were quite involved afterwards.
Q. And in the ERS consensus document that you were a co-author of, did that document discuss brain imaging studies and other data related to the unawake patient?
A. Yes, it did.
Q. And did you cite the ERS study in your expert report?
A. Yes.
MR. CLINE: No further questions, Your Honor.
THE COURT: Any recross?
MR. BUTTS: No further recross, Your Honor.
THE COURT: You can step down. Thank you, Doctor.

It is 12:35. I want to give everybody an opportunity to get something to eat and return. Is an hour enough time, or do you propose a different amount of time?

MS. SIMPSON: That's fine with us, Your Honor.

MS. SHARPE: That's fine, Your Honor.

THE COURT: All right. So we will start back at 1:35. All right. Have a good lunch. And just for your information, if you go down to the basement, there is a deli. You can get lunch there. If you don't want to leave the building and have the delay of coming in and out, that's an option for you. So have a good lunch.

(Recess was taken at 12:35 p.m. until 1:42 p.m., at which time the proceedings reconvened, as follows:)

THE COURT: All right. Welcome back.

I want to clarify my earlier ruling that -- on the motion to strike, I want to make sure my ruling was clear. I am striking any reference to the Huang study from 2018 and any specific testimony related to that specific study. So it's a narrow ruling, but it is specific to the study itself that was not provided. Is that clear?

MR. CLINE: Thank you, Your Honor.

THE COURT: Very good. The plaintiff will call its next witness.

MS. SHARPE: Thank you, Your Honor. I just wanted to introduce a colleague who's joined us at counsel's table, Tommy

Huynh, who has been admitted.

THE COURT: Good afternoon.

MS. SHARPE: And Plaintiff Jeffery Lee calls Dr. Julie Bastarache to the stand.

Your Honor, once again, we have witness binders for both the Court and opposing counsel, so may I approach?

THE COURT: Yes. Please. Thank you.

MS. SHARPE: Your Honor, I would just note that the witness binder contains one demonstrative that we previewed with opposing counsel and that they do not oppose, and the other exhibits are all plaintiff's exhibits which have been preadmitted.

JULIE BASTARACHE

The witness, having first been duly sworn to speak the truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MS. SHARPE:

Q. Good afternoon. Could you please introduce yourself to the court.

A. Sure. Hi. I'm Julie Bastarache.

Q. And where are you employed, Dr. Bastarache?

A. I live in Nashville, Tennessee, and I work at Vanderbilt University Medical Center and also at the VA hospital in Nashville.

Q. What are your roles at Vanderbilt and at the VA?
A. Sure. So I'm a physician scientist, which means I'm a physician. I went to medical school. I see patients. But I also have a research laboratory where I study critical illness and lung issues. So I do both jobs.
Q. And do you also work in ICU?
A. Yes, ma'am.
Q. And with respect to your clinical work, in what areas of medicine do you practice?
A. I practice in pulmonary and critical care medicine.
Q. And can you describe what your medical practice actually involves.
A. Sure. So I spend about 25 percent of my time seeing patients, and that equates to about six weeks a year at our VA hospital right next to Vanderbilt. The bulk of that work is in the intensive care unit, but I do see some consult patients that have pulmonary issues and an occasional outpatient with pulmonary issues.
Q. And how do you spend the other 75 percent of your time?
A. Sure. So that's the scientist role. So I have a large research lab at Vanderbilt, and I study critical illness and sepsis and how that affects organs, like causing lung failure, brain failure, kidney failure, and then I also have some leadership roles at Vanderbilt. So that accounts for the other 75 percent of the time.

Q. And can you describe your experience in the field of pathology.
A. Sure. So I do have an appointment. I'm also a professor of pathology. And that really -- I'm not a clinical pathologist, but my -- I do have clinical experience with pathology.
So I'll explain it a little bit. So my appointment as a professor in pathology is primarily related to my research role. Since I study lung injury and lung disease, that relates to pathology, so I have a lot of experience looking at mouse and human lung tissue from a research perspective.
Then from a clinical perspective, I have been to dozens of autopsies, I've read hundreds of autopsy reports, so I'm very familiar as a critical care physician in reviewing autopsy reports.
Q. And Dr. Bastarache, I am just going to, for the comfort of the court reporter, ask that you slow down a little bit. I know you naturally speak quickly from spending time with you.
A. My apologies.
Q. No, not at all.
In your treatment of patients, do you use the observation of lay witnesses such as friends and family members to inform your diagnoses and treatment?
A. Absolutely. That's actually central to being a physician, and particularly in the ICU where we can't talk to many of our patients. All doctors are trained to get information from

family, friends, the patient him or herself, take those observations, take those statements, and then make medical interpretations on those. So that's part of everyday practice. Most of my patients are not medically trained, so every day I'm interpreting lay witness observations about patients.

Q. And since you obtained your medical degree, can you estimate about how many patients you've treated with pulmonary issues?

A. Sure. So I've seen thousands of patients. I've been practicing pulmonary critical care for over 20 years, so thousands of patients.

Q. And in your clinical practice, do you regularly treat patients with dyspnea caused by hypoxia?

A. Yes. That's a very common thing that I treat as a pulmonary critical care physician.

MS. SHARPE: Your Honor, Dr. Bastarache is an expert in the field of pulmonology, critical care medicine, and pathology, and defendants have stipulated to her expertise.

THE COURT: She's accepted.

Q. Dr. Bastarache, what were you asked to do in this case?

A. Yes. So I was asked to review the eye witness reports of the nitrogen hypoxia executions, review the protocol that was used and also some testimony from prior hearings, and give my expert opinion as to the physiologic effects of hypoxia on the body. And by physiologic, I mean physical effects of hypoxia on the body that would be induced by this method. Also to make

some comments about time to loss of consciousness in these particular cases.
Q. And are all the opinions that you will be providing today be given to a reasonable degree of medical certainty?
A. Yes, ma'am, they are.
Q. And on what are you basing your opinions?
A. So primarily my education, training, and experience as a practicing pulmonary critical care physician. Learning about respiratory physiology is part of our education. I also have a few articles I've cited in my expert reports.
Q. And have you formed opinions in your review of this case about the physiological steps that lead to loss of consciousness during an execution by nitrogen gas?
A. Yes, ma'am, I have.
Q. And what are those physiologic steps?
A. Sure. So there are three main steps involved. The first is the amount of time that it takes from when the nitrogen starts flowing until the mask that is placed on the inmate's face is completely devoid of oxygen. So all the oxygen has been washed out. That's step one. The second step is the amount of time that it takes for the inmate to exchange all of the air in his lungs with the 100 percent nitrogen that's being breathed in. And then the third step is the amount of time it takes the blood to circulate and deliver oxygen throughout the body.
Q. You mentioned 100 percent oxygen. Is it your opinion that

the oxygen in the mask gets down to 100 percent?
A. It's the nitrogen.
Q. Thank you. I'm sorry.
A. I've done that myself.
So no. The lowest it came -- got down in Dr. Antognini's experiment was 2 percent. So it never got down to zero percent.
Q. And I want to walk through those steps with you in a little more detail. As we were just alluding to, the first step is the filling of the mask with nitrogen gas. Do you have an opinion about how long that takes?
A. Yes, ma'am. My opinion is that it takes about 33 seconds for the mask to fill with mostly nitrogen.
Q. And on what are you basing that opinion?
A. That was on Dr. Antognini's test where he tested the mask and how long it took to wash out all the oxygen.
Q. And what is your understanding of the test that Dr. Antognini conducted?
A. So based on the description from his expert report, what Dr. Antognini did was use the system that's used by the Department of Corrections. He placed a towel around the mask to simulate a seal as it would be around an inmate's face and then put an oxygen probe inside the mask to measure the oxygen concentration in the mask and then set a timer from when the nitrogen gas was turned on to calculate how long it took for the oxygen levels in the mask to drop.

Q. So the demonstrative that we have is actually an excerpt from Dr. Antognini's report. If we could pull that up. And that should be in your binder under a tab labeled demonstrative.

Dr. Bastarache, can you describe what is being displayed here.

A. Sure. So this is a simple table showing two things. It's showing the oxygen concentration on the top row -- that's the O2 C-O-N-C, concentration -- and then the bottom row is time measured in seconds. So this is relating the concentration of oxygen measured in the mask from the time when the nitrogen gas was turned on.

Q. And to be clear, which oxygen reading are you relying on your opinion for the time that it takes for the mask to fill sufficiently with nitrogen?

A. Sure. So less than 5 percent oxygen is really where you start to get to critically low oxygen levels of inspired gas, and so I looked for the oxygen concentration to get below 5 percent. The next reading is 3 percent, and that's 33-and-a-half seconds, so that's where the 33 seconds came from.

Q. And are the lungs depleted of oxygen during the 33-and-a-half seconds that the mask is filling with nitrogen?

A. They are -- they're slowly starting to deplete with oxygen during that time, but they are not able to fully deplete with oxygen until the oxygen concentration reaches 3 percent in that mask.

Q. And why is that?
A. It's because of the second step of the air going in and out of the lungs.
Q. And before we get to that second step, does this chart from Dr. Antognini's report inform your opinions in any other way?
A. Yes. So the other thing I looked at in this chart is at what point did the oxygen level get below 15 percent, which is right about the level of oxygen that -- when someone's breathing in that they start to feel dyspneic or air hunger.
So at 10 seconds, the oxygen is about 15 percent, and then at 14 seconds it's 10 percent. So somewhere between 10 and 12 seconds after the nitrogen gas is turned on, the inmate will first start to experience that dyspnea or air hunger.
Q. And in your clinical experience, what is air hunger?
A. Air hunger is the primal urge to get more air. As we heard early this morning, the body has to have oxygen to survive, so when oxygen is not available for whatever reason, the body sends intense alarm signals and gives the sensation that the patient has to get a breath. So that extreme physiologic need to get more oxygen is what we call air hunger.
Q. So moving on to the second step, how does the oxygen in the lungs get replaced with nitrogen?
A. Sure. So the lungs have a lot of air in them, but each time we breathe in and out, we just breathe a small amount. So that's called the tidal volume, which we heard this morning. So

in order to replace all of that gas in the lungs with a different gas, a person has to breathe several times to exchange all of the air that's in the lungs with new air that is being breathed in.

Q. And are you able to estimate how many breaths that would require?

A. Yes. It does vary by age. So in younger men aged 20 to 30, that would be about six to nine breaths, which would take roughly 35 seconds. Older people, 50, 60, 70, takes a little bit longer, so nine to 11 breaths, about 45 seconds.

Q. And is there medical literature on which you rely for your opinion about the number of breaths it takes to replace the oxygen in the lungs with nitrogen?

A. Yes, ma'am, there is.

Q. And can you identify what that literature is.

A. Yes, ma'am. That was the study by Fowler in 1951.

Q. And how does that article support your opinion about the length of time that this oxygen to nitrogen replacement takes?

A. So the reason that this article helps me is because the article was answering this exact question: How long does it take a young, healthy -- and I'm still saying that 60 and 70 is young -- but a young healthy person to exchange all of the air?

So what the scientists did, they took ten healthy volunteers, all men in this age range, and had them breathe 100 percent oxygen in this case, because you can't have someone

breathe 100 percent nitrogen. Had them breathe 100 percent oxygen and measured how long it took to completely get all of the nitrogen out of the lungs. So this study established that range of six to nine breaths for younger men and nine to 11 breaths for older men.

Q. And was the Fowler article on which you're relying, was that published in the peer-reviewed medical literature?

A. Yes, ma'am, it was.

Q. Now, how does the time that it takes for the mask to fill with nitrogen correlate with the time that it takes to replace the oxygen in the lungs with nitrogen?

A. So those things are happening simultaneously; but as you note here, even at 23-and-a-half seconds, there's still 5 percent oxygen in the mask. And even at these very low oxygen levels, hemoglobin, like we heard about this morning, is able to extract more and more oxygen from the limited oxygen supply in the lungs.

This is sort of analogous to mountain climbing. People who climb mountains are routinely exposed to oxygen in the single-digit percent, and hemoglobin has evolved to hold on to oxygen more tightly in those oxygen-poor environments. So while these two things are happening simultaneously -- the mask is getting depleted of oxygen and the air is getting exchanged in the lungs -- there's still very little overlap in those two time intervals because the oxygen really needs to get to 3 percent in

the mask and be fully exchanged in the lungs before there's critically low oxygen levels in the lungs themselves.

Q. So are these times additive?

A. Yes, they are additive.

Q. And then you testified previously that there is a third step, an additional step in the process. Can you explain in more detail what that third step involves.

A. Sure. So that third step is the way that the oxygen gets delivered to the body, and that's through blood flow; blood circulation on red blood cells. So the blood has to move through the lungs and then through the whole circulatory system to first pick up oxygen and then deliver oxygen, and that cycle takes time. So it takes up to 60 seconds for a red blood cell to circulate in the body and return back to the lungs and then takes an additional eight to 10 to 12 seconds to transit through the lungs themselves.

And importantly, when the first round -- let's say you go around one time. When the blood comes back to the lungs to get more oxygen put on, it still has 70 percent oxygen, so it still has a high level of oxygen. So the blood coming back to the lungs in a normal circumstance, someone breathing room air and not hypoxic, the hemoglobin just sort of gets topped up from 70 percent to 100 percent. So it's going to take several cycles of the blood cycling through a nonoxygenated or low-oxygen environment in the lungs, delivering oxygen to the body, for the

hemoglobin in the red blood cells to get critically depleted of oxygen.
Q. And on what are you basing your opinions for the time period that it takes for the red blood cells to circulate through the body?
A. Yes. So this is fundamental physiology that I learned in medical school, residency, fellowship. So this is fundamental cardiopulmonary physiology about the transit time of red blood cells.
Q. And with respect to the time periods that we've been talking about, how does this third step correlate to the first two steps which you have testified are additive?
A. Again, this step is also additive because, like I said, the unique property of hemoglobin is that as the oxygen in the lungs gets scarcer and scarcer, the blood wants to hold on to oxygen, so binding gets tighter. So it really, again, takes getting to those very critical levels of oxygen in the air space before the blood is critically depleted, so the circulation time is also additive to the other two phases.
Q. And at what point in relationship to these three steps that you've outlined would a person then lose consciousness?
A. So those three steps would result in the blood being delivered to the brain having a critically low oxygen to the point where a person would lose consciousness.
Q. And based on these times, have you calculated as a

theoretical matter what would be an average time to loss of consciousness based on these three steps?
A. Yes. And it's important to note that these numbers are derived from idealized experiments -- experiments done in idealized conditions, so the real world condition is a little bit different. This really provides a theoretical framework for the length of time. So the length of time, adding those intervals together, is about two minutes and 18 seconds.
Q. And with respect to this estimate of two minutes and 18 seconds under idealized conditions, would that time period be the same for every person in the same conditions?
A. No. So that really -- so that's really just an idealized, theoretical calculation based on the existing evidence and knowledge of physiology. Each patient is going to have a different experience in time to loss of consciousness. People vary in their sensitivity to hypoxia, their sensitivity to hypercarbia, the time it takes for them to pass out after getting hypoxic. So there's a lot of individual variability. So, again, that 02:18 is really just a theoretical time frame, illustrating those three critical pieces that need to happen, each of which takes time.
Q. And just based on this theoretical framework, in your opinion, what is the likelihood that it will actually take longer for this loss of consciousness in an execution setting?

A. Sure. So this theoretical framework is really getting close to the lower limit. This is never going to be zero, just because each of these things take time. So the best estimate to kind of the floor on how fast this can happen is probably about two minutes, so a few seconds shorter than the 02:18. But again, for a variety of reasons, the -- so some people will be in that two-minute range, but there's going to be a long tail of people that are going to have variable and lengthy -- longer times to loss of consciousness in the same scenario.

Q. Are your opinions about the time to loss of consciousness and the body is depleted of oxygen informed at all by your experience in the ICU?

A. Oh, absolutely. Yes, ma'am.

Q. And can you explain to the Court how your experience with intubation figures in.

A. Yes, ma'am. I'd be happy to. We heard a little about intubation earlier, and that's a situation where someone can't breathe, and they're about to die, and so we need to take over breathing.

What we do during the process of intubation -- and intubation is just that procedure of putting the breathing tube into the lungs. What we have to do in order to make that happen is we do something called rapid sequence intubation, which is we rapidly give the patient a high-dose sedative and a paralytic to make them calm and stop breathing and relax their muscles so we

can get that endotracheal tube into the wind pipe. During that period we -- there are several physicians and nurses in the room. The patient is hooked up to monitors, including pulse oximetry.

So I have lots of experience watching people who are not breathing at all; not getting any oxygen. And we watch -- we can see how fast the oxygen is going down by the pulse oximetry, similar to what the inmates are wearing. And it can take up to minutes for the oxygen levels to go down to really critically low levels. So it actually does take quite some time in the real world for oxygen levels to go down, even when someone's not breathing.

Q. The steps that we walked through in this theoretical two minutes and 18 seconds, do they tell you when inmates executed by nitrogen gas actually lost consciousness?

A. No. No, they don't. As I mentioned, that's really the theoretical framework for these time intervals. Determining loss of consciousness is a visual clinical determination, so the only way to determine when someone loses consciousness is to observe them or read a report of someone who has observed them and described what's going on. So the two minutes and 18 seconds really doesn't have -- doesn't dictate when someone loses consciousness. It's more of a theory.

