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convenes the

FOURTH MEETING

PEASE COMMUNITY ASSISTANCE

PANEL (CAP) MEETING

August 28, 2017

The verbatim transcript of the Meeting of the Pease Community Assistance Panel held at the New Hampshire Department of Environmental Services, Pease Tradeport, Portsmouth, New Hampshire, on August 28, 2017.

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C O N T E N T S

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P A R T I C I P A N T S

(alphabetically)

AMICO, ANDREA, CAP
BOVE, FRANK, ATSDR
BREYSSE, PATRICK, ATSDR
CHAN, BENJAMIN, TECHNICAL ADVISOR
CIBULAS, BILL, ATSDR
CLAPP, DICK, CAP TECHNICAL ADVISOR
CLARK, MARTHA FULLER, CAP
COSTANTINO, JOE, AIR FORCE
DALTON, MICHELLE, CAP
DAVIS, ALAYNA, CAP
DURANT, JOHN, CAP TECHNICAL ADVISOR
HARBESON, ROBERT, CAP
MCNAMARA, KIM, CAP
MUTTER, JAMIE, ATSDR
OSGOOD, RUSSELL, CAP
SCHAIDER, LAUREL, CAP TECHNICAL ADVISOR
SHEEHAN, JARED, CAP
SOMERS, TARAH, ATSDR
SULLIVAN, MARK, CAP

P R O C E E D I N G S

(6:00 p.m.)

WELCOME AND INTRODUCTIONS

DR. BREYSSE: And I'm the, as you know hopefully, the director of ATSDR. And I'm not sure why I'm welcoming you because we're in your community, so it seems a little odd from that perspective. But as you know, the philosophy is that when you engage a community on, you know, health and safety concerns, engaging the community means partnering with the community, and this is part of our commitment to that partnership. So in that sense I'm happy to be here. And maybe we could take a minute and go around the table and introduce ourselves. Why don't we pretend like we're playing cards, and we'll start and we'll go around to the left.

MR. HARBESON: I'm Rob Harbeson from Market Square Architects. I'm the Chair of the Board at Great Bay Kids, which has an early childhood center at Pease, and I am the parent of two children who were impacted by this.

MS. DALTON: I'm Michelle Dalton. I'm a member of Testing for Pease. I've worked on Pease for about seven years, and also my son attended daycare on Pease.

MS. DAVIS: I'm Alayna Davis. I worked on Pease

and my son was impacted. He went to daycare on Pease and I was working there when I was pregnant with him.

MS. AMICO: My name is Andrea Amico, and I am a founder of Testing for Pease and my two small children and my husband were exposed to the contaminated water here at Pease.

CDR MUTTER: Hi. My name is Jamie Mutter, and I'm the CAP coordinator at ATSDR.

CAPT SOMERS: My name is Tarah Somers. I'm the regional director for ATSDR Region 1.

DR. CIBULAS: Good afternoon. I'm Bill Cibulas. I'm the acting director of the division of toxicology and human health sciences. This is my second CAP meeting, and I'm happy to be here.

DR. BOVE: This is Frank Bove. I work at ATSDR. I worked on the feasibility assessment.

MR. SHEEHAN: Jared Sheehan. I represent Pease Development Authority.

MS. MCNAMARA: Kim McNamara, the City of Portsmouth health officer.

MR. OSGOOD: And I'm Russell Osgood with the Portsmouth fire department.

ACTION ITEMS FROM MAY 2017 CAP MEETING

DR. BREYSSE: Fantastic. So I'd like to turn now

to Commander Jamie Mutter to review the action items from the May 2017 CAP meeting.

CDR MUTTER: Thank you. So the first action item we have is for the U.S. Air Force, and it was the CAP requested the draft language that the Air Force prepare to support ATSDR when requesting funding from Congress. I did receive that from Colonel Costantino. I think we decided that you'll send that out to the CAP directly tomorrow or the next day, whenever I can get him the distribution list, since I'm traveling tomorrow. Okay?

The next one is for the New Hampshire Department of Human Health -- I don't know that abbreviation. Human Health Service --

UNIDENTIFIED SPEAKER: Health and Human Services.

CDR MUTTER: Health and Human Services, thank you. Should've just said the abbreviation and been done with it. The CAP requested the New Hampshire DHHS check if the blood samples from the 2015 blood testing are still being stored or if they have been discarded. Sir, do you --

UNIDENTIFIED SPEAKER: We have them all frozen and stored in, in Concord.

CDR MUTTER: Okay. And for the transcriptionist, he said, that they have them frozen and stored in Concord. Thank you, sir.

The next action item is for ATSDR. A CAP member requested that updates on ATSDR's plans and progress on the national PFAS study are included on any future agenda, and that has been done. It's on tonight's agenda, and we can continue that going forward.

The next one's for ATSDR. ATSDR will provide the CAP with the Agency's position education materials. These materials are available on our Pease -- our PFAS website, and they were also sent to the CAP on August 18th as a follow-up.

The last action item is: ATSDR will continue to move forward with developing a Pease study, preparing a protocol and questionnaire, and I think that might be on the agenda later. Sir, do you want to address that now or later on the agenda?

DR. BOVE: At present we're working on the questionnaire. We're borrowing from the C8 study and also some studies we've conducted as well on other exposures. So the questionnaire's moved along. We were also working on the consent form, again, based somewhat on the C8 studies but also on other work that we've done. And we've been looking at neural behavioral test batteries that we might want to consider using in any national study. And that's where we're at at this point.

Also we're working on the protocol itself. We're basically taking a lot of what's in the feasibility assessment and turning that -- because it was pretty far along. It's a -- almost as a protocol, so we're taking a lot of that out of the feasibility assessment and making a protocol out of it. So we are in the process of developing that protocol, so that's the extent we're at right now. We're also looking to see what comes about with the possible legislation too, so that'll have an impact on also our thinking. But whatever we do we will present it to you as a draft for your comments.

DR. BREYSSE: Is that it for the action items?

CDR MUTTER: That's it, yes, sir.

DR. BREYSSE: Well, that didn't take long.

CDR MUTTER: No, it did not.

DR. BREYSSE: So I'm looking at agenda items that maybe we can dispose of without some of the outside experts in particular, and maybe we can have a discussion about the PFAS website.

ATSDR PFAS WEBSITE DISCUSSION

DR. BREYSSE: I understand there are some concerns. Would somebody like to articulate those concerns, to start the discussion?

MS. DAVIS: Was this in regard to the email that I sent, Jamie?

CDR MUTTER: Yeah. I think there were a couple of emails sent about the topic.

MS. DAVIS: Okay. So I had sent an email because I had seen an article online that was discussing the ATSDR comments about -- so basically it was 3M, which is one of the producers of PFAS chemicals, quoting ATSDR and the CDC as refuting health effects of these chemicals. And they were taken from the website for ATSDR and the CDC, and it was basically saying, you know, according to the CDC, you know, there are no known health effects. So I mean, I understand we can't prevent 3M from doing things like that but our concern is that maybe the language is a little too careful from ATSDR, and that, more and more, that that is going to happen. And we actually had an example of that brought up at the national conference, when Emily Corwin had discussed passing along the story to a fellow journalist because she wasn't able to work on the local issues around here anymore. And he had gone to the CDC website and, like he said, why are you worried about these chemicals? The CDC says that there's no conclusive health effects. And she had to like basically educate him because he had already written it

off as not an issue.

DR. BREYSSE: Yeah, so that's unfortunate, and I looked at this issue carefully. So first of all I'll start off by saying we welcome scrutiny of things we put on the Web. I can tell you we have a complex webpage. There's different groups posting components that relate to one another. There can be some old stuff there. And so please, you know, look at, with a jaundiced eye, at what we put on the webpage. We're constantly reviewing it. If there's concerns like this we want to hear about it.

MR. DALY: May I just make a point? The CDC has not included the C8 peer-reviewed 800-page report done on the DuPont facility in West Virginia. And in there they mention 3M, ^, and two other companies.

DR. BREYSSE: Sir, could you introduce yourself?

MR. DALY: My name is Geoff Daly. I'm from Nashua, and I'm involved right now with the Merrimack PFOA, PFOS in the water system of the towns, including Nashua now. And I'm sorry if the Air Force is not doing its due diligence. The C8 report has been around since the mid-90s.

DR. BREYSSE: Yes, we cite the C8 report. We don't include the report on the website. Is that your concern, the whole report?

MR. DALY: It should be on the website, sir.

DR. BREYSSE: We can look into that. If there's a link -- we'll look into -- and --

MR. DALY: The CDC site and the EPA site, and it's linked.

DR. BREYSSE: But it's not on the ATSDR site; is that what you're saying?

MR. DALY: Yeah.

DR. BREYSSE: Okay. Well, that's -- we can look into that.

MR. DALY: That's a mistake, and especially when I learn that you guys have been at this for two years.