Q. And did you rely on eye witness accounts of executions by nitrogen gas to form your opinions in this case?

A. Yes, ma'am, I did.
Q. And what were you looking for specifically in those witness observations with respect to loss of consciousness?
A. So, again, we heard a little about it this morning, but there's -- I'm looking specifically for movements that the inmates are making. We classify movements into two different categories.
So the first is purposeful movements -- I know what I'm doing; I'm rolling over; I'm trying to sit up and breathe, so movements that have purpose -- versus unpurposeful movements like a seizure or that myoclonic jerking we heard about. So purposeful movements indicate consciousness, whereas nonpurposeful movements indicate loss of consciousness. So that's what I was looking for as I was reading these.
Q. Now, to the extent any of these eye witnesses provided their own assessment of when an inmate lost consciousness, are you relying on that eye witness's account of that?
A. No, not to the determination of loss of consciousness. So the purposes of what I was doing -- the determination of loss of consciousness really requires some clinical assessment and clinical judgment. And as we heard this morning, often people use that term, and it might mean that someone looks like they're asleep or they passed out. So the loss of consciousness determination is really my determination based on the movements I'm seeing, not relying on a witness to say, oh, that person

lost consciousness.
Q. And based on the eye witness accounts that you have reviewed, were you able to form an opinion as to the time to loss of consciousness in each of the executions that Alabama has conducted by nitrogen gas?
A. Not all of them. A few of them, I think two or three, I believe, just didn't have enough information in the description, and so I was not able to make an assessment as to time to loss of consciousness.
Q. Conversely, were there executions where you reviewed eye witness accounts and felt that you were able to render an opinion as to roughly when loss of consciousness occurred?
A. Yes, ma'am.
Q. Were you also able to form opinions based on these eye witness accounts as to what the inmates experienced during the executions by nitrogen gas?
A. Yes. So I was looking for signs of respiratory distress, dyspnea or air hunger, and so I was looking for those signs also in the descriptions of what the eye witnesses reported.
Q. And are there physical signs associated with air hunger that are observable?
A. Oh, absolutely. And as I mentioned, this is what I assess daily in the ICU. So there are physical signs, and those would include rapid breathing, trying to take a deep breath, being very fidgety in bed, trying to reposition, struggling, trying to

sit up to get more breath, shaking, sweating. So there are lots of signs that could reflect underlying air hunger from hypoxia.
Q. And in your opinion, have all of the inmates who have been executed to date by nitrogen gas, have they all shown signs of air hunger?
A. Yes, ma'am, they have.
Q. And have those signs been consistent?
A. No. Not everyone has to have every sign to display air hunger. People can vary in their outward display, so they're not all the same. But each of them had some of those -- at least some of those features of air hunger.
Q. And are your opinions as to the air hunger that these inmates suffered, are they based on any individual sign, or are they based on the constellation of circumstances and signs that you were observing from the reports?
A. Sure. So any sign or symptom, pretty much regardless, has to be taken in context of everything else that's going on. So it's really -- you know, it's really contextualizing these descriptions in what the actual circumstances are at the moment.
MS. SHARPE: Let's pull up Plaintiff's Exhibit 29, please.
Q. And that should be in your binder as well, Dr. Bastarache.
A. Yes, ma'am. I have it.
Q. I think we're waiting for it to come up on the screen.
Dr. Bastarache, can you identify this article for the Court.

A. Yes, ma'am. This is Nitrogen Gas Execution. Kenny Smith -- Kenneth Smith Convulses for Four Minutes in Alabama Death Chamber.

Q. And who is the author of this article?

A. This was written by Marty Roney.

Q. And do you have an understanding of whether Marty Roney was a witness to Mr. Smith's execution?

A. It's my understanding that he was there during the execution.

Q. And how does Mr. Roney's account of Mr. Smith's execution support your opinions in this case with respect to loss of consciousness during this execution?

A. Yes, ma'am. So we can walk through this.

So the first thing I'm looking for to start the clock, so to speak, is the time that the nitrogen began flowing. And in this case, Mr. Roney says at 7:57 the nitrogen apparently began flowing.

And then in terms of assessing for consciousness, I'm looking for purposeful movements as we've discussed as I'm reading through this. And so the next time period, 7:57 to 8:01, I noted several movements that were in my assessment purposeful movements. So writhing and convulsing on the gurney, his body shaking, his eyes rolling back, clenching his fists and legs, shaking under the sheet, are all evidence of conscious -- purposeful movements in the effort to try to get more air.

Q. And based on Mr. Roney's observations and your interpretations of them, how long did it take for Mr. Smith to lose consciousness?
A. So in order to determine that, I looked for the last time that I saw a movement that I considered to be purposeful. And the next time frame here is 8:02, and after that I did not see any evidence of purposeful movements. So my time interval was 7:57 to 8:01.
Q. And did any of the descriptions in this article indicate to you whether Mr. Smith was experiencing air hunger?
A. Yes, ma'am, they did. And there was some overlap between the two. Those would be taking deep breaths, body shaking, eyes rolling, gasping for air.
Q. Thank you, Doctor.
MS. SHARPE: Let's pull up Plaintiff's Exhibit 126.
Q. Dr. Bastarache, can you identify this article for the Court.
A. I'd be happy to. This is Witnessing Alan Miller's Execution: A Firsthand Account From Alabama's Death Chamber.
Q. And who is the author of this article?
A. This was written by Gladys Bautista.
Q. Do you have an understanding of whether Gladys Bautista was a witness to Mr. Miller's execution?
A. Yes, ma'am, it's my understanding that she was.
Q. And how does Ms. Bautista's account of Mr. Miller's execution support your opinions in this case with respect to

loss of consciousness during this execution?
A. Yes. So I went through a similar exercise. So in this report, at 6:18, it was noted that the gas started to flow. Then I looked for evidence of purposeful movements. And so at 6:18, I noted purposeful movements, specifically lifting his head off the gurney; struggling against restraints. And those were described as continuing for two minutes. And then at 6:19, again, movements continued. And then the next conscious movement that I noted was at the 6:22 time period, head lifting -- lifting his head from the gurney. That is a conscious movement in my opinion.
Q. And that time period in which the head continued to lift from the gurney was what time period?
A. So the exact end of that is not clear. So starting at 6:22, it says the next two to three minutes, so up to 6:23, 24, 25.
Q. And based on Ms. Bautista's observations and your interpretation of them, about how long did it take for Mr. Miller to lose consciousness?
A. About seven minutes.
Q. Now, does Ms. Bautista also indicate that Mr. Miller appeared to lose consciousness earlier than that?
A. Yes, she does make that notation.
Q. Again, why do you disagree with that?
A. Because I see evidence of purposeful movements after that assessment by Ms. Bautista.

Q. Do any of the descriptions in Ms. Bautista's article also indicate to you whether Mr. Miller experienced air hunger during the execution?
A. Yes, ma'am, they do. And those would be taking deep breaths. Also lifting the head off the gurney, struggling against restraints, trembling and shaking. And then at 6:20, 6:21, gasping for air.
MS. SHARPE: Let's pull up Plaintiff's Exhibit 127, please.
Q. And Dr. Bastarache, can you identify this article for the Court, please.
A. Yes, ma'am. This is "Alabama Executes Dale Grayson by Nitrogen Gas for 1994 Murder. Grayson was Convicted with three other men for the brutal slaying and mutilation of 37-year-old Vickie Lynn Deblieux."
Q. And who was the article -- pardon me. Who is the author of this article?
A. That would be Kent Faulk.
Q. And do you have an understanding of whether Kent Faulk was a witness to Mr. Grayson's execution?
A. Yes. It's my understanding that he was.
Q. And how does Mr. Faulk's account of Mr. Grayson's execution support your opinions in this case?
A. So the only thing I was able to get from this particular article was the time that the gas started flowing, and I put

that time at 6:12.

MS. SHARPE: Let's pull up Plaintiff's Exhibit 17, please.

Q. Dr. Bastarache, can you identify this document for the court, please.

A. Yes, ma'am. This is declaration of Dr. Brian McAlary.

Q. And is it your understanding that Dr. McAlary was a witness to the execution of Mr. Grayson?

A. Yes, ma'am. That's my understanding.

Q. And how does Dr. McAlary's account of Mr. Grayson's execution support your opinions?

A. Yes. So this allowed me to put a time interval on the loss of consciousness. So point 13 and point 15 are where I get the most useful information. So Dr. McAlary talks about the patient exhibiting significant anxiety and fear, including rapid eye movements and raising his head off the gurney. And simultaneous with that, in number 15, Mr. Grayson lifted both legs off of the gurney. I interpret those as purposeful movements. And Dr. McAlary says that these movements went on for approximately three to five minutes.

Q. And so based on these observations, do you have an opinion as to how long it took for Mr. Grayson to lose consciousness?

A. Yes, ma'am. Between three and five minutes.

Q. Do any of Dr. McAlary's descriptions indicate to you whether Mr. Grayson experienced air hunger during his execution?

A. Yes, they do, similarly in 13 and 15. So he's described as having an increased depth and rate of breathing, anxiety and fear, raising the head and the feet off the gurney, are all evidence of air hunger.

MS. SHARPE: And let's pull up Plaintiff's Exhibit 86, please.

Q. Can you identify this article for the Court, Dr. Bastarache.

A. Yes, ma'am. This is "Alabama Executes Gregory Hunt by Nitrogen Gas for 1988 Murder of Karen Lane."

Q. And do you have an understanding of whether this reporter was a witness to Mr. Hunt's execution?

A. Yes, ma'am. It's my understanding that this writer was there.

Q. And if you flip to the second page, I'm going to ask you to assume, based on documents that have been produced in this case, that the nitrogen gas began to flow at 5:55. Taking that into account, how does this --

MR. THOMPSON: Objection, Your Honor. There's been no foundation laid that the gas did, in fact, flow at 5:55 p.m., and Dr. Bastarache has no personal knowledge of when that would have begun.

MS. SHARPE: I'm asking the witness to assume at 5:55. Not that it's an actual fact, but asking that as an assumption that she make for purposes of her calculations. If it's later shown that it's different, we can reexamine, but I'm just asking

her to use that time in order to derive an interval, not to take it as an actual fact in the case.

THE COURT: Overruled. You can continue.

A. Thank you. I'm sorry. I'll let you ask the question.

Q. Yes, Dr. Bastarache. I was asking you to assume that the nitrogen gas starts to flow at 5:55. Taking that as an assumption, how does this reporter's account of Mr. Hunt's execution support your opinions in this case with respect to loss of consciousness?

A. Sure. So I noted as 5:57 that Mr. Hunt was lifting his head off the gurney and he jerked his left knee up and his body shook. And then at 5:59, lifting head and feet into the air. And then at 6:01, the left fist was balled tightly. And that was the last conscious movement that I noted at 6:01.

Q. Based on this reporter's observations and your interpretations of them, how long did it take for Mr. Hunt to lose consciousness during this execution?

A. That would be 5:55 to 6:01, which would be approximately six minutes.

Q. And do any of the descriptions in this article indicate to you whether Mr. Hunt experienced air hunger during his execution?

A. Yes, ma'am, they do. So at 5:57, breathing more heavily and lifting his head off the gurney and also his knee. Lifting head and feet off the gurney at 5:59. At 6:01, breathing deeply.

Those are all signs of air hunger.
Q. Dr. Bastarache, can you explain to the Court how it is that you've calculated a theoretical number of two minutes and 18 seconds or so from a physiological standpoint for loss of consciousness to occur and opined that the executions that you've reviewed have taken up to seven minutes? Can you explain how you reconcile those numbers?
A. Sure. Absolutely. So that physiologic basis is really a theoretical basis based on idealized experimental conditions. And as I mentioned, although it's an average of a few people, it sort of represents the floor.

I think there are a couple of factors that could have prolonged this or could have explained a longer time period than that, one of which is that I never saw -- I didn't see evidence that the nitrogen that was being breathed in ever got to 100 percent. So even after 45 seconds, there was still some oxygen going into the lungs. So that would make the time longer.

Also, individuals vary greatly in how they're going to respond. In each of those physiologic steps, there's wide -- there's variation only out to the longer side, again, we talked, not to the shorter side. Just like people can run at different speeds, there's variation.

And then finally, we talked a little this morning about the breathing being restricted. So if the inmates aren't able to breathe deeply, that would also prolong the time.

So I think those factors are what explain the difference between the theoretical calculation based on idealized experiments and what we see in real life.

Q. We saw in some of the articles descriptions that the inmates took deep breaths. Can you explain how that squares with your opinion that you offered with respect to this chest restraint and their ability to breathe deeply.

A. Sure. So taking a deep breath can be really very variable. So as we're all sitting here breathing quietly, we're taking pretty small breaths. But when I see someone take a deep breath or when a person is witnessed to take a deep breath, that breath can be twice the size of our normal breath or five times the size of a normal breath. So there's a wide variation. So while these inmates were able to breathe more deeply, based on the restriction on their chest, they weren't able to maximally take the deepest breath that they could.

Q. Dr. Bastarache, before we move on, can you please share with us, what are your personal views of the death penalty?

A. My personal views are that I'm opposed to the death penalty.

Q. And do those personal views affect the opinions that you're offering in this case whatsoever?

A. No, ma'am, they don't.

Q. I want to switch gears a bit and talk about your opinions in this case with respect to pathology and autopsies. You testified earlier about your experience in those areas, and I

wanted to ask, in forming your opinions in this case, did you review autopsy reports from prior nitrogen hypoxia gas executions to form your opinions?
A. Yes, ma'am. I had the opportunity to review four autopsy reports.
Q. And which autopsy reports were those?
A. Those were Boyd, Grayson, Miller, and Smith.
Q. And what did you observe, if anything, that was notable about these autopsy reports?
A. The thing that most stood out to me was all four autopsies were described -- the lungs were described as having pulmonary edema, and that's an abnormal finding. So that struck me that they all had pulmonary edema.
Q. What is pulmonary edema, Doctor?
A. Pulmonary edema is when the lungs start to fill with fluid. Normally the barrier -- the cell barrier between the blood and the air space, the air sacs, is very, very tight to keep the lungs dry. We need to have dry lungs in order to exchange gas. If that becomes disrupted, the lungs can fill up with fluid, and then oxygen and carbon dioxide can't be exchanged. So pulmonary edema is really the lungs filling up with fluid.
Q. And do you treat patients with pulmonary edema?
A. Yes, ma'am.
Q. And what does the presence of pulmonary edema in the autopsy reports of these inmates indicate to you with respect to

nitrogen asphyxiation as an execution method?
A. Absolutely. So when I saw the pulmonary edema, I went through the exercise of trying to figure out, well, why is there pulmonary edema? Pulmonary edema -- and, again, this is the -- one type of pulmonary edema is the type that I've been studying in my lab for 20 years. That's called acute respiratory distress syndrome. And that type of pulmonary edema, there's actually injury to the cells that line both the blood vessels and the air sacs. That pulmonary edema happens in response to something else. A pneumonia, sepsis. And then over days, the ARDS or acute respiratory distress syndrome can develop. Obviously, that was not what happened here, because this pulmonary edema developed very quickly.

So I ruled out ARDS or what we call noncardiogenic pulmonary edema, and that left the other type of pulmonary edema, which is cardiogenic pulmonary edema. In that type of pulmonary edema, the lung structure remains completely intact, but the pressure in the blood vessels in the lungs gets higher than the pressure of the air in the air sacs. So the plasma from the blood is essentially squeezed or pushed into the air sacs because of pressure changes. When that type of pulmonary edema happens, we call it cardiogenic, because it happens because of heart or circulatory system problems.

One common way that people get noncardiogenic pulmonary edema is acute heart attacks. I ruled out heart attack as a

cause because although heart attacks can cause pulmonary edema, the formation of pulmonary edema would have to occur over several minutes to hours and not seconds to minutes as it did here.

So that really left me with one type of pulmonary edema, and we call that flash pulmonary edema. The reason we call it flash pulmonary edema is because it happens almost instantaneously, and it happens as a result of sudden increase in blood pressure in the circulation. So sudden increase of blood pressure in the body translates back into the lungs and suddenly increases the blood pressure in the lungs, leading to fluid rushing in to the air spaces.

So it's my opinion that more likely than not, flash pulmonary edema is the cause of the pulmonary edema that I saw, that I noted on these autopsies.

Q. And how does the presence of flash pulmonary edema in the autopsies of inmates executed by nitrogen gas correlate at all with dyspnea or air hunger?

A. So as you pointed out, I treat people that have pulmonary edema from both causes. And just having extra fluid in the lungs or pulmonary edema makes it extremely difficult to breathe. Suddenly these light, pliant, spongy lungs are heavy and filled with fluid. So when fluid rushes into the lungs, it becomes very, very hard to breathe. In fact, when we see patients with severe pulmonary edema, that's the situation where

we have to intubate them. So it can cause significant dyspnea. So I think it's additive to the hypoxia that causes dyspnea.
Q. Do you have an opinion as to when during these executions these inmates would have developed flash pulmonary edema?
A. Yes, ma'am, I do. These would have had to happen very early on in the executions, during the time when air hunger was occurring and reaching its peak. The reason for that is because it takes really extreme high levels of blood pressure to get fluid into the lung like this. And by the time an inmate loses consciousness and transitions into agonal breathing, heart rate and blood pressure are very, very low. So these -- the pulmonary edema had to develop early on during the execution.
Q. And is it your opinion that the inmates were likely conscious when the pulmonary edema developed?
A. Yes, ma'am. Based on timing.
Q. To sum up, Dr. Bastarache, what are your conclusions about Alabama's use of nitrogen gas as a method of execution from a physiological perspective?
A. Sure. So from a physiological perspective, this forced nitrogen hypoxia causes extreme air hunger that lasts up to minutes, during minutes of consciousness, and also it's a physiologic stress that's above and beyond just the nervousness and the stress of being executed. So it's this intense physiologic stress that causes intense suffering in the moments before death.

Q. Thank you, Dr. Bastarache.

MS. SHARPE: I'll pass the witness.

THE COURT: Cross-examination.

MR. THOMPSON: Your Honor, permission to approach to hand the witness a binder?

THE COURT: Yes, you may.

MR. THOMPSON: We have one for you as well.

Your Honor, there are two tab 34s that represent Defendants' Exhibits 34 and 35, but I'll make sure that everyone is clear where we're at if that distinction becomes relevant. And we apologize for the error.

MS. SHARPE: Can I just ask, do the tabs correlate with your --

MR. THOMPSON: Yes, they do.

MS. SHARPE: Your Honor, for the Court's benefit, I will just note that we don't have objections to the preadmission of the exhibits that have been designated for Dr. Bastarache's cross-examination.

THE COURT: All right. So those are Defense Exhibits 21 through 32, 34, 35, 41, 43, and 45?

MR. THOMPSON: Yes, Your Honor.

THE COURT: All right. Those are admitted.

CROSS-EXAMINATION

BY MR. THOMPSON:

Q. Dr. Bastarache, there was some discussion on direct about

this two minute and 18 second time estimate that you've come up with, and it started with the 33 seconds estimate to get the oxygen saturation level in the mask environment to approximately 3 percent; is that correct?
A. Yes, sir.
Q. And then you had the second step, which was 35 seconds for a patient or a person in their twenties and thirties for the lungs to completely -- for nitrogen to completely displace the oxygen in the lungs, and then anywhere from 30 to 60 seconds from that point when oxygen saturation in the lungs had reached zero or approximately zero for loss of consciousness for a total of two minutes and 18 seconds. Is that a fair summary?
A. Yes. And one other point was for older people, it's 45 seconds to exchange gas. But, yes, that's where I get those intervals.
Q. So for someone in their twenties and thirties, your estimate would be two minutes and 18 seconds. For someone in their fifties and sixties, that time frame jumps up to two minutes and 18 seconds. Is that a correct distinction?
A. It's whatever those add up to. I'd need a calculator to add those up. I can't do that in my head.
Q. Sure. I won't make you do math. But there's a ten-second difference at step two, based on the age of the person that we're talking about. Is that fair?
A. Yeah, that's fair. And, again, these are theoretical

numbers based on idealized conditions.
Q. Sure. On that point, you said that this was, as you just said, the lower bound of your theoretical estimate; is that correct?
A. Close to the lower bound, yes.
Q. How does that statement account for the fact that you are describing these time estimates as additive as opposed to overlapping in some significant way?
A. I guess I'm not sure I'm understanding the question.
Q. In other words, as I understand that two minute and 18 second estimate, you are taking as a given that there is either no displacement going on as the mask is filling with nitrogen or a negligible amount.
A. I think what I said was a little bit different. So these things are happening, but they have to -- the -- in terms of the concentration of oxygen in the mask and exchanging it in the lungs, the oxygen in the mask has to reach that critical level before it can exchange. So there's a slight amount of overlap, but the overlap in the time intervals is negligible.
Q. But this is -- I understand it's a theoretical baseline, but it is drawn from cardiovascular pulmonology first principles. Is that fair?
A. Yes. From knowledge of cardiopulmonary physiology and from some experimental studies, yes, sir.
Q. So what we're talking about is an opinion that you have

offered that in this setting, a nitrogen hypoxia execution, there will invariably be an upward departure from that theoretical estimate; is that correct?
A. No, I don't think so. I didn't say invariably. I think two minutes is kind of the lower limit, and the four I reviewed were longer than that.
Q. But do you think that that upward deviation would apply in this case?
A. There's no way in any one particular person to predict the time to loss of consciousness in this scenario.
Q. So, then, in what way -- how do we make effective use, then, of the clinical experience that you have discussed, the lay witness accounts that you have discussed, as a deviation from this two minute and 18 second hypothetical time frame?
A. Again, I don't see it as a deviation. They're two separate issues. So the two minutes and 18 seconds, like I said, is theory in young healthy people in idealized circumstances, breathing 100 percent nitrogen, not having restricted chests. And even within the subjects in that study, there's a few seconds of variation in those measurements. So I don't see it as a deviation.
Q. How would you describe it, then?
A. I would describe it as the two minutes and 18 seconds is the theoretical time frame based on the studies and cardiopulmonary physiology. What happens in real life and not in these

idealized circumstances is what we witnessed in the four executions that I reviewed.
Q. So staying on that track, you said you reviewed, among others, the autopsy of Kenny Smith; is that correct?
A. Yes, sir.
Q. And you said, I think -- and please correct me if your understanding is different -- that there was a finding of pulmonary edema in those four cases; is that correct?
A. Yes, sir, there was.
Q. Did the medical examiner make a specific finding of pulmonary edema, or are you taking the findings that were made and applying your own, I guess, view on it to come to a conclusion that those subsidiary findings support your ultimate conclusion that there was pulmonary edema?
A. I can't remember word for word all the autopsies. I know some of them specifically said pulmonary edema. Some described the lungs as being heavy, and the lungs get weighed during an autopsy. So either one of those is sufficient for me to make the assessment as to whether or not there's pulmonary edema. So I don't recall specifically which autopsies said the words pulmonary edema or which just had heavy lungs, but both are the same to me.
Q. So what would you expect lungs to weigh if they were heavy in such a way that would suggest there was pulmonary edema?
A. So they would be a few hundred grams more than what a normal

lung -- a nonpulmonary edematous lung would weigh.
Q. And how do you determine what a normal lung should weigh in a particular case?
A. You know, I'd have to look it up. There have been autopsy studies historically that report normal lung weights for people of different heights. I don't recall off the top of my head what a normal lung weight would be for men in this age group.
Q. But your opinion is that these lungs were heavy, though; is that correct?
A. Again, without reviewing the four statements, I can't remember exactly if they all four said specifically pulmonary edema, or if some just said heavy lungs with lung weight. But, again, they would be equivalent to me.
Q. Do you recall if any of the autopsies you reviewed made a finding of flash pulmonary edema?
A. No, they didn't, and I wouldn't expect that. Flash pulmonary edema is a clinical diagnosis, so that's something that requires clinical -- it's a clinical diagnosis, not a pathologic diagnosis. The pathologic diagnosis is pulmonary edema, and then the clinical diagnosis would be flash pulmonary edema or one of the other causes of pulmonary edema. So I wouldn't expect a pathologist to note flash pulmonary edema on autopsy.
Q. Is there any way to make a determination of whether flash pulmonary edema existed in that context, a forensic postmortem

examination?
A. Without any knowledge of the situation preceding that, if you just had the postmortem exam, there's no way to determine that. The only thing that could be determined is the presence of pulmonary edema, and it requires understanding of what preceded the autopsy to determine what caused the pulmonary edema.
Q. So what sort of information would you need to know in addition to what you had in front of you to make that determination in a clinical setting?
A. In these circumstances, I don't need any additional information. I walked through my reasoning to getting to flash pulmonary edema. That's really only -- really the only likely cause in this particular circumstance.
Q. Talking a little bit about the lay witness accounts that you relied on in forming your opinion, and I just want to make sure that I'm clear on what your testimony is. You said that you did rely on the eye witness accounts, but that you weren't -- that you were also relying on what you saw. Can you clarify the distinction there for me, and what it is you are relying on and what you meant by both of those?
A. I'm sorry if I was confusing.
The eye witness reports, I was looking for their description -- the eye witness description of what was going on with the inmate during the execution. So their movements and

breathing patterns, et cetera. If I said -- if I used the word saw, that -- I didn't see anything. I'm reading what they're reporting.

Q. So you did not witness any of the past nitrogen hypoxia executions in Alabama that you've mentioned in your report?

A. No, sir. I did not personally witness them.

MR. THOMPSON: Your Honor, may I have just a moment to get the plaintiff's exhibits binders?

THE COURT: You may.

Q. Doctor, do you still have the black binder in front of you?

A. Yes, sir, I do.

Q. Could you turn, please, to Plaintiff's Exhibit 29.

A. Yes, sir. I'm at 29.

Q. So this is the Montgomery Advertiser article written by Mr. Roney about Kenneth Smith's execution. Can you tell --

You testified, I believe, on direct that you saw purposeful movement up until I believe it was 8:01; is that correct?

A. Yes, sir.

Q. So which -- in the -- if you turn to page 2 of 4.

A. Okay. I'm here.

Q. The second heading, 7:57 to 8:01 p.m. Can you identify for me in that paragraph the last purposeful movement that you believe is reflected there.

A. Well, all of these are described together, and the time frame is 7:57 to 8:01. So I can't make an assessment -- the way

I'm reading this, these were all occurring during that time window. So I don't know if by last you mean last in time. I can't make that assessment with this description.
Q. Chronologically in the paragraph.
A. Oh, in the paragraph -- not chronologically in time but in the paragraph?
Q. Certainly. Yes.
A. Okay. I got it. Clenching his fists.
Q. That was the last purposeful movement in your opinion?
A. As it's written in this paragraph. But, again, there were other purposeful movements described in the paragraph in that time window.
Q. So contextually, what about the other information provided in this article informs your opinion that clenching fists between 7:57 and 8:01 p.m. was a purposeful movement indicating consciousness?
A. Because fist clenching is a conscious movement.
Q. Categorically?
A. No, I would not saying anything categorically. As I mentioned earlier, we take all signs and symptoms in context. So in this context, fist clenching, in my opinion, is a conscious movement.
Q. So I guess consciousness is a holistic assessment?
A. I guess in the sense that it requires understanding of the context and using all available information.

Q. Are you aware that there are ADOC witnesses who have spoken to their observations about each of these executions and what they observed relating to consciousness and movements of the condemned?
A. I might have seen those in some trial testimony, but I don't -- I'd have to look at them again to refresh my memory.
Q. Did you take any of those accounts into account in forming your own opinion about which of these were purposeful movements and when your best guess is as to when Mr. Smith and the other past condemned lost consciousness?
A. No. I relied on the media reports, the eye witness reports for those.
Q. Do you know if any of those media witnesses knew the precise moment when the gas started flowing?
A. I don't know if they knew or not.
Q. Do any of these time stamps in the Montgomery Advertiser article about Kenneth Smith's execution denote what second in the minute the -- I guess the time frame is referring to?
A. No, sir, they don't. It's just the minute.
Q. So it could be 7:57:59 to 8:01:01?
A. Yes, it could be.
Q. So on that front, it is nonspecific?
A. Well, it has a range of one minute -- I mean, there's a 60-second range within each one-minute interval.
Q. Sure. But your estimate of four minutes assumes that the

nitrogen started flowing at 7:57:00, and that loss of consciousness occurred at 8:01:00. You know, it could be as short as three minutes, based solely on the facts that you have presented -- or the facts that you have testified to on direct.
A. That's why I called it an estimate, because there -- as you pointed out, there's not enough precision to get more than an estimate.
Q. Do you know if any of these media witnesses, these lay witnesses, have medical training?
A. I don't know that.
Q. Does that factor into your assessment of their accounts of these executions?
A. No, not at all.
Q. So the -- you don't adjust your interpretation of facts reported by a lay observer versus somebody with some level of medical training?
A. No, not for observable characteristics. As I mentioned, this is what I do every single day in the ICU. We have a patient come in that can't speak to us, and I have to talk to the family members, and they report to me what the -- what's going on with the patient, and then I make a medical assessment. So a medical resident or a mother are equally capable of providing an assessment of what they're observing, and then I make the medical assessment based on what the witness is telling me.

Q. Is that an active dialogue between you and the person reporting the facts?
A. Sometimes it is and sometimes it's not. It really just depends on the situation.
Q. Were you able to have any sort of follow-up discussion with any of these lay witnesses about what they saw?
A. No, sir, not in these cases.
Q. To clarify something like -- actually, would you please turn to Plaintiff's Exhibit 126.
A. Okay. I am at 126.
Q. And I apologize, Doctor. I am leading you on a goose chase. Can we go back to 29?
A. Yes, sir. I'm at 29.
Q. So when you say that -- when you see it in the paragraph under 7:57 to 8:01 p.m., quote, he took deep breaths, you were interpreting that as purposeful movement?
A. No, sir. The deep breaths is a sign of air hunger. That is not a sign of -- what I use as a sign for purposeful movement. The way that breathing is occurring is not -- I'm not able to use that to assess level of consciousness.
Q. Body shaking violently.
A. Yes, that could be a conscious movement.
Q. Could be? Does that mean it could also not be?
A. In this circumstance, because he's at the same time displaying other conscious movements, I interpreted that

movement as a purposeful movement.
Q. So would you interpret the word -- or would you accord the same weight to a lay person's description of the condemned as moving violently, versus they raised their legs, you know, quickly in a ten-second period? I mean, I guess what I'm asking is, how do you account for the natural editorializing that goes with this sort of account?
A. So, again, this is how -- this is what I do every day in the ICU. And, yes, I do sometimes get the opportunity to talk to families and patients, but sometimes I'm just provided written information. And it's my job to take all of those pieces of -- all of those data points that I'm given and then interpret them in context and make a clinical assessment. And people have different ways of describing things. So this is just part of my everyday clinical practice, interpreting comments like this.
Q. Do you know how Mr. Roney would naturally describe something like this?
A. I'm guessing he would describe it the way he described it. He wrote this article, so I think it's his description of what was happening.
Q. Sure. Two different people can say violently and mean completely different things; right?
A. Absolutely.
Q. There are inherent restrictions, in other words, on this sort of -- using this sort of basis to make medical

determinations. Is that fair?
A. I would say that that's not fair, because this is -- again, this is everyday medical practice, is using eye witness observations to make assessments about what's going on.
Q. But I guess -- just sort of where I'm going with this is you're not just using eye witness accounts to make medical determinations. You are using eye witness accounts to double your theoretical estimate from the time the nitrogen starts flowing to the time of loss of consciousness.
A. So let me just clarify. So the two minutes and 18 seconds, as I mentioned, is theoretical based on what we've talked about a few times. The actual determination of loss of consciousness really does not have any bearing on the theoretical. You can only make the determination of loss of consciousness in each individual case by looking at the circumstances. So the two minutes and 18 seconds, again, is just a theoretical framework to establish the time intervals, but the actual determination of loss of consciousness is a clinical determination requiring descriptions like this.
Q. Descriptions like what? I'm sorry.
A. Descriptions that we're talking about from the lay witnesses.
Q. So then what benefit, if any, is the theoretical determination if a Montgomery Advertiser article for whom you are not able to go back and forth with Mr. Roney informs your

decision or your opinion, rather, about the time to loss of consciousness?
A. Sure. So I think it is important to -- when I was forming my opinions, I thought it was important to really -- to go through the exercise of what we understand about physiology and the steps that were happening. But, again, for the reasons that we've talked about -- again, the fact that the nitrogen never gets to 100 percent in the mask, individual variability, et cetera -- that time frame can vary, and the two minutes and 18 seconds is just, like I said, a theoretical time frame.
Q. So you just said that oxygen never got to zero percent saturation in the mask?
A. That's correct.
Q. What is the basis for that statement?
A. Dr. Antognini's experiment.
Q. Would you agree or disagree with the statement that as you get closer and closer to zero percent oxygen saturation, that the reliability of instruments that measure oxygen saturation become less and less reliable?
A. I'm not sure what type of instrument was used to measure oxygen here, so I can't comment on the reliability at low levels. There are instruments that can measure down to zero. I don't know what was used here.
Q. Switching gears a little bit, Doctor, is it your opinion that a patient's subjective reporting of any symptoms of dyspnea

are always consistent with their oxygen saturation levels at the time that they're reporting those symptoms?
A. No. There are several factors that can make a person dyspneic, so it's not always related to the oxygen.
Q. What are some of those factors?
A. So if you exercise and you increase the amount of carbon dioxide that your body is producing, that will make you breathe faster. If you get pneumonia and have a fever, your fever makes you breathe faster, and you would feel dyspneic. If you have obstruction in your airways, like you have asthma, that could make you feel dyspneic. If your chest were restricted for some reason and you couldn't take a deep breath, that could make you feel dyspneic. So there are a wide variety of things that could make someone feel dyspneic.
Q. In other words, it's a complicated inquiry. Dyspnea is a complicated, I guess, state that a patient could be in. It's multifaceted.
A. I would say that dyspnea is a symptom, and there are multiple causes of that particular symptom.
Q. What are some of those causes?
A. All of the causes I just listed. Would you like me to list them again or --
Q. Well, I guess my specific question is, can that -- can those circumstances be affected by the patient's underlying cardiovascular or respiratory disease?