DR. BREYSSE: Thank you. But the, the issue -- I think I've looked at the material you sent, and unfortunately it's -- people can cherry-pick stuff out of context, and that's part of what's happening here. So we're -- in a section we're talking about medical monitoring. We say that we don't know enough to establish a level at which health effects are known to occur in terms of blood lead levels. That doesn't mean health effects don't occur. But like -- as you all know, if you have a blood test for most things of medical significance, there are ranges that you can fall in that are acceptable and ranges that, if you're outside of that range, it's unacceptable. We don't

have a safe range of PFAS in blood that clinicians can refer to right now in order to, in a very black-and-white way, interpret the results.

And so when we say there's currently no established PFAS level which health effects are known nor is there a level that predicts health problems in the blood, we think that's a true statement, but they could take that out of context and say, therefore CDC says there's no health effects but that's not what we say. But we will look very carefully to make sure that the context of that is stronger.

And so that's an example, I think, unfortunately where somebody could take our stuff out of context. But at its face value, that's a true statement, but it shouldn't be used to make the case that there are no health effects. It just means we don't have an exposure response-dose response value that would allow us to predict how much disease occurs at how much blood PFAS that allows us to create a clinical range that can be used. And so I think maybe there might be an opportunity to clarify that more on our webpage, and we will look at that.

MS. AMICO: I just want to add to that, that a lot of us attended a conference in Boston, and had the opportunity to collaborate with a lot of other

community members experiencing the same contamination. And there were several members there from the Pennsylvania community, and they brought to the attention of us a slide show that was presented by a member of ATSDR in Warminster, and essentially using our blood testing data in their presentation to say why biomonitoring wasn't being suggested in Warminster. And so I had sent an email to ATSDR saying I was concerned about how -- I felt like these slides that this ATSDR member presented in Pennsylvania was really kind of a direct contradiction to our feasibility assessment that had just come out saying our levels were elevated and we're recommending health studies or saying that health studies are feasible. And so I guess to kind of just echo what Alayna is saying and use this as another example, that I think it's critical that, you know -- I think ATSDR is being seen as a leader here. I think a lot of states are deferring to you guys as to what to do and, you know, how to answer people's questions, and it's imperative that the information is consistent and it's balanced and that it's not trying to minimize information but it -- you know. So I think that's just an example that I found kind of upsetting, that pretty big inconsistencies between different members of ATSDR, and that I think,

you know, that shouldn't happen.

DR. BREYSSE: Yeah. So I thank you for that. And as we started down this road we had people -- so first of all, I want to remind people to use the microphones and say your name before speaking for the transcriptionist. And if you're in the audience there's a microphone at the end of the table. But for now I think we're going to wait for the audience stuff until there's a period of time when we have questions from the audience. We'll make sure that we reserve that time. But for now I think we're talking to the CAP.

But we have, I think, a situation now where we've asked all the SMEs across the country in any region to centralize the presentations they're making and their interpretations they're making so we can do exactly what you said; we can standardize this. We'll make sure we do it. So we make sure when there's data that are being displayed the data are up-to-date and most current. And we want to make sure that we're making similar judgments about what the science means. And so the office of science now is in charge of making sure that we coordinate all those presentations we have on our webpage. A slide bank now that have been approved for people to use, and hopefully we'll get better at

that. But thank you for that observation.

MS. AMICO: Sure.

DR. BREYSSE: So it looks like we got some new people joining us. Why don't we just wrap up the introductions, those of you who just came in? We started with some of the more, you know, administrative items. Hope you didn't mind. Just to move along. But, Laurel?

DR. SCHAIDER: Hi. I'm Laurel Schaider. I'm a research scientist at Silent Spring Institute.

DR. CLAPP: I'm Dick Clapp, retired professor of epidemiology at BU's School of Public Health.

DR. DURANT: Hi. I'm John Durant. I'm a professor in the department of civil and environmental engineering at Tufts University.

MR. SULLIVAN: Hi. I'm Mark Sullivan. I own a business here at Pease Tradeport for the last 11 years, Seacoast Asset Management. Glad to be here. Thank you.

DR. BREYSSE: So is there anybody who has not been introduced or introduced themselves yet? I think we got everybody. So we've done welcome and introductions. So I'll speed it along by saying welcome. We finished the action items from the last CAP meeting, and we moved to the discussion of the

website because I thought that's something that -- the issues were raised by the CAP members who were here, and I thought we could address those pretty quickly.

So if there's any -- if there's no issues, what I'd like to do is move on to probably something that's going to take the biggest amount of time we have tonight, and that's the discussion of the feasibility assessment.

FEASIBILITY ASSESSMENT DISCUSSION

DR. BREYSSE: We got comments back from you, and we'd like to discuss those comments with you and have a discussion about that issue. Probably before we start I should probably say, so as you know, there are efforts to get resources to ATSDR to do a national study. And as I said last time that, if we got resources, a study at Pease, along the lines of what we propose as a feasibility assessment, might make a good place to start as a pilot, and we still feel that way. I just want to make sure I mention that.