A. Yes. So, yes, it could be related to someone's underlying cardiovascular state, and also just individual variability. Just people differ in how sensitive they are to low oxygen and high carbon dioxide just as part of natural human variability.
Q. Is that something you observed in your practice in the ICU?
A. It's not something we measure, but, yes, I've seen patients who are very, very dyspneic, very short of breath, with an O2 sat of 80 percent, and then I've seen other people that are almost blue and have a sat of 30 percent and are able to talk to me. So there's a wide variability in people's response to hypoxia.
Q. So what are some of the common cardiovascular or respiratory diseases that you see in the ICU with the patients that you treat?
A. So common things that we see are pneumonia, sepsis, COPD, asthma, serious bleeding, like bleeding from an ulcer, abdominal infections. A multitude of medical issues. Cancer. Lots of different medical issues.
Q. So I believe that earlier Dr. Schwartzstein mentioned emphysema. And I don't want to misstate his testimony, but he talked about lung damage, that emphysema creates lung damage that reduces the effective surface level of the lungs, the surface area through which gas exchange can occur. Do you agree with that description?
A. Yes, sir, I agree with that.

Q. So that would inherently affect a patient's ability to relieve or avoid in the first instance the feeling of dyspnea?
A. In emphysema specifically, there are several factors that contribute to dyspnea. It really depends on the individual patient.
Q. What about COPD?
A. COPD and emphysema are similar. Emphysema is a subtype of COPD. COPD also includes chronic bronchitis, and those both are under the umbrella of COPD.
Q. What about pneumonia?
A. I forgot what the first part of the question was.
Q. Just that you treat patients who have underlying diseases that can in small or significant ways affect their baseline ability to -- or their lungs' baseline ability to perform gas exchange; their ability to take in oxygen.
A. So emphysema, yes, I would say. Chronic bronchitis, no. The gas exchange area is intact. Pneumonia -- in someone who doesn't have underlying lung disease, pneumonia is an acute illness, so there's nothing really underlying that would predispose them to behave differently. So it kind of depends on the disease you're talking about and then the acuity or chronicity of that problem.
Q. What about ARDS?
A. ARDS is acute respiratory distress syndrome, so that's an acute problem. That happens within seven days of an inciting

insult. That's an acute problem.
Q. So all of these underlying diseases you see in your ICU patients? I apologize for being repetitive, and I have a point, but that's -- you see a varied range of underlying illnesses, underlying diseases in your patients?
A. Yes. Very. Yes.
Q. And so from that experience with those patients with this variable range of underlying issues, you're extrapolating from treating those patients in the ICU setting to making a determination about how nitrogen will affect -- or how nitrogen will create a hypoxic environment for a condemned person under Alabama's nitrogen hypoxia protocol?
A. So the way I'm using my -- so, yes, I am using my clinical experience to inform my opinion. The way I'm using my clinical experience specifically relates to hypoxia, which may or may not be present. Well, in ARDS, hypoxia is always present because that's part of the diagnostic criteria. But I have a lot of experience with treating patients that are hypoxic, either intubated with hypoxia or hypoxic and not intubated. And it's my experience with treating patients with hypoxia that really informs my opinion about the effects of hypoxia and how that might be experienced. It's not tied to any disease. It's more the conserved -- the physiologic response to hypoxia that everyone has when they're exposed to low oxygen levels and become hypoxic.

Q. But in the ICU, that hypoxic reaction is not happening in a vacuum, is it? There are other variables going on, things like mechanical ventilation, intubation, preoxygenation; is that correct?
A. Well, those things are sort of related. Yes, oftentimes there are many things going on in the ICU, but not every patient that I take care of and that I watch experiencing hypoxia or dying with hypoxia is intubated. So the response to hypoxia, the physiologic response, is a conserved response that we all have, regardless of how the hypoxia occurs. And my experience in the ICU I think informs this, because hypoxia is something that I see very, very commonly. Many patients that I have have hypoxia, so I have a lot of experience seeing patients that have hypoxia from a variety of causes.
Q. What percentage of those patients are intubated and mechanically ventilated?
A. In my practice, probably -- of all my patients, probably 15 percent are intubated and mechanically ventilated in the ICU.
Q. What percentage get supplemental oxygen?
A. Probably in the range of maybe 50 percent get supplemental oxygen of some form.
Q. Would it be your expectation that a patient receiving supplemental oxygen would experience a flatter decrease in their oxygen saturation relative to somebody who wasn't receiving oxygenation?

A. I don't think I understand your question. Would you be -- do you think you could restate it possibly?
Q. Sure. So you're making estimates about the rate at which a condemned person receiving nitrogen under the protocol would hit certain benchmarks: The mask filling up, displacing all the oxygen in the lungs, ultimately loss of consciousness. You're making a prediction or you're making an estimate about the rate at which that process will proceed. Is that fair?
A. Yes, that's fair.
Q. And you are at least in some way extrapolating from your experience in the ICU with hypoxic patients; correct?
A. Yes, sir.
Q. So you're extrapolating from a situation where patients are receiving oxygen, which inherently would slow the rate at which their oxygen saturation dropped; correct?
A. It really depends on the underlying illness, but in general, yes. If you're receiving supplemental oxygen and you're hypoxic, the goal of the supplemental oxygen is to raise the oxygen levels in the blood.
Q. So in other words, your goal is fundamentally opposed to the goal of the nitrogen hypoxia protocol.
A. That's fair.
Q. Same thing with mechanical ventilation?
A. Yeah, I'd say that's fair, assuming that the -- that we're not doing like a terminal extubation or someone's at the very

end of life. But assuming we're trying to increase the oxygen, yes, that's fair.
Q. So is there any situation in which a person receiving supplemental oxygen would have their oxygen saturation drop at a rate lower than it would have if they weren't receiving supplemental oxygen?
A. I mean, if the lung -- there are certain situations where the lung damage is so bad that no matter how much oxygen we're giving, the body can't use it. So, yes, there are situations where no matter what we do, the body cannot take up oxygen.
Q. Wasn't quite my question. What I'm asking is if you look at two rates of oxygen saturation dropping, same patient, scenario one, no supplemental oxygen; scenario two, supplemental oxygen. Is there any circumstance in which scenario two's rate of the oxygen saturation dropping would be lower than circumstance one? So is there any situation in which getting oxygen would cause your oxygen saturation to drop at a slower rate than if you didn't get any oxygen at all?
A. Slower? I don't think so. But as I said, giving -- there may be circumstances where the rates of dropping would be the same if the lung damage is so bad that the oxygen is just not working. So it would be, essentially, the oxygen is ineffective.
Q. But it is raising the baseline.
A. If the gas cannot be exchanged in the lungs, you can't raise

the baseline. So there are situations where, for example, severe pulmonary edema where the lungs are completely filled with fluid. You could give someone 100 percent oxygen in their lungs, and they're not going to be able to take up any more in their blood, just because the gas can't get there.

Q. Sure. I understand in that situation, we're talking a little bit more about rearranging deck chairs. But theoretically would supplemental oxygen ever cause oxygen saturation to drop at a lower rate than without it?

A. I can't think of a situation. I've never -- I mean, that -- that's a little bit of an odd question. I can't think of a situation sitting here today.

Q. I'm just distinguishing the circumstances in which your patients are experiencing dyspnea and the circumstances in which, at least sort of in your view, Mr. Lee and other condemned people in Alabama would experience dyspnea under the protocol and saying that those situations -- I mean, they're a bit apples to oranges. Wouldn't you agree?

A. I think the circumstances are different, but the response to hypoxia in terms of the physiologic response, air hunger, is the same.

Q. Can mechanical ventilation cause the sensation of air hunger in ICU patients?

A. It can in certain circumstances. It can cause -- I would use the term ventilator dyssynchrony, but, yes, it can cause

what we would call air hunger.
Q. How would you define that dyssynchronization?
A. So probably one of the more common circumstances where I see something like that is when I'm trying to ventilate someone who has ARDS or acute respiratory distress syndrome. In order to protect the lung, like we heard earlier today, we have to give very small breaths to not overstretch the lungs. And so we're giving less of a breath than the patient actually -- their body is demanding, and in that circumstance the patient struggles because they're not getting the breath that they want. So that is what I would call ventilator dyssynchrony. And we treat that with sedation and narcotics for air hunger.
Q. What is the effect of a sedative and a paralytic on an intubated and mechanically ventilated patient's ability to breathe?
A. If someone is paralyzed, they themselves are not going to be able to initiate any breaths. They won't be able to breathe at all.
Q. Would that depress the respiratory rate?
A. Yes. It depresses it to zero. They can't breathe at all. There's no respiratory rate with paralysis.
Q. So do you have your report in front of you, Doctor, your -- I don't remember if it was amended or supplemental, but the most recent support that you submitted in this case.
A. I don't believe I have that in front of me, unless it's in

your binder.

MR. THOMPSON: Your Honor, could I have just one moment?

THE COURT: You may.

(Brief pause in the proceedings.)

Q. Do you have your screen in front of you, Doctor?

A. I have the screen, but it's blank right now.

MR. THOMPSON: Your Honor, if we were to put Dr. Bastarache's exhibit on the screen, would that be acceptable?

THE COURT: Yes. It's not confidential; correct?

MR. THOMPSON: Perfect. Thank you.

Q. Do you have a preference, Doctor?

A. I like both, if you don't mind.

MR. THOMPSON: Permission to approach, Your Honor?

THE COURT: You may.

Q. So we're bouncing around a little bit. Would you turn to page 3, Doctor, of your report.

A. Yes, sir. I'm on page 3.

Q. About halfway down, do you see the heading under -- or next to number four?

A. Yes, I do.

Q. I'm quoting here: "Hypoxia does not cause rapid or instantaneous loss of consciousness and death." Is that your fourth opinion offered in this case?

A. Yes, it is.
Q. And in that opinion, you have concluded that it would take several minutes after nitrogen -- or after there's full displacement of oxygen in the lungs for loss of consciousness to occur.
A. Yes, sir.
Q. Is that correct?
A. Yes, sir. That's what I said in my report.
Q. So specifically -- and I know that we've talked a little bit about it being a theoretical time estimate that can change based on the circumstances of the case, but how do you square your two minute and 18 second time estimate for loss of consciousness for someone in their fifties and sixties with opinion number four, that once full oxygen displacement occurs in the lungs, loss of consciousness will not occur for several minutes?
A. Well, I think I stated here, it would take several minutes for the inmates to lose consciousness after the flow of nitrogen is turned on. And that squares with my opinions in this case using the physiologic calculation and also the eye witness reports.
Q. But you're making that -- you're offering that opinion categorically; correct?
A. I'm offering the opinion based on the nitrogen hypoxia protocol, the eye witness reports, and the physiology.
Q. Sure. But you testified that whatever the actual number

ends up being, you know, whether it's three minutes, five minutes, seven minutes, the two minutes and 18 seconds is theoretical. The actual number depends on the facts and circumstances of the particular case; correct?
A. Yes, sir. That's what I said.
Q. So what facts and circumstances are you pointing to specifically here in support of that conclusion where you are saying that it will take several minutes, which is above and beyond the two minute and 18 second theoretical time that we've been talking about?
A. Again, this opinion is not just based on the theoretical calculation. It's based on the other things we're talked about, including the eye witness reports.
Q. Can you link those two for me, please?
A. I'm not sure I understand the question.
Q. Are you saying that the eye witness -- I guess -- is this -- is this retrospective or prospective? Are you saying that future executions under the protocol will take several minutes once nitrogen starts flowing, or are you saying that in your opinion, past executions have taken more than two minutes and 18 seconds, and that's the basis for your predictive opinion?
A. Well, I wouldn't really have an opinion based on unknown facts in the future. But both of those statements are true, so based on what we've discussed in this case, including the eye witness reports, they've taken three to seven minutes. And I

would expect similar time frames in the future based on all of this information.
Q. In your experience, do patients experience all forms of air hunger the same?
A. I think the physiologic response, so the brain saying, I need more air, do whatever I can to make air, that's universal. How someone might experience that or describe it could vary.
Q. So no matter whether that's a lack of oxygen, displacement with an inert gas, or a buildup of carbon dioxide, you're saying that those are experienced identically across patients?
A. No, that's -- let me clarify a little bit. So both hypercarbia or high carbon dioxide and low oxygen can cause the symptom of air hunger. Whether those two are exactly identical is --

They're not exactly identical with how the signals are processed. So the initial signal for high carbon dioxide is the body sensing high carbon dioxide, and the initial signal for low oxygen is the body sensing low oxygen, but those signals converge to the same place, and that is, I need to breathe more. I can't get enough air. I'm suffocating. So the input is different, but the end result is the same.
Q. And just to be clear, you said it can, and that sounded a bit less equivocal, so I want to make sure that I'm clear. Are you saying that in all cases, the end result will be the same? Are you carving out some exceptions? Where are you drawing that

line?
A. So each person is going to have some individual variability on the set points for where the symptoms start to occur in terms of levels of oxygen and carbon dioxide, but ultimately the mammalian body's response to sensing those extreme danger signals is the same. So it causes the same response in the brain and body to try to get more air.
Q. So you're saying that the response to dyspnea, no matter what form it takes, is objective or subjective?
A. It's both. It's objective physiologic, physical response of the body that's then experienced by the person living in that body.
Q. And those two things are not always congruent in a particular patient, are they?
A. I am not sure what you mean by congruent.
Q. Physiological markers might suggest that the oxygen saturation levels are acceptable or within normal limits, and yet the patient might still be experiencing dyspnea as sort of a subjective experience?
A. Yes. So dyspnea, as we talked about a few minutes ago, can be caused by several different things, including constriction of the airways. That can cause someone to be dyspneic, but their oxygen level is going to be totally normal. So there are lots of different ways that someone can be dyspneic.
Q. So we've talked about inert gas displacement. We talked

about lack of oxygen. We talked about CO2 buildup. Are there any others that come to mind for you?
A. So asthma or obstruction of the airways, constriction of the chest, you know, inability, pain, exercise, fever. Those all can cause dyspnea.
Q. So you mentioned asthma. And some obstruction of the airway can cause the feeling of dyspnea in a patient, potentially regardless of their oxygen saturation levels. Is that fair?
A. Yes, that's fair.
Q. So would the same be true of a mechanically ventilated and intubated patient in the sense that the foreign object in the trachea is what's causing the distress and the uncomfortable sensation, not the oxygen levels?
A. No. Actually, the tube in the -- surprisingly, just the physical tube doesn't really cause a lot of distress. You bypass all the cough receptors. The distress that patients feel that are intubated is much more related to the underlying lung disease and then how we have to set the ventilator. But again, it depends on the specific circumstance for each patient.
Q. So what's the point of the sedative?
A. The sedative is to really relieve the air hunger that is associated with the underlying lung problem, and also to help treat the ventilator dyssynchrony that we talked about.
Q. So I guess that sounds to me like a roundabout way of saying that in that context, it's the procedure that's causing the

distress, you know, instead of or at least as much as any underlying drop in oxygen saturation, carbon dioxide buildup, what have you.
A. I disagree with that. I think it's completely -- I mean, there are scenarios where it's -- you know, ventilator dyssynchrony is a big driver of why someone's uncomfortable, and then there are other scenarios where it's severe underlying lung disease and hypoxia that we can't treat even with the ventilator. So I can't make an overarching statement that covers all patients. It's very variable, depending on the circumstances.
Q. Have you reviewed any of Mr. Lee's medical records in this case?
A. No, sir, I have not.
Q. Have you examined him in any way?
A. No, sir, I have not.
Q. Have you spoken to him?
A. No, sir, I have not.
Q. Are you aware of his medical history?
A. No, sir, I'm not.
Q. So in that situation, how would you expect to predict how a patient would respond to a hypoxic event or state of being?
A. So in this circumstance, I would not call Mr. Lee a patient. From what I understand, he's a young, healthy man that is going to be exposed to high levels of nitrogen to force him to be

hypoxic so that he suffocates. So I would not consider him -- I don't think of this as a patient. This is someone that's being forced to suffocate from hypoxia.
Q. So you described him as a young, healthy man. Wouldn't that suggest that your theoretical estimate of two minutes and 18 seconds, based on the Fowler article, that he would fall much closer to that end of the range than some of the outer bounds that you've expressed in your report?
A. Again, the two minutes and 18 seconds is the theoretical framework, and all of -- you know, there are other factors related to the actual circumstance. And so there's no way to predict how long it will lead to loss of consciousness for any given individual.
Q. Would you expect in the aggregate, across a sufficiently large set of patients, though, that the healthier they are, the fewer confounding variables that we've talked about -- underlying respiratory illness, mechanical ventilation, supplemental oxygen -- that the healthier the person is, the closer to that theoretical baseline they would be?
A. Actually, it's the exact opposite. The healthier the person is, the more able they are to tolerate hypoxia and low oxygen, and it would actually take longer. The healthier the person is, the longer it would take to loss of consciousness.
Q. Categorically?
A. I wouldn't say anything categorically; but if you have a

healthy person and a person with emphysema, forced nitrogen hypoxia is going to result in hypoxia and loss of consciousness faster in someone who has underlying lung disease than a young, healthy person that does not have any underlying lung disease.
Q. And for the unhealthy person, what explains that? What's the mechanism?
A. It's lack of reserve in cardiovascular fitness, lung function, ability to exchange gas. So when someone has an underlying lung disease or other kind of disease, they're more sensitive or more susceptible to perturbations, low oxygen, high carbon dioxide, et cetera.
Q. You said reserves. What do you mean by that?
A. So every organ in our body has reserve. We're not redlining any of our organs at any one moment. If I took out one of your lungs, you wouldn't be able to run a marathon, but you would be able to live a normal life and do your everyday activities. So we have a tremendous amount of lung reserve.
As patients get chronic illnesses, that reserve goes down. And the smaller that reserve, the faster it's going to -- in this circumstance, the smaller the reserve, the faster the nitrogen hypoxia is going to work because you don't have to overcome that reserve.
Q. Sorry, Doctor. Give me just one second.
A. Sure.
MR. THOMPSON: Your Honor, may I have just one moment?

THE COURT: You may.

(Brief pause in the proceedings.)

MR. THOMPSON: Your Honor, I should just have a couple more questions.

Q. Doctor, going back to the autopsies that you reviewed in this case, did you talk to any of the medical examiners who performed these autopsies?

A. No, sir, I did not.

Q. Do you think that that would have been helpful in forming your opinion?

A. No.

Q. Maybe not necessary, but helpful?

A. No.

Q. Did you review the testimony of Dr. Shante Hill?

A. That does not ring a bell. I don't believe I did.

Q. Well, Dr. Hill is the examiner who conducted Kenneth Smith's autopsy.

MR. THOMPSON: Your Honor, I think that's it.

THE COURT: All right.

MR. THOMPSON: Thank you.

THE COURT: You have redirect? I feel like now is a time to take a quick break.

MS. SHARPE: I do not have redirect, in any event.

THE COURT: All right. Then you can step down.

It is 3:22. We will take a break until 3:40.

(Recess was taken at 3:22 p.m. until 3:41 p.m., at which time the proceedings reconvened, as follows:)

THE COURT: Plaintiff will call its next witness.

MS. WIESNER: Thank you, Your Honor. Plaintiff Mr. Lee calls Sarah Clifton to the stand.

Your Honor, before we begin, we have witness binders for Ms. Clifton as well. May I approach?

THE COURT: Yes. Thank you.

MS. WIESNER: Your Honor, all of the exhibits contained in Ms. Clifton's binder have been previously admitted.

THE COURT: All right. Very good.

SARAH CLIFTON

The witness, having first been duly sworn to speak the truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MS. WIESNER:

Q. Good afternoon. Can you please go ahead and state your name for the record.

A. My name is Sarah Clifton.

Q. Thank you, Ms. Clifton. Where do you currently work?

A. I work for the Montgomery Advertiser as a reporter.

Q. And how long have you worked at the Montgomery Advertiser?

A. Since August of 2024.

Q. Now, Ms. Clifton, have you attended an execution?

A. Yes.
Q. How many?
A. Three. Yeah.
Q. And have each of those three executions been here in Alabama?
A. Yes.
Q. Have each of the three executions been by nitrogen hypoxia?
A. Yeah.
Q. So I want to walk through those three executions.
Did you attend the execution of Demetrius Frazier, which was in February of 2025?
A. Correct.
Q. And did you also attend the execution of Geoffrey West?
A. Correct.
Q. And finally, did you attend the execution of Anthony Boyd?
A. Correct.
Q. Why was it that you attended each of those executions?
A. It's part of my job as a reporter. On paper I'm a business reporter, but the executions beat was open, and I took it up.
Q. Now, given that you were there in your capacity as a reporter, does that mean that you sat in the media witness room?
A. Correct.
Q. And did you take notes during each of those executions?
A. Yes.
Q. What types of things were you taking notes of?

A. Taking notes of every movement I see, times that correspond with movements -- correspond with movements, you know. It's mostly movements, times, keeping track of those things, any breathing. Anything that I can see gets written down.
Q. So is it fair to say that throughout those executions, you're focused on the inmate?
A. Yes.
MS. KENNY: Object. Leading.
THE COURT: Sustained.
Q. I'll reask. What are you focused on during those executions?
A. Everything that's happening.
Q. Does that include the inmate?
A. Yes.
Q. You also mentioned that you're writing down times. Are you keeping track of time on a clock while you're taking those notes?
A. There's a digital clock that's on the wall in the death chamber.
Q. And were you trying to record in real time what you were observing?
A. Yes.
MS. KENNY: Objection. Leading.
THE COURT: Sustained.
Q. I understand that you wrote articles describing your

observations of each execution.
A. Correct.
Q. And in writing those articles, were you doing your best to be as accurate as possible in describing your observations?
MS. KENNY: Object to bolstering.
THE COURT: I'm sorry. I couldn't hear you.
MS. KENNY: Objection. It's bolstering before she even testifies.
THE COURT: You need to do a better job rephrasing your questions.
MS. WIESNER: I can reask my question, Your Honor.
THE COURT: Please do.
Q. (Ms. Wiesner, continuing:) In the articles when you're describing -- well, strike that. In each of the articles, what are you basing the information contained in your articles on?
A. Can you ask that again? I'm sorry.
Q. Sure. And why don't I actually use an example to help.
A. Okay.
Q. If you can, Ms. Clifton, in your binder, there is an exhibit labeled P 0028. Do you recognize this article?
A. Yes.
Q. And is that an article that you wrote regarding Demetrius Frazier's execution?
A. Correct.
Q. And was Mr. Frazier's execution fresh in your mind when you

wrote this article?
A. Yes.
Q. And do you recall that you previously testified in this court regarding your observations of Mr. Frazier?
A. Yes.
Q. And do you recall that that was in September of 2025 in a case brought by Mr. Boyd?
A. Correct.
Q. Is the testimony that you provided last year about your observations during the Frazier execution still accurate today?
A. Yeah, it should be.
Q. And if you look at Plaintiff's Exhibit 28, which is the article on the screen, if you turn to page 2, do you see that there's an execution time line?
A. Yes.
Q. And did you, yourself, write this execution time line?
A. Yes.
Q. What information were you using to create this execution time line?
A. It's based on my observations during the execution. A very simple version of what happens is that, you know, they start the process, it goes through after all media sits, and, you know, I write what I see as I'm seeing it and notate times. It's a very straightforward witness account.
Q. And do you stand by the description of events that you

witnessed during Mr. Frazier's execution as relayed --
A. Yes.
Q. -- as what's on the screen?
A. Yes.
Q. Now, you also observed Mr. West's execution in September of 2025?
A. Uh-huh (positive response).
Q. And did you also write an article about what you observed during Mr. West's execution?
A. Correct.
Q. If you could, Ms. Clifton, please turn to Plaintiff's Exhibit 34, which is also in your binder. Do you recognize this article?
A. Yes.
Q. Is this the article that you wrote regarding Mr. West's execution?
A. Yes.
Q. And when you wrote this article, were the events in his execution still fresh in your mind?
A. Yes.
Q. If you can take a look at the first page, please, you'll see that there is a bolded header that says "Execution time line."
A. Uh-huh (positive response).
Q. Do you see that?
A. Yes.

Q. What information were you basing this time line on?
A. My notes that I was taking as the process happened.
Q. So I want to talk to you about a few of the entries contained in your time line. And if you can start with the very first bullet, please.
MS. KENNY: I'm going to object to this methodology. At this point, she's not established that she cannot testify as to her own recollection. This is improper refreshing of recollection if she's going to have her read her article out loud to this court.
THE COURT: What's your response?
MS. WIESNER: Well, Your Honor, I'm going to ask specific questions about certain entries and what her observations were, but I'm certainly fine to ask the question first, and if the witness requires refreshing, we can refer back to the article.
THE COURT: All right. Let's do that.
MS. WIESNER: Your Honor, I do, however, want to orient the witness to certain bullets in the article, which I think would be helpful for expediency today.
THE COURT: All right. Go ahead.
Q. (Ms. Wiesner, continuing:) The first bullet, you write at 5:52 that the drapes in the viewing room were drawn back --
MS. KENNY: Objection, Your Honor. She's reading the entry.

THE COURT: Why don't you ask her questions about her recollection? And then if you need to refer to the article, you can do that.

Q. (Ms. Wiesner continuing:) When you first entered the media witness room, are the curtains closed?

A. Yes.

Q. At some point in time during each execution, are the curtains drawn back?

A. Yes.

Q. Following the point in time when the curtains are drawn back, do you have a clear view of the gurney?

A. I would say so.

Q. And likewise, after the point in time at which the curtains are drawn back, do you have a clear view of the inmate?

A. Wait. Ask that again? I'm sorry.

Q. Sure. After the curtains are drawn back, do you have a clear view of the inmate?

A. Yes.

Q. And in the case of Mr. West, did you have a clear view of Mr. West?

A. Yes.

Q. Were you able to see Mr. West's face?

A. Yes.

Q. And do you recall during Mr. West's execution seeing a member of the corrections staff conducting some type of an

inspection of the mask on Mr. West's face?
A. I believe so. I would like to double check my article to be sure.
Yeah. Yeah. They do, like, a seal check where they run their hands along the edge of the mask.
Q. And that was something that you were able to see from the media witness room?
A. Yes.
Q. During Mr. West's execution, did you see Mr. West nod his head?
MS. KENNY: Object to leading.
THE COURT: Overruled. You can answer that.
A. When are you referring to? There's -- it's like a long period of time, so I would need a specific --
Q. Is there a document that would help refresh your memory on the points in time during Mr. West's execution?
A. Yeah. It would help if I could review this. As I've said previously, this is written directly after the thing happens, so --
Q. So why don't I ask my question, and if it would be helpful for you, I can direct you to a point in the article. You can review it silently to yourself, and then I can reask my question.
A. Okay.
Q. Was there a point in time at which you saw Mr. West moving

his head, nodding his head? And I would direct you, Ms. Clifton, to the bullet at time stamp 5:57, if you could read that to yourself.
A. Yeah. Everything that I've written, like I said before, is true as I witnessed it.
Q. So having reviewed this article, does that refresh your recollection about whether or not you saw Mr. West nodding his head?
A. Yes.
Q. And at approximately what time did you see that?
A. Around 7:57.
Q. Do you mean 5:57?
A. Yes. Sorry. 5:57.
Q. And did you also see what appeared to be like Mr. West trying to say something?
A. Yeah, at points.
Q. And did that also occur at approximately 5:57?
A. Yes.
Q. Now, based on your observations, did it appear to you that Mr. West's breathing changed at various points in time?
A. Yes.
Q. Can you describe that for us.
A. It's nothing that's, at least as far as this one goes, not consistent, but there are several points where I noticed the rate of breathing change, whether it was -- it became quicker,

became slower or shallower, more ragged. The quality of it changed over the process.
Q. Did you ever observe what looked like his breathing becoming heavier?
A. Yeah.
Q. And approximately when did that happen?
A. I would have to look at the time line. Probably --
You said heavier; right?
Q. Yes, ma'am.
A. His breathing becoming heavier? Sorry. I wrote a lot. Hold on. Starts at around 5:57, and it continues to get heavier, and then it shallows out minutes later.
Q. Did you see Mr. West make any movements with his body?
A. Yeah.
Q. Can you describe those movements, please.
A. One thing I do remember, without even having to review it, is his head sort of, like, lolling to the side and sort of rolling like this. There was a lot of movements in general that happened with these things, but that one is a big one I remember. He appeared to give a thumbs up towards the beginning of it and looked like he was trying to say something. His hands would curl. You know, the breathing impacts that. Not the hands thing, the, you know, just general stability of the body on the gurney. Those are the main things, I would say. My article is a lot more detailed, but, yeah.

Q. Fair enough. So you mentioned that you saw Mr. West's head loll to the side. Did you record in your article the approximate time at which you saw Mr. West's head loll to the side?
A. I did. 5:58, and then it continues into 5:59.
Q. You said that you also saw Mr. West's hand curl. Did you also record in your article the approximate time at which you saw his hands curl?
A. Yes. Let me find it. Somewhere in here. 6:00.
Q. And at any point in time, did you see Mr. West make any other movements with his upper body?
A. Besides ones that are impacted by heavier breathing, I suppose not, but it was mostly ones related to breath.
Q. Did you ever -- did it ever appear to you that Mr. West was pushing against the restraints?
A. It appeared that way. I don't necessarily know if that is -- or what -- if that is what was happening, but there were times that it appeared like that was the case, yes.
Q. And can you describe for me what he was doing.
A. I say it somewhere in the beginning, where he's, like, strapped cruciform to the gurney. There's points where, you know, as it went on, it looked like his arms were just fighting against the restraints. Yeah. Just like, you know -- yes.
Q. And did you record in your article the approximate time at which you observed Mr. West's arms fighting against the

restraints?
A. Yeah. I know it's in here. I've got to find it. 5:58. Did you not --
Q. Sorry. I didn't hear your answer.
A. 5:58 is when that happened. Sorry.
Q. Did you take notes on when you were able to hear Mr. West's last breath?
A. You can't -- well, "can't" isn't the word.
Q. Let me reask my question.
A. Yeah.
Q. Were you taking notes on what you could observe about Mr. West's breathing?
A. I took notes on when I saw his last breath.
Q. And when was that?
A. It was around 6:07. Yeah.
Q. And the four minutes leading up to when Mr. West took his last breath, what were you observing about his breathing?
A. In the four minutes leading up to it you said? Like I've said before, the quality of the breath changes a lot very rapidly over the course of this process. There is a lot of gasping breaths that are further apart and inconsistently timed, and at a point they start to shallow out. Everyone looks differently, but the gasping breaths and tapering off into more shallow ones is a common thing that I've seen. I remember he in particular had breathing that sort of appeared like he was

coughing. Again, I can't say exactly that he was coughing, but that's what it appeared like. But, yeah. Breathing that was gasping at first, shallowed out, sputters into some coughs, and then nothing perceptible to the eye.

Q. And did you record in your article the approximate times at which you saw the gasping and coughing breaths?

A. Yes, extensively.

Q. I want to turn to Mr. Boyd's execution, which was in October of 2025. Did you also attend that execution?

A. I did, yes.

Q. And where were you sitting for Mr. Boyd's execution?

A. Mr. Boyd's, I was in the second row of the viewing chamber. But the seats are staggered, so it's still a very clear view from where you're sitting.

Q. Did you write an article regarding your observations of Mr. Boyd's execution?

A. Yes.

Q. And if you can turn, please, to Plaintiff's Exhibit 30. Is this the article that you wrote regarding your observations of Mr. Boyd's execution?

A. Yes.

Q. And did you take notes of your observation during that execution?

A. Yes.

Q. If you take a look at Exhibit 30, do you see that there's an

execution time line reflected?
A. Uh-huh (positive response).
Q. What information were you using to create this execution time line?
A. The notes I take in real time as I'm watching the execution occur.
Q. And were the events of Mr. Boyd's execution fresh in your mind when you wrote this execution time line?
A. Yes. This is written directly after it happened.
Q. Is that true for Mr. West as well?
A. It's true for all of them.
The process the prison uses is that they have a separate media room on the site. We witness the executions, we're taken back to the media center, there's a short press conference with John Hamm, and then we have an hour to write in there before it closes. So it's always right after the execution occurs.
Q. Thank you. When you first entered the witness media room for Mr. Boyd, were the curtains closed?
A. Yes.
Q. And at some point, the curtains were opened?
A. Yes.
Q. After the curtains were opened, were you able to see Mr. Boyd on the gurney?
A. Yes.
Q. Did you have a clear view of Mr. Boyd on the gurney?

A. At that point, yes.
Q. There is a reference in your article to Mr. Hood.
A. Uh-huh (positive response).
Q. Who is Mr. Hood?
A. That was Boyd's spiritual advisor.
Q. Did Mr. Hood block your view of Mr. Boyd's face for any period of time?
A. For a portion of time, he stood next to him, holding his hand. So he was standing in front of his face, but I could see the rest of his body. I believe that's -- yeah, it's like 5:55 -- no -- no. That's not the part where he was blocking it. Yeah, at like 5:56 to 5:58.
Q. So to clarify, at some point in time, Mr. Hood stepped away?
A. Yes.
Q. And once Mr. Hood stepped away, did you have a clear view of Mr. Boyd's face?
A. Yes.
Q. But even when Mr. Hood was standing next to the gurney, you could see Mr. Boyd's body?
A. Everything except his face.
Q. And you indicate in your article that the gas apparently began flowing at 5:57. What did you observe happening with Mr. Boyd right after you believe the gas was flowing?
A. Like sudden movements, you know, like the body jerking a bit off the gurney. I forget exactly how I phrased it, but I

remember it was his, like, legs tensed. But -- yeah. Basically, sudden movements.
Q. All right. Did you see Mr. Boyd roll to the side or make any attempts to roll to the side?
A. Yeah. There was a point in the beginning where he did that. I would have to see the exact time in here. Yeah. 5:57 is when that happened.
Q. What other movements did you see from Mr. Boyd at 5:57?
A. He, like, jolted and rolled to the side. There was a bit of shuddering, too, bodily, like, shuddering. You know, that's the -- that's most of it.
Q. At any point in time, did you see Mr. Boyd's legs raise up off the gurney?
A. Yeah. I saw that twice.
Q. And did you document in your execution time line approximately when you saw Mr. Boyd's legs raise up off the gurney?
A. Yeah. It happens once at the beginning. I believe around 5:56 or 5:57, one of those -- no, 5:58. That's when it happened. And then it happens again somewhere towards the end. I have to find it. Sorry. I read slowly. 6:15. That's the second time it happens.
Q. And I saw in your article some descriptions of the time that passed in between each breath.
A. Yeah.