Now, I have to be careful because we have no money for a national study and I can't commit to anything, but certainly we're down the road a good ways with you, and so if we were to embark on something like that I think it would make sense to start with some, for lack

of better phrase, low-hanging fruit, since we now have a study design in hand and we have a history here and we have a relationship here. We know more about the history of the contamination. So that's still what we're thinking but I just want to be clear that that's not a -- an expression of an overt commitment on our part, because obviously I can't commit to something that doesn't exist yet in terms of the resources that might support a national study. So any questions about that? So that's the context now. Oh, yes?

MS. MCNAMARA: Can you speak to the difference between --

DR. BREYSSE: Can you just give your name?

MS. MCNAMARA: Oh, Kim McNamara, Portsmouth Health Department. Can you speak to the benefits of doing a smaller pilot study here in Portsmouth versus the power of a national study?

DR. BREYSSE: Well, the power of the national study, as you'll see as part of the discussion we get to today, is that there are huge sample size issues for a number of the important endpoints that we'd like to investigate, such that we're going to need to recruit larger samples of people, a larger number of people, than we can get by just studying this community.

The other benefit of a national study is one of

the things we'd like to have is ranges of exposures that allow us to look at the full range of some things that are very high to things that are pretty moderate to things that are maybe on the lower end of the distribution, again, so we can understand what that exposure/response relationship is.

So there's lots of reasons why a national study will allow us to expand the endpoints that we look at, and that'll be part of the discussion we have right now because some of the comments we got back was: How come we can't look longitudinally? How come we can't include some other endpoints? If we can do a national study we'll be able to consider some of those things, because we don't feel we have enough statistical power in terms of the number of people we can recruit here to look at some of those endpoints.

Plus what we're proposing here, if you recognize -- you remember, is a cross-sectional study as a pilot study. It helps us think about what instruments we use to collect data. It helps to ask questions about what's feasible in terms of recruitment. It helps us think about how the -- readily we can collect large numbers of samples from people, how willing they are to produce those samples, what kind of exposure data do we need to make all this.

So there's a lot of things that we can think about in a context of a pilot which will inform a national study. Does that answer your question?

MS. MCNAMARA: Yes. Thank you.

DR. BREYSSE: So I'd like to now turn it over to Dr. Bove who is going to review the comments you submitted, and begin a discussion about our response.

DR. BOVE: So several CAP members provided comments. Actually we tried to boil them down into a smaller amount and it still took 15 pages, single-spaced, so we have -- we've got plenty of comments actually.

One of the things I want to say though is most of the comments are relevant to a protocol, which is actually not bad at all because that's our next step in both developing a pilot and developing a national study. But I think also the feasibility assessment was written in a way that it almost looked like a protocol, so it -- maybe that's why a lot of the comments were that way. So I'm going to focus on those comments first because that's the multitude of the comments.

And first -- oh, by the way, on the issue of pilot versus a national study, what we're thinking about at this point is that the pilot would include all the endpoints that we would include in a national study,

and so it would actually pilot all the aspects of a national study, so endpoints that were not feasible to study at Pease alone or -- we're possibly able to study there but more likely we would need more of those two tiers in the feasibility assessment, we would look at all those endpoints. We wouldn't -- you know, since we're collecting, we want to collect enough blood to look at all those endpoints in a national study; we'd want to do the same thing at Pease.

So that -- and also the -- one of the key questions and comments was will we look at the full spectrum of PFAS chemicals? The feasibility assessment focused a lot on PFOS and PFHxS, and that was because at Pease the source was AFFF, and those were the two contaminants that were the highest in the Haven well and also highest in the serum and also elevated compared to NHANES, so that's why we focused on those two. That didn't mean we weren't interested in any of the others; it just meant that we wanted in particular to look at PFHxS because of the dearth of studies that have looked at the health endpoint -- the health effects of that chemical.

So what we intend to do, in any national study and in any pilot at Pease, is to look at as many PFAS chemicals as possible to analyze, and to actually

archive blood so that if, in the future, if we have better ability to analyze additional PFAS we would do that as well. And also we're thinking about as well urine samples that could analyze certain PFAS chemicals as well. So we're thinking about all that for the protocol. So that question was raised -- that comment was raised: Are you going to evaluate the full spectrum of PFAS, and we will evaluate as many as we can possibly analyze with the idea that we would, in a consent form, ask the participant if it is okay to archive their blood to look at additional PFAS at a later date, once the technology --

DR. BREYSSE: Can I just add something? So it's important to recognize that this is a huge problem, in that there are upwards of a thousand different members of this family. So when you say you're going to look at all the chemicals, we're not going to look at all of them but we're going to look at the ones that we have strong analytical methods for right now. And the lab, as Frank said, is developing new analytical methods. As they do we will -- we have the -- we'll preserve the right to look at those chemicals as well, but we have to focus on the things that we can measure for now.

DR. BOVE: Right. Now, this wasn't actually brought up, I don't think, in one of the comments, but

our focus has -- because the -- because the feasibility assessment was focused on Pease, we were focused on AFFF and the chemicals that are -- that get into the drinking water from the use of AFFF, and I think that that may also be how our national study might focus, but we haven't made any decisions yet on that. So just keep that in mind, that we're still very much interested in AFFF as a source of drinking water contamination nationwide.

So another group of comments dealt with the outcomes that we were going to evaluate or should evaluate, and a number of them were listed actually in the feasibility assessment. Either they were listed as ones we could do at Pease, ones that we possibly could do at Pease but probably would need more sites, and ones that were not feasible at all at Pease alone but would require a national study or at least multiple sites. And so again, as I said earlier, we will try to involve -- look at all those endpoints or as many of those as we possibly can within a pilot study as well as in a national study.

So some of the outcomes mentioned were endocrine disruption, endpoints like fertility, thyroid function, sex hormones. There's -- there were some comments about whether it was worth it to look at neural

behavioral outcomes, and I think there is, particularly I'm interested in the executive function and attention that are part of attention deficit-hyperactivity disorder. And so I think there -- it's important to look at that, and we're looking at batteries that will look at that.

Other outcomes that were important, that were stressed, were immune system endpoints such as asthma. Fevers was brought up. Atopic dermatitis, antibody response to vaccines. Many of these were mentioned in the feasibility assessment. What wasn't mentioned as much because the focus of the feasibility assessment was on Pease were birth outcomes such as birth weight, miscarriage, preterm birth. Also effects to the mother, pregnancy-induced hypertension, and so on. We didn't really evaluate those at Pease because we didn't think it was really possible to look at those. However, in a multisite study you could. So we'll leave that -- those outcomes open, and that really depends on what sites we can include in the study, and then to see if it's feasible to look at some of those outcomes as well.

MS. DALTON: Excuse me for one second. This is Michelle Dalton. Can you explain as to why you don't think it's feasible? Is it regarding numbers?

DR. BOVE: Yeah.

MS. DALTON: Okay.

DR. BOVE: Yeah, yeah. Yeah, I mean, it may be feasible to look at birth outcomes in a different type of study altogether. I was thinking for example if a whole town, a large town, was exposed, residential exposure, let's say, and we have a comparison town, and you can look at it over many years, you could look at birth weight possibly and maybe even particular birth defects. Again, it would depend on the size of the town and how many people were exposed, and so on, so these are tough endpoints to look at.

Similarly with childhood cancers, because they're so rare that it's very hard to look at them unless you have a large population exposed. So it may not be feasible to do that, even in a multisite study. On the other hand it may occur that there may be, as I said, populations exposed where the whole town or whole city is exposed or a couple of cities could be cobbled together. And then it might make sense. So we're not ruling it out; it's just that it's going to be difficult to look at.

Other endpoints that were mentioned were chronic diseases such as cardiovascular disease and hypertension. And then coming out of the conference,

it was already mentioned, that occurred two months ago, one of the biomarkers that was mentioned there was fatty liver biomarkers and some novel biomarkers, and we're looking into that as well as a possibility. It looked from the studies I've seen, you don't need a large population to evaluate that. I was trying to do a sample size calculation, could not really do one very effectively, but the studies I've seen involve rather small populations, certainly a Pease-sized population would be feasible for that biomarker, and certainly if we expand it to other sites. So these are endpoints that might make sense, and we're going to be evaluating them as well. So those are the -- on the outcome side. Are there any questions about outcomes and issues there?

MS. DAVIS: In regard to the childhood cancers, would -- if we do have more numbers because we're bringing in other communities, would it be limited to certain cancers or would it be a general childhood cancer? I mean, how would you figure out which ones you're going to focus on?

DR. BOVE: Well, I use -- well, I mean, usually we focus on leukemia, in particular acute lymphocytic leukemia, and brain cancer, are the two that we often focus on.

DR. CLAPP: Those are the big ones. Those are the two biggest.

DR. BOVE: Yeah.

DR. BREYSSE: Two biggest in terms of the most?

DR. CLAPP: Childhood --

DR. BREYSSE: Childhood cancers, the most frequent childhood cancers.