Q. How did you determine how much time was passing in between each breath?
A. Manually counting seconds as I watched.
Q. So you were literally counting to yourself in between each breath?
A. Yes. I do that during every execution, but that's how that was ascertained.
Q. And if you look at your article, beginning at time 6:01, how much time were you counting in between Mr. Boyd's breath?
A. Every time he took a new breath, I would start over my counting in seconds and write down each single one. So those were -- they came really inconsistently, and there were some intervals that were about five seconds long, some about 15. I remember a couple were like eight or ten. But that range of time intervals between breaths was what I observed.
Q. And if you look beginning at minute 6:02 and again at 6:06, did there come a period of time when Mr. Boyd's breath became more regular?
A. Yeah. Yeah.
Q. And how often was Mr. Boyd breathing?
A. There was a point where it -- where I counted two to three seconds between breaths. There was a couple of minutes where it seemed like it was three seconds between each one, and then it appeared to become less stable at a point, and there was more variation of two seconds and three seconds between them. But --

yeah.
Q. But were there multiple minutes where Mr. Boyd was breathing every two to three seconds?
A. Yeah. Yes, there was.
Q. And did you document in your execution time line approximately at what point in time Mr. Boyd was breathing every two to three seconds?
A. Yes. Yeah, I believe it starts somewhere in here. Yeah, at 6:02, there's longer intervals between them, and they get progressively shorter as you go on to 6:07, which is where he was breathing approximately every two to three seconds.
Q. And at some point in time after 6:07, did Mr. Boyd's breath start to become shallower?
A. Yeah.
Q. And did you again --
THE COURT: Sorry. Can you answer out loud?
THE WITNESS: Oh, sorry. Yes.
Q. And did you document in your execution time line approximately when that occurred?
A. Yes.
Q. How long was it before you saw what appeared to be Mr. Boyd's last breath?
A. I believe about -- hold on. It's in here. The last one was around 6:17.
Q. Thank you.

MS. WIESNER: Your Honor, I would pass the witness.

THE COURT: All right. Cross-examination.

CROSS-EXAMINATION

BY MS. KENNY:

Q. Good afternoon, Ms. Clifton. Polly Kenny.

A. Hi.

Q. Let's start with Mr. West's article, if you could turn back to Exhibit 34. I would like to turn your attention to the 5:58 entry. You state that West's hands seemed to lax as he began to apparently shake his head. His arms appeared to tense against the restraints, and his body appeared to shake slightly over about 20 seconds.

His body appeared, and then there's "appeared" two more times in that entry. Do you see that?

A. Yes.

Q. And then throughout the next 5:59, 6:00, 6:01, the word "appeared" appears multiple times; correct?

A. Yes, it does.

Q. And the word "apparently" appears multiple times as well; correct?

A. Yes.

Q. And you're not using -- when you say you're counting seconds, are you counting those in your head, or do you have a stopwatch-type thing?

A. You're not allowed to bring a stopwatch in there.

Q. So you're counting -- how do you do it? One Mississippi?
A. One Mississippi, two Mississippi, three Mississippi.
Q. Like every Southerner does.
A. Yes. Correct.
Q. Now, Mr. West -- you indicate that his body began to turn blue at 6:00; correct?
A. Yes. That was what I saw.
Q. And you testified on direct examination that the last four minutes, that the breathing was variable, I guess -- that might not be the word you used, but that's a word I would use to describe your testimony. Would you agree that it was sort of variable?
A. Yes.
Q. And would you agree that that's consistent with agonal breathing?
MS. WIESNER: Objection.
THE COURT: What's the objection?
MS. WIESNER: Lack of foundation. Calls for expert testimony.
THE COURT: Sustained.
Q. (Ms. Kenny, continuing:) You testified in the Boyd hearing; correct?
A. Yes, I did.
Q. And you testified in regard -- in regard to agonal breathing, that you saw Mr. Frazier having agonal breathing?

A. I believe what I said was I was aware of what agonal breathing was, not necessarily that I can attest that that was agonal breathing.
Q. What is agonal breathing?
A. That's not within my purview to define right now.
Q. So you knew what it was then, but you don't now?
A. I do know what it is, but --
Q. Have you ever seen someone die?
A. Several times.
Q. And have you seen end-of-life breathing?
A. Yes.
Q. Would you call that agonal breathing?
MS. WIESNER: Objection, Your Honor.
THE COURT: Overruled. She's laying enough of a foundation that this line of questioning can continue. Go ahead.
A. I am not a medical expert, so I am not going to attest to whether or not it was agonal breathing, but I do know what it is. I'm aware of that concept. But I can't say for certain if it was or wasn't.
Q. And excuse me if my question tended to that. What I was meaning to ask was whether that was consistent in your mind with what you had seen previously.
A. Consistent with what I had seen previously --
Q. In seeing other people die and end-of-life breathing.

A. Everyone is different when they die. The type of movements that happen, type of breathing, how hard or shallow or rough it is, it's all different. So I don't know if necessarily comparing visual stimuli is the most helpful, especially if the deaths occurred by different means. I've seen three executions, and I've watched several people die naturally, and those are all very different circumstances. So I would not feel comfortable, you know, making that decision one way or another.
Q. So that's fair. So in that several, the three executions and the people you saw die naturally, they were all different, you said?
A. Yes.
Q. Now, in a nitrogen execution, you do not know exactly when the gas begins to flow; correct?
A. Correct. The State does not tell us.
THE COURT: Ms. Kenny, could you pull the microphone down a little bit more? Thank you.
Q. And you cannot see the pulse oximeters to see what the blood saturation is; correct?
A. They're not publicly, like, available.
Q. So you cannot see them.
A. No.
Q. And you cannot see the EKG machine; correct?
A. Correct. For Boyd's case in particular, they told us when he flatlined, though, so that is information that I got from the

State.
Q. Was that during the press conference or prior to that --
A. Yes.
Q. And you don't know from your personal observations when the condemned inmate loses consciousness; correct?
A. Correct.
Q. You don't know when their heart stops, other than Boyd being --
A. I was about to say, in Boyd's case, they told us directly.
Q. Okay. But other than that --
A. General protocol is that we are not able to see the EKG.
Q. And of the movements you see, you don't know which movements are conscious movements and which ones are not conscious movements; correct?
A. Correct.
I'd like to clarify that all the things that I've documented in here are things that I've observed. I don't know the intention behind them or the thought process behind them, but these are all things I saw with my eyes.
Q. From your perspective on your angle and your observations; correct?
A. These are just literal events that I saw with my eyes, not colored by anything else. Just write what I see.
MS. KENNY: No further questions.
THE COURT: Any redirect?

MS. WIESNER: No, Your Honor.

THE COURT: All right. You can step down. Thank you.

Plaintiff will call its next witness.

MS. WIESNER: Thank you, Your Honor. Plaintiff Lee calls Defendant Commissioner Hamm.

Your Honor, again, I have witness binders. May I approach?

THE COURT: You may.

MS. WIESNER: Just for the record, Your Honor, Plaintiff's Exhibit 4 is highly confidential. I do not anticipate that I will have to show it, so hopefully we can avoid any issues there.

THE COURT: All right.

MS. WIESNER: And Plaintiff's Exhibit 114, I've had conversations with counsel for defendants. They agreed that I could publicly show this document. They did, however, ask that I redact the language "highly confidential," which we've done in the electronic version. So if it is published, I understand from defense counsel that I may do so without closing the courtroom.

THE COURT: That's correct?

MS. SIMPSON: Yes, Your Honor.

THE COURT: All right.

JOHN HAMM

The witness, having first been duly sworn to speak the

truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MS. WIESNER:

Q. Good afternoon.

A. Good afternoon, ma'am.

Q. Can you please state your name for the record.

A. John Hamm.

Q. Mr. Hamm, you've been the commissioner of the Alabama Department of Corrections since January 1st, 2020?

A. No. 2022.

Q. Thank you. And you approved Alabama's protocol for execution by nitrogen gas?

A. That is correct.

Q. And you have the authority to approve an execution protocol in Alabama? It's one hundred percent wholly yours?

A. Yes, ma'am.

Q. You did not personally write the protocol for execution by nitrogen gas?

A. That is correct.

Q. Attorneys at the Attorney General's office wrote it?

A. Yes, ma'am.

MS. SIMPSON: Objection, Your Honor. Again, leading the witness.

THE COURT: Sustained.

MS. WIESNER: Your Honor, this is a defendant in the matter. I would ask for permission to lead.

MS. SIMPSON: Your Honor, the witness hasn't proven himself to be hostile yet.

THE COURT: True.

Q. (Ms. Wiesner, continuing:) Who wrote the protocol for the execution by nitrogen hypoxia?

A. The Attorney General's office.

Q. Do you, yourself, have any medical training?

A. No, ma'am.

Q. Do you, yourself, have any training in physiology?

A. No, ma'am.

Q. What about mental health?

A. No, ma'am.

Q. Do you have any training in hypoxia?

A. No, ma'am.

Q. Did you consult with any medical professionals as part of the drafting process?

A. I did not.

Q. And did you consult with any medical professionals regarding the onset of unconsciousness from nitrogen gas?

A. No, ma'am, I did not.

Q. Are you aware of whether anyone on the drafting team consulted with any medical professionals or experts on nitrogen gas?

A. I'm not sure.
Q. Let me break that up.
Are you aware of whether anyone on the drafting team consulted with medical professionals?
A. I don't know who all they consulted with, ma'am.
Q. Do you recall I took your deposition on March 4th of this year?
A. Yes, ma'am.
MS. WIESNER: Court's indulgence.
(Brief pause in the proceedings.)
MS. WIESNER: Permission to approach, Your Honor, with a copy of that deposition transcript?
THE COURT: You may.
Q. If I could direct you, Mr. Hamm, to page 119, beginning at line one. Do you see that I asked, "Are you aware of whether anyone on the drafting team consulted with medical professionals?" And you answered, "I'm not aware." Did I read that correctly?
A. Hold on. I'm just now catching up, ma'am. Hold on. That is correct.
Q. Are you aware of whether anyone on the drafting team consulted technical experts?
A. No, ma'am, I'm not aware.
Q. Before approving the protocol for nitrogen gas, did you personally take any steps to confirm that it does not cause pain

or suffering?
A. No, ma'am.
Q. And before approving the protocol for execution by nitrogen gas, did you take any steps to confirm that it does not cause terror?
A. No, ma'am.
Q. Before approving the protocol for execution by nitrogen gas, did you personally take any steps to confirm that it does not cause psychological trauma?
A. No, ma'am.
Q. And are you aware of the fact that plaintiffs have alleged in this litigation and in others that the protocol for execution by nitrogen gas does, in fact, cause pain and suffering?
A. I understand that's some of the allegations. Yes, ma'am.
Q. After those allegations have been raised, did you take any steps to investigate whether execution by nitrogen gas causes pain and suffering or trauma?
A. No, ma'am.
Q. You've observed several executions by nitrogen hypoxia?
A. Yes, ma'am.
Q. In fact, have you observed all of the executions by nitrogen gas?
A. In Alabama, yes, ma'am.
Q. And are you generally familiar with the steps taken during an execution by nitrogen gas?

A. Yes, ma'am.
Q. Is there a point in time during the execution when someone on the execution team conducts a final inspection of the mask?
A. Yes, ma'am.
Q. Is that inspection a technical inspection of any kind?
A. No, ma'am.
Q. It's just visual?
A. And feel.
Q. Is there any negative pressure seal test performed on the mask?
A. No, ma'am.
Q. Now, when the mask is first placed on the inmate, is breathing air being pumped to the mask?
A. Correct.
Q. And would you agree with me that once the breathing air is turned off during the course of an execution, there will be some residual breathing air throughout the length of the breathing tube?
A. One would figure that.
Q. Does the protocol have any steps to purge the breathing air from the breathing tube?
A. I don't recall specifically.
Q. Sitting here today, you're not aware of any steps in the protocol?
A. To purge the air, no, ma'am.

Q. Are you aware of any tests that have been undertaken at any point in time to confirm how long it takes for the residual air to be flushed from the breathing tube and mask?
A. No, ma'am, I'm not aware.
Q. Are you aware of any independent investigation undertaken to ascertain how long it takes for the residual oxygen to be flushed from the breathing tube and mask?
A. No, ma'am.
Q. Do you know how long it takes for the nitrogen gas to displace the residual oxygen in the breathing tube and mask?
A. I do not, ma'am.
Q. Are members of the media permitted to witness executions by nitrogen gas?
A. Yes, ma'am. Witnesses to all of our executions.
Q. Where do the media witnesses sit?
A. If you're -- from my perspective or where I sit in the media room, they would be to my right.
Q. Is there anything that would obstruct the media's view from seeing the execution gurney when they're located in the media witness room?
A. Should not be, no, ma'am.
Q. And if I could show you, please, Plaintiff's Exhibit 114.
MS. WIESNER: And Your Honor, given representations of counsel, I would like to go ahead and put that up on the screen.
THE COURT: You may.

Q. Does this picture accurately reflect what witnesses can see from the media witness room during an execution?
A. That is correct.
Q. Now, you sit in a different room from the media?
A. That is correct.
Q. And do you have a different viewpoint of the inmate during executions?
A. Yes, ma'am.
Q. Would you agree with me that members of the media may have a better view of the gurney and inmate than you do?
A. I wouldn't say a better view. I'd say a different view, but not a better view.
Q. Would you agree with me that members of the media may have a better view of the witness's face during execution than you do?
A. Yes, ma'am.
Q. Now, the visual inspection of the mask that we've been discussing, if a witness is tracking what's going on, would they be able to see that final inspection?
A. They should be able to.
Q. And if a witness is tracking what's going on, would they be able to understand that that was the final inspection, and the execution is going to proceed?
A. They should.
Q. Do you know someone by the name of Kim Chandler?
A. I do.

Q. And do you know her to be fair and accurate in her reporting?
A. Yes, I think Kim's fair and accurate.
Q. Do you think she would say any falsehoods in newspaper articles?
A. No, ma'am.
Q. Do you know someone by the name of Marty Roney?
A. I do.
Q. And do you know Mr. Roney to be accurate in his reporting?
A. Yes, ma'am.
Q. I want to talk to you about some of the executions that have happened to date, and I'd like to start with Mr. Kenneth Smith. Did you personally observe Mr. Smith struggle against his restraints during the execution?
A. I did.
Q. And would you agree that Mr. Smith shook and writhed on the gurney for a period of time?
A. I probably wouldn't use those descriptive words, but, yes, he did move.
Q. Would you agree with me that Mr. Smith shook and moved on the gurney for a period of time?
A. Yes, ma'am.
Q. And is it your opinion that that shaking and writhing occurred after the nitrogen gas began to flow?
A. Some before and some after.

Q. So did you observe shaking and writhing after the nitrogen gas began to flow?
A. Yes.
MS. SIMPSON: Objection to the characterization of the testimony of the witness. I don't believe he said he endorsed the word "writhing."
MS. SHARPE: I've asked a question, Your Honor. I'm doing my best to just ask questions and letting him answer.
THE COURT: Overruled. He can answer.
Q. Are you aware of the fact that media witnesses have reported that Mr. Smith was shaking and writhing on the gurney for an approximate two-minute period of time?
A. That is correct.
Q. And do you have any reason to disagree with the fact that there was some movement by Mr. Smith over a two-minute period of time?
A. I'm not going to agree about two minutes continuous, but over a two-minute period of time, he did move some, yes.
Q. Did you give a press conference following Mr. Smith's execution?
A. I did.
Q. Do you recall making statements during that press conference about whether or not Mr. Smith was holding his breath?
A. I did.
Q. Did you personally observe Mr. Smith holding his breath?