DR. BOVE: Yeah. Not necessarily because they're more likely to be related to these chemicals, because we really don't know, but because they're the biggest. So trying to look at all childhood cancers as a group is not a good idea because there are very different cancers with different etiologies, so we try to at least focus on particular ones. But still it would be difficult to look at those unless you have a large population and follow them quite a long time or over time. So it's not out of the realm to look at these. It's just that they're extremely difficult.

MS. DAVIS: So would you -- I mean, I'm not sure how you go about the process so I mean, would you take -- look at the registry for all the communities that are involved for any type of cancer in children, and see if there's a higher incidence for certain types, or is that going backwards, or?

DR. BOVE: No. Well, again -- well, if you know

that the whole town was exposed you could actually use a registry like that. Otherwise you'd have to do a study to find out who -- and, and you could use the registry for that purpose, in a sense. I mean, you could divvy up the town into parts that were exposed, unexposed, and you might be able to do that. It really depends on how -- what geographic unit the registry gets down to, what the exposure situation is. Does it fit -- is it easy to characterize particular areas as exposed and unexposed. So there's some of the ways to do it.

You could do a case control sample of a registry, and look and see if the cases are more likely to have lived in areas where the exposures occurred. So there are a number of approaches. All of them, though, are going to be difficult with -- unless you have a large population. In this case a large population exposed, not just a large population. So but that isn't -- we're not saying we're not ruling it out; I'm just saying these are some of the difficulties we have to grapple with in doing it.

MS. DAVIS: So would what I was describing be a case control exposure method?

DR. BOVE: That's one approach to it, yeah. Yeah. So in the case, for example, of Woburn, which Dick can

talk more about, that's the approach that was taken, to see if the -- in that case there were about 19, I think, weren't there at some point?

DR. CLAPP: Twenty-one.

DR. BOVE: Twenty-one, that's right, close, cases and to see where they resided and whether the wells, the two wells that were contaminated, served the areas of more of the cases than the controls. So that's, that's how it was done there. And still -- and, and Woburn was -- there was a good portion of Woburn that was exposed, and the town was big enough and it could be followed over a long period of time, so you could get that many cases and look at it. Still, you had small numbers of cases to evaluate. So I think the study was great, but, you know, because of the small numbers you had wide confidence intervals, and so on. And so, you know, there's some uncertainty. So and this is just the difficulty you have with any of these rare outcomes, like, you know, specific birth defects or childhood cancers.

DR. BREYSSE: So can I pause for a minute?

(pause for audio issues)

DR. BOVE: As I was trying to say, if you look at the literature there are no studies as far as I know that have looked at childhood cancers, and that's

because of the difficulty. And there are very few have looked at specific birth defects, and all of them have been so small that it's really been hard to interpret them, so this has been the problem. So if we can find enough population to study these, we'd like to add something to the literature since there's very little, if any. But it is difficult.

MS. AMICO: Can I just add a comment to that? Andrea Amico. I don't know if you folks are aware but we do have a rare pediatric cancer cluster here on the seacoast of two rare cancers, so obviously there's been no environmental link to it, but it's certainly a concern of a lot of people, and it makes me wonder if we're going to look at that, if we can maybe look at those cancers in other sites. You know, like there's rhabdomyosarcoma and pleuropulmonary blastoma. And we also have seen increased levels of brain cancer, or central nervous system cancers, on the seacoast, so I guess I just want to put that out there. You know, I don't know if any of these children are -- have been exposed at Pease or their parents were exposed at Pease; I have no idea. But if we are seeing that cluster here, if that's something, when we look at other sites maybe we look at the cancer -- those cancer incidences in kids at those other sites too.

DR. BOVE: Well, this is maybe off the topic, but the first thing to do is to find out from those -- where those cases -- where the pregnancy occurred for those cases, where the child was up to one year of life at least. That would be important just to ask those particular questions, and see if, if they were located at Pease or had anything to do with PFAS exposures or any other particular exposure, so that -- in any cluster investigation I think that would be the first step to take. Anyway, but that's for another topic.

So -- okay, so those are the endpoints that were discussed in the comments, and I think we're interested in all the -- all the endpoints that were raised. The question is which ones are possible to study, even with a national study, and which ones aren't, and so we'll continue to move in that direction, to include as many of them as possible.

Another issue raised was the inclusion criteria for the children study, the adult study, military, civilian worker studies, and so on. And so we had initially proposed that the age range would be four to 16 for the children study. There's no reason why we couldn't expand that to 17. And then the adult study would be 18 and over. The other way -- move though to include three-year-olds poses some difficulties. So

we're not ruling it out but the difficulties we were thinking about are, one, it may be difficult to recruit them. The second issue would be the amount of blood we'd want to get to look at a lot of these endpoints may be too much to ask for a three-year-old. It may be too much to ask for a four-year-old as well. And the third issue would be, related to the second, is what endpoints are feasible to evaluate in a three-year-old versus the older children? And we're thinking here about some of the neural behavioral endpoints. There are batteries that go to look at age four and higher, such as ones that look at executive function and attention, that we're looking at, but don't include three-year-olds; they start at four.

So these are some of the issues we were thinking about when we used that age limit. We're still open to expanding it. I don't think it would add too many to the Pease population. So those are the issues. Whether it's easy to recruit them or more difficult to recruit three-year-olds; it may be difficult to recruit four-year-olds too. The amount of blood we're asking, so that we can look at a whole range of endpoints, and whether for particular endpoints you can actually evaluate three-year-olds effectively. Okay? So.

MS. AMICO: This is Andrea. Can I ask a question?

How much blood would you be asking for?

DR. BOVE: Well, we were talking about -- let's see if I can remember. For the children study -- it's been a while since I looked at this. We were looking for four teaspoons, or 20 milliliters. So in the New Hampshire blood sampling, I can't remember, I think it was just one teaspoon, if that much. Is Dr. Chan around?

DR. CHAN: Yeah. It was between like one half to one milliliter.

DR. BOVE: Oh, so it was even much smaller than that. Yeah, so it was just enough to look at the PFAS chemicals. So we're asking for quite a lot more. It may not -- again, we may have difficulty getting this from a four-year-old too. These are supposedly the amount that NHANES tries to get from children. Whether they actually do is -- you know, may vary. That's also why, for a long time, the age range where they analyzed PFAS chemicals was 12 and above. Now they've actually looked at younger children, so they're able to look at that. So they are able to get blood -- enough blood for at least to look at a range of PFAS chemicals. So anyway, that's the issue. It's just we're asking for a lot more blood than was done for the New Hampshire blood testing, okay?

Any other -- any questions about the children study?

As for adults, one of the -- several of the comments, I think, were what about those who attended daycare at Pease and are now 18 or over? And it's certainly possible to include them. Our concern would be that, if you're 18, say, next year, your last -- the last time you might have been exposed, say at age five or six, we're talking about a long period now since the last -- your last exposure, so that could make a difference in terms of trying to estimate what your historical serum levels were. And looking at your serum levels now, after 13 or more years since you were last exposed, may not be very helpful. So that's why we're a little concerned about doing that, versus people who had more recent exposures at Pease, in the last three, four, five years. So those are the issues there.

And again, I think that what you have to remember is you don't have to include everyone in a study. You need to include those who can provide the most information in a study. So that -- so leaving people out of the study doesn't mean that the study isn't relevant to them. In fact it might be very relevant to them. It's just that it may not be effective to study

them, given the length of time since their last exposure, so.

MS. DAVIS: This is Alayna Davis. So my question about -- you said that their serum levels might have reduced by the time we get around to studying them. What about PFHxS which has the longest half-life? And we want more information on that one. I mean, the half-life is about seven to nine years, so for an 18-year-old, you know, they've only had like two cycles of reducing.

DR. BOVE: Right, right. I mean, that's true. So for PFHxS there's a long half-life. That's still, though, a long period of time since their last exposure. So we're not ruling it out; I'm just saying that these are the considerations. So we could include --

DR. BREYSSE: I think the challenge is for the historical reconstruction, when we look at what's in the blood today and predict what it was in the past. The closer that blood measurement today is to when the exposure occurred in the past, the stronger that prediction will be. And so something that occurred, you know, ten, 12 years ago is just going to be -- there are a lot more uncertainty around trying to calculate back to what the exposure was, recognizing

that they do have two half-lives, that it's probably dropped, or something on -- of that order. So it doesn't mean, as Frank said, that it's not worth looking at, but it's just sometimes that uncertainty is -- creates more of a challenge than we would gain by including them in a study.

DR. BOVE: Okay. And then there was a comment that, what about those exposed in utero or during breastfeeding after the Haven well was shut down, so after 2014, May 2014? And that's, partly depends on when we would start the study. If we started the study, the pilot, in 2018 they wouldn't be old enough. They wouldn't fit the four- to 16-year group. If we -- if the study started later than that it's possible to include them but we would again have to figure out how to estimate their serum levels when they were exposed, and this might be difficult, more difficult than, say, if we -- if for those who were exposed to the drinking water itself or when the -- when the water was contaminated. It's not impossible, again, and so this is something we'll think about. But if we start the study in 2018 they wouldn't be old enough to fit the age range.