A. I was told that by some of the execution staff.
Q. So I want to reask my question. Did you personally observe Mr. Smith holding his breath?
A. I did not.
Q. And so were the statements that you made at that press conference based entirely on what other people told you?
A. That is correct.
Q. I want to turn to Mr. Miller's execution, which was September 2024. You attended that execution?
A. That is correct.
Q. And would you agree with me that Mr. Miller also shook on the gurney for a period of time?
A. His body did move for a period of time, yes.
Q. And is it your belief that Mr. Miller was shaking after the nitrogen gas began flowing?
A. His body did move after the nitrogen started flowing.
Q. The next execution was Mr. Grayson?
A. If you say so.
Q. Did you attend Mr. Grayson's execution?
A. Yes, ma'am.
Q. And do you recall there being an execution in November of 2024?
A. Yes, ma'am.
Q. Did you observe Mr. Grayson making some movements with his body for a period of time after the warden asked if he could

proceed?
A. I don't recall Mr. Grayson's execution personally, but they have all had some type of body movement.
Q. Do you recall giving -- you recall that we took your deposition on March 4th?
A. Yes, ma'am.
Q. And do you recall that I asked you questions about Mr. Grayson during the deposition?
A. Yes, ma'am.
Q. Would it refresh your memory to look at what you testified to on March 4th?
A. It would help.
Q. If you could please turn to page 283, line 18, please.
A. Okay.
Q. Did you observe Mr. Grayson -- does that refresh your memory?
A. Yes, ma'am.
Q. Did you observe Mr. Grayson continuing to make some movements with his body for a period of time after the warden asked if he could proceed with the execution?
A. Yes, ma'am.
Q. And did you also see Mr. Grayson shake his head at some point in time during the execution?
A. Yes, ma'am.
Q. And at some point in time, did you see Mr. Grayson lift both

of his legs up off the gurney?
A. I believe he did.
Q. Did you attend Mr. Frazier's execution in February 2025?
A. Yes, ma'am.
Q. And would you agree with me that there was movement by Mr. Frazier after the nitrogen gas began flowing?
A. Yes, ma'am.
Q. Did you see Mr. Frazier twirling his wrists in a circular motion?
A. I do remember that happening. If it was Mr. Frazier, yes, ma'am.
Q. And did you see Mr. Frazier lift his legs a few inches off the gurney at one point during his execution?
A. Yes, ma'am.
Q. And would you agree with me that you saw movement at various points in time over a seven- to eight-minute period after the nitrogen gas began flowing during Mr. Frazier's execution?
A. I believe that's correct.
Q. You attended Mr. Hunt's execution in June 2025?
A. Yes, ma'am.
Q. And you would agree with me that Mr. Hunt was, in fact, making some shaking movements during his execution?
A. His body was moving, yes, ma'am.
Q. And those movements occurred after you believed that the nitrogen gas had begun flowing?

A. That is correct.
Q. You attended Mr. West's execution in September of 2025 as well?
A. Correct.
Q. And you saw movement by Mr. West during his execution as well?
A. Yes, ma'am.
Q. And the last execution that you attended, that was Mr. Boyd in October of 2025?
A. I believe that's correct.
Q. And do you recall that Mr. Boyd also had movement during his execution?
A. Yes, ma'am.
Q. And the movement that you saw by Mr. Boyd, that also occurred after you believed the nitrogen gas had begun flowing?
A. Yes, ma'am.
Q. Would you agree with me, then, that every inmate who's been executed to date by nitrogen hypoxia has shown some form of movement after the nitrogen has begun flowing?
A. That is correct.
Q. Does ADOC maintain an armory with rifles?
A. We do have an armory. It does have rifles.
Q. And does ADOC maintain ammunition for the weapons in its armory?
A. Yes, ma'am.

Q. Are law enforcement personnel required to undergo basic training and annual requalification with firearms?
A. Yes, ma'am.
Q. Could ADOC train people to use .30-caliber rifles for firing squad if approved by the legislature?
A. We could train in rifles, yes.
Q. And if the Alabama Legislature approved firing squad as a method of execution, would you be able to ensure that officers are trained appropriately in how to use that weapon?
A. Whatever weapon was chosen, yes, we would make sure they were properly trained.
Q. Could ADOC procure lumber?
A. Yes, ma'am.
Q. Could ADOC procure sandbags?
A. Yes, ma'am.
Q. Could ADOC procure armor steel plates?
A. Yes, ma'am.
Q. Could ADOC procure bulletproof windows?
A. Yes, ma'am.
Q. Does Holman have outdoor space that's secured with a perimeter fence?
A. Yes, ma'am.
Q. And if the legislature approved firing squad and approved the funds, could ADOC modify a space at Holman to carry out executions by firing squad?

A. Certainly we could look into that.
Q. If firing squad executions became legal in the state of Alabama and a protocol was enacted, do you believe that you could modify space at Holman to carry out firing squad executions?
A. We would certainly have to do our research to see what type of space we would need, and I'm sure we would be able to come up with an appropriate place.
Q. So is the answer to my question yes, that if the Legislature approved execution by firing squad and appropriated the funds, ADOC would be able to modify space at Holman to carry out executions by firing squad?
A. Yes.
Q. Thank you.
MS. WIESNER: I'll pass the witness.
MS. SIMPSON: Your Honor, I also have a small witness binder.
THE COURT: All right.
MS. SIMPSON: May I approach?
THE COURT: Your may.
MS. SIMPSON: Your Honor, I have a brief cross-examination, and then I request the Court's permission to take the witness on direct. We had also planned to take the witness on direct. Of course, plaintiff beat us to it.
THE COURT: Any objection?

MS. WIESNER: I certainly have no opposition to them doing the direct examination and asking questions within the scope of my direct. I'm not sure I would agree that they can take leading questions, as this is their own client.

THE COURT: I'm understanding her to say she's going to cross-examine him, and then after she's done, wants to then take him on direct. Do you oppose them going ahead and taking him on direct during your case in chief?

MS. WIESNER: No, Your Honor.

THE COURT: All right. Go ahead.

CROSS-EXAMINATION

BY MS. SIMPSON:

Q. Begin with cross-examination.

Commissioner, have you ever worn a full-face respirator?

A. I don't recall.

Q. So have you ever conducted a negative pressure test?

A. I'm sorry. Yes, I have worn a military gas mask. It is full face.

Q. Do you know what kind of military gas mask that was, sitting here today?

A. That was about 40 years ago. No, ma'am.

Q. But have you conducted a negative pressure test?

A. On those masks, we did.

Q. And how do you conduct a negative pressure test?

A. Those particular masks, once you fit them to your head, you

would cover the seal with your hand and then breathe out, you know, push air out.
Q. Can you conduct a negative pressure test on someone who doesn't want to cooperate --
A. No, ma'am.
Q. -- with the test? And why is that?
A. Well, it takes cooperation.
Q. Is that because you're cutting off the air supply?
A. You're going to have to have them cooperate on pushing the air out.
Q. You were asked some questions about reporters who have witnessed executions. Do you recall that?
A. Yes, ma'am.
Q. Do you recall that Mr. Roney reported seeing an IV line during one of the hypoxia executions?
A. Yes, ma'am.
Q. Does ADOC endorse the media time lines or descriptions of any of these articles concerning the hypoxia executions?
A. No, ma'am.
Q. You were asked about a statement you made during a press conference concerning Mr. Smith holding his breath.
A. Correct.
Q. Do you know specifically who gave you the information that Mr. Smith held his breath?
A. I believe it was Cynthia Stewart.

Q. Who is Cynthia Stewart?
A. At that time, she was regional director. She was over several prisons, Holman being one, and she's the former warden at Holman prison.
Q. Was she present at Mr. Smith's execution?
A. Yes, ma'am. She was in the chamber.
Q. Do you think she had a better view than you did?
A. She was right next to him. Yes, ma'am.
Q. You were asked some questions about movements that Mr. Grayson made after you cleared the way for execution. Do you recall that?
A. Yes, ma'am.
Q. What sort of movements did he make?
A. Grayson and all the inmates that have been executed, they've all had some type of body movements. They have had the raising of the legs. They've all had some type of body movement.
Q. Do you expect to see movement during hypoxia executions?
A. Yes, ma'am.
Q. Why is that?
A. That's just -- from information, when the oxygen is cut off, your body is going to have movement.
Q. Do you know specifically when the nitrogen begins to flow during an execution?
A. No, ma'am.
Q. Do you know when the inmates lose consciousness?

A. No, ma'am.
Q. And do you know whether all inmate movements made during hypoxia executions are consciously made?
A. No, ma'am.
MS. SIMPSON: At this point, Your Honor, I would request to turn over to direct examination.
THE COURT: All right. Let me ask this. Do you want an opportunity to redirect before they move into direct?
MS. WIESNER: Your Honor, for efficiency purposes, I would suggest I do all of my questions at the end, if counsel doesn't oppose.
MS. SIMPSON: No opposition here.
THE COURT: All right. Let's do that.

DIRECT EXAMINATION

BY MS. SIMPSON:
Q. Commissioner, have you testified in a hypoxia execution litigation before?
A. Yes, ma'am.
Q. Do you recall testifying in the Demetrius Frazier case?
A. I'm sure I did.
Q. Do you recall testifying in the Anthony Boyd case?
A. I'm sure I did.
Q. I would ask you at this time just to look at Exhibits 5 and 11 in your binder there.
MS. SIMPSON: Your Honor, I would note that these have

been pre-agreed for admission.

THE COURT: These have been admitted?

MS. SIMPSON: Yes.

THE COURT: Okay. Go ahead.

Q. Sir, do you recognize Defendants' Exhibits 5 and 11?

A. Yes, ma'am.

Q. And what are they?

A. These are transcripts of my testimony in this court in Demetrius Frazier and Anthony Boyd.

Q. Do you stand by your prior testimony?

A. Yes, ma'am.

Q. Is there anything in your prior testimony that you would change here today?

A. No, ma'am.

Q. Now, Mr. Lee has suggested that he would prefer to be executed via firing squad. Is that method currently available to ADOC?

A. No, ma'am.

Q. Does ADOC have a protocol for a firing squad?

A. No, ma'am.

Q. Training for a firing squad?

A. No, ma'am.

Q. Does ADOC have a facility today in which you could safely carry out a firing squad execution?

A. No, ma'am.

Q. Have you investigated implementing a firing squad protocol?
A. No, ma'am.
Q. Why not?
A. It is not the law of Alabama, it's not an approved execution method, so I have other things I can be doing.
Q. Sitting here today, can you identify five ADOC employees who you consider to be sufficiently skilled and willing to carry out a firing squad execution?
A. Not at this time.
Q. Do you have firearms training?
A. Yes, ma'am.
Q. What sort of firearms training do you have?
A. Handgun, long gun, or rifle.
Q. And where were you trained?
A. Started at Northeast Alabama Police Academy and then the Federal Law Enforcement Training Center in Glynco, Georgia. Then Tuscaloosa Academy and -- I'm sure there are some others in there.
Q. Are you trained to the level of a marksman?
A. No, ma'am. Well, Alabama Peace Officers Standards Training Commission, they're the ones that regulate firearms training or basic training for correctional officers and law enforcement in the state of Alabama, and they really do not have a classification. They give a numerical score. You have to shoot at least a 70 to pass, and 100 is the top score. But there is

no breakdown. Like at FLETC, Federal Law Enforcement Training Center, they did have different grades of marksman or, you know, you're a good shot or you just passed.
Q. The training standard for the state, is that commonly called APOSTC?
A. That is correct. That's Alabama Peace Officers Standard Training Commission -- everybody refers to it around here as APOSTC.
Q. Do you have to qualify under APOSTC personally?
A. Yes, ma'am, I do.
Q. Dare I ask, what's your qualification score?
A. Oh, it's kind of off. 96 was my last one.
Q. Thank you, sir.
As commissioner -- well, let's see. What role do you play in selecting members of the execution team?
A. I do not select members of the execution team.
Q. As the commissioner, could you compel ADOC employees to participate in executions?
A. No, ma'am.
Q. Why not?
A. That is -- it's kind of like when I was state police, I could not compel any agent to work internet crimes against children because of the type crimes they were. You had to volunteer to investigate those type crimes. So an execution, you would have to volunteer, but it depends on how the law would

be written and passed. Current law, the warden at Holman prison is the executioner. So that would have to be taken into account in any new legislation.
Q. Let's talk briefly about the execution chamber. Are you familiar with the execution chamber at Holman?
A. Yes, ma'am.
Q. Do you believe it could be used for a firing squad execution?
A. I think it's too small.
Q. Any other reasons why or why not?
A. I would -- yeah. I mean, just -- I think it would probably not -- be cost prohibitive to try to retrofit or remodel that, because we still have electrocution, lethal injection, nitrogen hypoxia, so all those methods are still available. So I don't think it could be retrofit to where you could have a firing squad and conduct those other three executions if so selected.
Q. In your opinion, is there another place at Holman that could be easily used for a firing squad execution?
A. Probably. Now, there's a lot of planning that would have to go into it. I think it would probably have to be constructed.
Q. So is there a currently standing facility at Holman that you believe could be used?
A. No, ma'am.
Q. What about the decommissioned part of Holman?
A. Well, it was decommissioned for a reason, so, no, I do not

think that would be acceptable.
Q. How about outside the prison, within the fence but outside the physical building?
A. That's what I'm saying. We would have to actually build probably a structure, would probably be the best choice.
Q. Did you witness Anthony Boyd's execution in October of 2025?
A. Yes, ma'am.
Q. And what kind of execution was that?
A. Nitrogen.
Q. Where did you sit?
A. We sit in the middle observation room. I sit front row, far right seat.
Q. Did you authorize the execution to proceed?
A. Yes, ma'am.
Q. Did you see Mr. Boyd make any movements?
A. Sure. Yeah, Mr. Boyd made movements.
Q. Were you concerned by those movements?
A. No, ma'am.
Q. Why not?
A. Like I said, that's to be expected.
Q. Sitting here today, do you know when Mr. Boyd lost consciousness?
A. No, ma'am.
Q. Do you know when he died?
A. We have a death time that we give out, but I do not know

when he quit breathing, no, ma'am.
Q. Is the official death time the time he quits breathing?
A. No, ma'am.
Q. Can you see the EKG during an execution?
A. No, ma'am.
Q. Can you see the pulse oximeters?
A. No, ma'am.
MS. SIMPSON: I have nothing further of the witness.
THE COURT: All right. Redirect and cross-examination.

REDIRECT EXAMINATION

BY MS. WIESNER:
Q. Mr. Hamm, you were asked a question about whether or not you know exactly when the nitrogen gas begins to flow. Do you recall that?
A. Yes, ma'am.
Q. Are there codes given during the execution that indicate when the execution can proceed?
A. Yes, ma'am, they have codes.
Q. And are you aware of those codes being given during the execution?
A. Not all the time, no, ma'am.
Q. Do you, yourself, have a role in authorizing the execution to proceed?
A. I do.
Q. And you inform the warden when the execution -- when there's

final authority to proceed with the execution?
A. The warden reads the death warrant to the inmate. Once he concludes reading the death warrant, he asks the inmate if he would like to make a final statement. After that the warden exits the chamber. Some period of time after that, he comes over the intercom and asks to proceed. I then ask the Attorney General if there is any legal reasons not to proceed, and if I get a negative, then I tell the warden to proceed.
Q. So even if you don't know the precise time that the nitrogen gas is flowing, you have an approximate estimate of when the execution proceeds and the nitrogen gas begins to flow?
A. I know when the warden has the authority to start the gas.
Q. And in your experience, does the execution typically proceed shortly after you give the authority to start the gas?
A. Some period of time after that, yes.
Q. But a short period of time?
A. I assume. He's -- I cannot see the warden when he does that.
Q. Now, you were also asked some questions about your statements that Mr. Smith was holding his breath. Were you relying entirely on information provided by Ms. Stewart for the statement that Mr. Smith was holding his breath?
A. Correct.
Q. Did you ever ask Ms. Stewart for how long Mr. Smith was holding his breath?

A. No, ma'am.
Q. So sitting here today, you have no idea how long Mr. Smith was or was not holding his breath?
A. That is correct.
Q. You were also asked some questions about whether or not the current execution chamber would accommodate execution by firing squad. Have you undertaken any efforts to understand what would be required from a physical space perspective?
A. No, ma'am.
Q. And have you spoken with anyone to confirm whether or not the execution chamber at Holman is large enough to accommodate execution by firing squad?
A. No, ma'am.

MS. WIESNER: Nothing further.

THE COURT: All right. Any further questions?

Is this redirect?

MS. SIMPSON: Redirect, Your Honor. And just one question.

REDIRECT EXAMINATION

BY MS. SIMPSON:
Q. Commissioner, based upon your experience with and training in firearms, would you authorize a firing squad execution in the chamber at Holman as it stands?
A. No, ma'am.
Q. Thank you.

THE COURT: All right. Anything further? All right. You can step down. Thank you.

Is this witness excused, or are you staying?

MS. SIMPSON: We have nothing further for this witness, Your Honor.

THE COURT: Okay. It is 5:00. I am open to moving forward with the next witness, depending upon how long that witness will be, or we can reconvene tomorrow. Why don't you confer for a moment and let me know what you would like to do.

MS. WIESNER: Your Honor, I think our next witness is likely no more than 30 minutes. If Your Honor is okay proceeding, we would be happy to proceed with him and then pick back up.

MS. SIMPSON: We're fine. Can we have a very brief comfort break?

THE COURT: Certainly. And one housekeeping matter, it appears to us as though you have not actually admitted Defendants' Exhibits 5 or 11.

MS. SIMPSON: We would move for their admission. I believe there was no argument to their admissibility.

THE COURT: Those are the transcripts from Frazier and Boyd?

MS. WIESNER: I think, Your Honor, we had actually agreed to preadmit those exhibits. Certainly no objection now.

THE COURT: All right. They're admitted, just so the

record is clear.

All right. We'll take a ten minute recess.

(Recess was taken at 5:02 p.m. until 5:12 p.m., at which time the proceedings reconvened, as follows:)

THE COURT: The plaintiff will call its next witness.

MS. WIESNER: Thank you, Your Honor. Plaintiff Lee calls Deputy Commissioner Williams to the stand.

Your Honor, again, I have witness binders for Mr. Williams. May I approach?

THE COURT: Please.

MS. WIESNER: For the record, one of the exhibits is marked as highly confidential. I'm, again, hoping that I don't need to use it.

THE COURT: All right.

CHARLES WILLIAMS

The witness, having first been duly sworn to speak the truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MS. WIESNER:

Q. Good afternoon.

A. Good afternoon.

Q. Can you please state your full name for the record.

A. Charles Williams.

Q. And are you currently employed as the deputy commissioner of

the Alabama Department of Corrections?
A. Yes.
Q. Are you aware that the Alabama Department of Corrections designated you as its corporate representative in a deposition in this proceeding?
A. Yes.
Q. And if I could turn your attention, please, to Plaintiff's Exhibit 34, which is in the binder I handed you.
MS. WIESNER: Your Honor, Exhibit 34 has been previously admitted into evidence.
Q. Do you recognize this document, Mr. Williams?
A. Plaintiff's Exhibit 34, yes.
Q. And if you take a look at -- looks like page 3, there should be a topic of schedules -- I'm sorry -- schedule of topics listed. Do you see that?
A. Page 3. From the beginning?
MS. WIESNER: Court's indulgence. The printed copy appears to have a missing page, but perhaps we could put it up on the screen.
A. Yes.
MS. WIESNER: I stand corrected. The page is simply out of order.
Q. Mr. Williams, have you located the topics of examination in Plaintiff's Exhibit 34?
A. Yes. I have Exhibit 34, definitions and instructions,

Schedule A.
Q. And did you, in fact, provide testimony in a deposition on March 5th and March 17th on the topics listed in Schedule A?
A. Yes.
Q. What year did the Alabama Legislature approve the use of nitrogen hypoxia as a method of execution?
A. 2018.
Q. And when was the protocol for execution by nitrogen hypoxia finalized?
A. August 2023.
Q. Prior to 2023, had anyone in the United States, to your knowledge, been executed by nitrogen gas?
A. No.
Q. And to your knowledge, were any medical doctors or scientists involved in the development of the protocol for execution by nitrogen gas?
A. No.
Q. Were all of the people responsible for developing -- well, strike that.
Are you aware of the fact that people on behalf of ADOC's -- on behalf of ADOC conducted some tests or demonstrations of the nitrogen hypoxia system at various points in time?
A. Yes.
Q. And to your knowledge, were all of the people who were responsible for developing and administering those tests all

attorneys?
A. Further define administering and developing the tests. As that pertains to just the actual testing itself? The ones that were involved in the studies?
Q. Are you aware of any tests conducted as part of the development of the protocol of nitrogen hypoxia that were developed by anyone other than an attorney?
A. No.
Q. And to your knowledge, do any of the attorneys who were responsible for developing those tests or the protocol have any type of scientific or research background?
A. Not to my knowledge.
Q. To your knowledge, did any of the attorneys responsible for developing the protocol for execution by nitrogen gas consult with any independent or third-party experts?
A. Not in the development of the protocol of it, just as it relates to how the outcome would be.
Q. So is the answer to my question that you are not aware of anyone -- sorry. Is the answer to my question that you're not aware of any consultation with independent or third-party experts in the development of the protocol?
A. No, not in the development of it.
THE COURT: Can you speak more directly into the microphone, please.
THE WITNESS: Yes, ma'am. I'm sorry.

Q. And you're aware that attorneys with the Attorney General's office conducted some testing of the nitrogen hypoxia system?
A. Yes.
Q. Did any medical professionals oversee that testing conducted by the Attorney General's office?
A. No.
Q. Did any scientists oversee that testing?
A. No.
Q. Does ADOC take any real-time measurements of the oxygen level in a mask during an execution by nitrogen hypoxia?
A. The nitrogen inside the mask?
Q. Yes, sir.
A. No.
Q. Is there any documentation that reflects when each inmate loses consciousness?
A. No.
Q. Are inmates restrained to a gurney as part of execution by nitrogen gas?
A. Yes.
Q. And are the inmates restrained pretty firmly against the gurney?
A. Yes.
Q. Would you agree with me that as a result of those restraints, the inmate's movement is very restricted?
A. It's restricted, yes.

Q. Would you agree with me that their movement is very restricted?
A. Movement is restricted, but breathing is not.
Q. Would you agree with me that the inmate's movement is very restricted as a result of being restrained?
A. Yes.
Q. Now, Mr. Williams, you've observed several executions by nitrogen gas that took place at Holman?
A. Yes.
Q. And if I have my notes correct, I believe that was the executions of Mr. Miller, Mr. Grayson, Mr. Frazier, Mr. Hunt, and Mr. Boyd?
A. Yes.
Q. And where were you located in each of those executions?
A. In the commissioner's witness room.
Q. Did you observe movement during the nitrogen hypoxia execution by the inmates?
A. Yes.
Q. Did you also observe in multiple different executions that the inmates raised their legs for a period of time?
A. Yes.
Q. Did you observe some of the inmates raising their legs in a coordinated fashion?
A. Slowly went up and slowly went down.
Q. So, again, have you observed inmates raising their legs in a

coordinated fashion?

MS. SIMPSON: Objection. It's outside the witness's knowledge whether the movements were coordinated or not.

THE COURT: Overruled. He can answer if he believes he can.

A. Coordinated as in them being conscious or unconscious? Is that -- can you explain?

Q. Sir, I'm not asking for your interpretation of their consciousness. I'm simply asking whether you observed what appeared to be coordinated movement.

A. I have observed in all executions that they all have raised their legs at one point.

Q. And would you agree with me that you have observed inmates raising their legs in what appeared to be a coordinated fashion?

A. They're together.

Q. So in other words, it's not random jerking. It's both legs coming off the table at the same time?

A. In all executions, at the same time, yes.

Q. Have you also observed in some executions that at some point in time after the nitrogen gas begins flowing that the inmates have clenched their fists?

A. Yes.

Q. So I want to turn to the execution of Mr. Miller, which was in September of 2024. Would you agree with me that you do not dispute that Mr. Miller was shaking on the gurney for

approximately two minutes following the administration of nitrogen gas?
A. There was movement.
Q. And would you agree with me that there was movement for approximately two minutes following the administration of nitrogen gas?
A. I didn't time it.
Q. Do you have any reason to dispute that he was -- there was movement for approximately two minutes following the administration of nitrogen gas?
A. There was movement. I didn't time it, again.
Q. I want to turn to Mr. Frazier's execution, which was in February of 2025. Do you agree that at one point in time following the nitrogen gas, Mr. Frazier appeared to quiver and twitch on the gurney?
A. Again, there was movement.
Q. Would you agree with me that possibly due to the nitrogen and the depletion of oxygen that at one point in time following nitrogen gas, Mr. Frazier appeared to quiver and twitch on the gurney?
A. Oxygen deprivation causes that.
Q. So would --
A. Agonal breathing.
Q. I'm sorry. I didn't mean to cut you off.
A. Oxygen deprivation causes that.

Q. So would you agree with me that at one point in time following the nitrogen gas, Mr. Frazier appeared to quiver and twitch on the gurney?
A. I agree with movement. Quiver and twitch is not necessarily the characterization that I would use.
Q. And while you may not know the exact time, do you agree that Mr. Frazier was making movements for a period of seven to eight minutes?
A. Again, there was movement. I didn't time it.
Q. Would you agree with me that although you don't know the exact time, it's possible Mr. Frazier was making movements for a period of seven to eight minutes?
A. There was movement. I didn't -- again, I didn't time it to see how long it was.
Q. Is it possible that it was seven to eight months?
A. It's possible that it was not also.
Q. But it could have been seven to eight minutes, true?
A. I can't agree to that.
Q. You recall I took your deposition on March 5th, 2026?
A. Yes.
MS. WIESNER: Permission to approach, Your Honor.
THE COURT: You may.
Q. Mr. Williams, if you could turn with me, please, to page 255 of the March 5th deposition.
A. Okay.

Q. And if you look beginning at line four, do you see I asked, Question: "You just don't know how long there was movement for?" Answer: "I don't know." Question: "Is it possible it was seven to eight minutes?" Answer: "Could have been shorter. Don't know." Question: "But it could have been seven to eight minutes?" Answer: "It's possible."

Did I read that correctly?

A. You did.

Q. And did you, in fact, agree during your March 5th deposition that it was possible the movement could have been for a period of seven to eight minutes?

A. I also agreed that it could have been shorter.

Q. Did you testify at your March 5th deposition that it was possible the movement lasted for seven to eight minutes?

A. I did say it was possible.

Q. And do you also agree that Mr. Frazier lifted his legs a few inches off of the gurney?

A. Yes.

Q. And that could also have happened at some point in time after the nitrogen gas began flowing?

A. Yes.

Q. Turning to Mr. Hunt's execution, do you agree that Mr. Hunt had some shaking movements?

A. Some movement, yes.

Q. Do you agree that there were movements following the

administration of nitrogen gas?
A. Yes.
Q. And then turning to Mr. Boyd's execution, do you recall that Mr. Boyd did, in fact, lift his legs off the gurney?
A. Yes.
Q. And do you agree that Mr. Boyd lifted his legs off the gurney after the nitrogen gas began flowing?
A. Yes.
Q. Would you agree with me that once the oxygen is turned off and the nitrogen gas begins flowing, there is some awareness by the inmates that the oxygen has stopped?
A. Yes.
Q. And do you agree with me that the entire time the individual is conscious, they're aware of the fact that they're not getting enough oxygen?
A. They're aware of the entire procedure. Yes.
Q. And you would agree with me that the entire time the individual is conscious, they're aware of the fact that they're not getting enough oxygen?
A. They're aware of the nitrogen hypoxia. The nitrogen is now flowing, and the breathing air is turned off.
Q. And that means certainly for the entire time they're conscious, they're aware that they are unable to get sufficient oxygen?
A. Yes.

Q. And would you agree with me that the natural response to not getting enough oxygen is to panic?
A. Yes.
Q. Now, you testified that prior to 2018, the Alabama Legislature had not authorized execution by nitrogen hypoxia; is that fair?
A. Yes.
Q. Does that mean that there was no protocol for execution by nitrogen hypoxia prior to 2018?
A. There was no protocol for ADOC.
Q. So in other words, Alabama did not have a protocol to execute by nitrogen hypoxia prior to 2018. Is that fair?
A. Yes.
Q. And is it also fair that prior to 2018, the execution chamber at Holman would not have been set up to carry out an execution by nitrogen hypoxia?
A. Yes.
Q. But was ADOC able to develop a protocol for execution by nitrogen hypoxia?
A. Yes.
Q. And was ADOC able to develop training materials for the execution team members to carry out an execution by nitrogen hypoxia?
A. They had training, yes.
Q. And would you agree with me that if the Alabama Legislature

was to authorize execution by firing squad, ADOC could contract with the appropriate structural engineers to figure out what modifications might be required to the execution chamber?
A. That's a hypothetical question.
Q. And in my hypothetical question, if the Legislature approved execution by firing squad, would ADOC be able to contract with the appropriate structural engineers to determine what modifications would be required?
A. I have to speak -- I have to give you a hypothetical answer, counsel. I mean, if, in fact, it was approved, we would contract, find ways in order to accommodate.
Q. So you would agree with me, then, that if the State Legislature did approve firing squad as a method of execution, ADOC would be able to figure out how to contract with the appropriate vendors?
A. Again, it's a hypothetical question, counsel. I mean, if, in fact, the Legislature approved that, then we would actually seek measures in order to accommodate that method of execution.
Q. So is the answer to my question yes, if the State Legislature approved this as a method of execution, ADOC would know or be able to figure out how to contract with the appropriate vendors to modify an execution chamber?
A. Again, it's a hypothetical question. I have to give a hypothetical answer, counsel. Yes, hypothetically.
Q. If the State were to approve execution by firing squad,

could ADOC figure out how to train people to use a .30-caliber rifle for use in execution by firing squad?
A. Again, I'm going to speak to that all in the hypothetical. Yes.
Q. There's nothing that would make it infeasible to train people on the proper use of a .30-caliber rifle for firing squad executions?
A. If that was approved, yes.
Q. And just to make sure I have a clear answer from you, if the Legislature approved execution by firing squad, you're not aware of anything that would make it impossible to train members to use a .30-caliber rifle, are you?
A. No.
Q. And, in fact, ADOC personnel -- or ADOC does have some personnel who are already trained on the use of a .30-caliber rifle?
A. Yes.
Q. And do you agree with me that if, again, the State Legislature approved execution by firing squad, ADOC would be able to figure out how to appropriately secure an inmate for execution by firing squad?
A. If that were to happen, we would, hypothetically.
Q. And, again, you would agree with me that if the State Legislature were to approve execution by firing squad, ADOC would be able to staff an execution team?

A. Yes.
Q. Thank you.
MS. WIESNER: I pass the witness.
THE COURT: Cross-examination.
MS. SIMPSON: Thank you, Your Honor.

CROSS-EXAMINATION

BY MS. SIMPSON:
Q. Mr. Williams, have you ever been restrained to the execution gurney at Holman?
A. No, I have not.
Q. What reasons might DOC have for using restraints on that gurney?
A. The restraints would be -- I mean, if it's actually a lethal injection, or if it's nitrogen hypoxia, the individual knows that death is going to be imminent, so there would be some anxiousness. There would be involuntary movements. Safety concerns. There's a variety of reasons why you would have to put restraints on that gurney.
Q. And what do you mean by safety reasons?
A. You don't want the individual maybe to fall on the floor, and he could bump his head or get other injuries. The staff inside the chamber could be at risk.
Q. Is it possible that the inmate could decide he didn't want to be executed?
A. That's possible.

Q. All right. In the hypoxia executions you've observed, did you expect to see movement during those executions?
A. Yes.
Q. Why?
A. With the flow of nitrogen and the deprivation of oxygen, it causes agonal breathing. It causes involuntary movements. So, yes, I did -- we did expect to see movement.
Q. You were asked the question about legs moving in a coordinated fashion. Do you recall that?
A. Yes.
Q. Do you know, sitting here, whether those legs actually moved in a coordinated fashion?
A. No, I do not.
Q. Do you know whether the inmate consciously moved his legs?
A. No, I do not know if it was consciously moving; however, with the studies that showed how quickly the oxygen goes from the body once the nitrogen flows, unconsciousness is within a matter of minutes.
Q. You were asked about the possibility of an inmate who was not getting enough oxygen experiencing panic. Do you remember that?
A. Yes.
Q. Would you expect an inmate who's about to be executed to experience anxiety, just period?
A. Yes.

Q. How about fear?
A. Yes.
Q. Terror?
A. Yes.
Q. Psychological distress?
A. Yes.
Q. Regardless of the method of execution?
A. Correct.
Q. Why is that?
A. Well, your life is about to end, so it's anticipation, first of all, of the unknown, and that tomorrow now is not promised to you. So, yes.
Q. You were asked some questions about what ADOC could do to start a firing squad execution if it were legalized. You were specifically asked -- mentioned modifications to the chamber. Do you believe the chamber at Holman could be safely used today for a firing squad execution?
A. Currently, no.
Q. Do you believe it could be modified for a firing squad execution?
A. I think it would be very difficult based on the -- where it's located at. Even if you turned it around, you still have individuals in dormitories that bullets could possibly penetrate if not built effectively.
Q. Do you have firearms training, sir?

A. Yes.
Q. In what kind of firearms?
A. I was previously military. AR-15's, shotguns.
Q. Have you fired high-velocity rounds in a small space?
A. Yes, I have.
Q. And based upon that knowledge, would you shoot a high-velocity round in the chamber?
A. No.
Q. Do you recall specifically when in 2018 the hypoxia changed to the -- the statutes went into law?
A. Approximately March.
Q. Okay. And do you remember when the first hypoxia execution was?
A. I can't recall exactly. It was Smith, 2024.
Q. Was that early or late 2024?
A. October seems to ring a bell, but I'm not positive.
Q. Would you agree with me that it was about five and a half years from the time that the hypoxia went into law to the time DOC had the first hypoxia execution?
A. Yes.
MS. SIMPSON: Nothing further, Your Honor. Thank you.
THE COURT: All right. Any redirect?
MS. WIESNER: No, Your Honor.
THE COURT: Okay. You can step down. Thank you.
All right. So housekeeping, then, for tomorrow. We'll

plan to get started at 9:00 in the morning.

How many witnesses does the plaintiff still have? Am I correct that you have one more?

MS. SHARPE: Yes, Your Honor, we have one more.

THE COURT: All right. And what's the expectation for ADOC?

MS. SIMPSON: We'll be calling Mr. Houts, Warden McKenzie, Warden Clemons, definitely Dr. Antognini, and possibly Mr. Lee. I'm sorry. And possibly Warden Raybon as well. But most of ours are fact witnesses, Your Honor, so --

THE COURT: Do you think we will finish up tomorrow or go into Wednesday?

MS. SIMPSON: I will be as expedient as possible, Your Honor.

THE COURT: All right. Then so shall I.

All right. You can leave your things in here. We will secure the courtroom. And you can, obviously, get here as early as the court opens if you want to be in here. I think that's -- 7:30 is the earliest I think you can get in. And then we'll get started promptly at 9:00.

All right. Have a good evening.

(Proceedings concluded at 5:41 p.m.)

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COURT REPORTER'S CERTIFICATE

I certify that the foregoing is a correct transcript from the record of the proceedings in the above-entitled matter.

This 4th day of May, 2026.

/s/ Patricia G. Starkie
Registered Diplomate Reporter
Certified Realtime Reporter
Official Court Reporter