So then the next issue was military and civilian workers, and we had a whole section of the feasibility

assessment that tried to address that, and we realized that we couldn't just do it at Pease but that doesn't mean we're not interested in studying them. And we think we can identify at least some other bases where PFAS-contaminated drinking water occurred that are possible candidates for inclusion, along with Pease, in such a study. So we still have work to do though in identifying those sites, determining what the water situation was at those sites, how far back the use of AFFF was, and so on. And so there's still a whole number of steps to do that, but we could look at those --

One of the things we proposed, or at least discussed in the feasibility assessment, was a study that is similar to what we're doing at Camp Lejeune, where we looked at mortality and cancer incidence, but instead of just Camp Lejeune it would be several sites. There are military sites, many military sites, that have used AFFF, but not many of them actually had contaminated drinking water on site. So there are sites that could be unexposed in that sense. And actually the issue would be which ones had contaminated drinking water and can we characterize that over time. So that's, you know, something we'll be focusing on as well. We're interested in studying those workers and

the military personnel. So that's those issues.

And then there was a discussion -- there was a couple of comments about comparison populations, and in the feasibility assessment we mentioned Portsmouth, the city of Portsmouth, residents there as a possible comparison population. There was some concern that there was PFAS contamination in one of the wells at least in the Portsmouth water system.

Our understanding is that the levels there would be so low it would be below the -- any of the standards that have been set, even in New Jersey or any other state, but that -- but, and again, before we would choose a comparison population we'd want to make sure that it was unexposed so that the levels would have to be way below -- a non-detect basically or, or similar to being non-detect so that we would feel comfortable. So we haven't set on a comparison population either, for Pease or for any other site that we were going to include, okay? So if Portsmouth is not suitable we'll try to find a comparison population that's similar to the Pease population in all other aspects we can possibly think of except for the exposure. Okay? So that's where we're at with that.

So we're going to do -- we'll do some more work to characterize the Portsmouth system. At this point we

think that the levels were such that it could be considered unexposed. But, you know, we're still looking into that. Yeah?

MS. MCNAMARA: Kim McNamara, Portsmouth Health Department. I'm not sure if I misunderstood but if almost all people carry these chemicals in their blood system how would you find a population that's non-detect, or are you talking about the water supply?

DR. BOVE: Just the water system.

MS. MCNAMARA: Okay.

DR. BOVE: Yeah. All of us have some background, so the question is what is the additional exposure to drinking water? What does that cause? Okay. Okay, so -- and that's true also for military personnel and sites where, even though they used AFFF, we'll look for those sites where there was no contamination of the drinking water, as, as possible comparison populations, so that they'll be similar to the bases that did have contamination except for the contamination itself, okay?

Okay, so a lot of comments about longitudinal studies, the fact that we're just -- at this point we were proposing a cross-sectional study. Actually the military study would be a retrospective cohort study, so that is longitudinal in that sense. But we weren't

talking about prospective longitudinal studies of a population, say, children or adults, at this point because we wanted to focus on doing the cross-sectional study first, as a basis for a then-possible future longitudinal study.

So this was the approach that was taken in the C8 studies. Almost all of them are cross-sectional. Very few were -- they were running out of money, basically. They did a few longitudinal studies but most of the work was a cross-sectional, and that was the basis even for the longitudinal studies that were conducted. So we're not ruling out at all a longitudinal study but we think we need to get our feet wet first and do a cross-sectional study of children and adults with, again, looking at a wide range of endpoints, and then seeing what funding and resources are available to move to a longitudinal approach to that -- those cohorts. So once -- so we'll have a cohort, we'll have archive samples. That's the idea, and then if we can follow those people over time, we'll do that.

Okay, and then there was a couple of other comments that dealt with what was the selection criteria for multi-sites, and we're working on, again, sites where there's residential exposures primarily, to drinking water, and the source of the contamination

being AFFF at this point; although we're not ruling out any other sites at this point. We're just -- but we are focusing a lot on AFFF primarily.

There was talk about case control sampling, how that could be done. We've already discussed there might be a way to look at some of the more rare outcomes. The purpose of doing a case control sample in this situation would be if you could improve the exposure assessment, for example. So when you look at -- when case control samples are often done you can get more information on exposure, on the residential history, and so on that you might not be able to get if you're evaluating a larger population.

But in this situation it seemed that the -- that it might not be necessary to do that because we intend to get a lot of information from all the participants in the study. We're going to get serum levels as well, so it's not clear that the exposure assessment would be improved by just doing a case control sample. So again, that's a very effective sampling method. We'll think about it in terms of looking at particularly rare diseases, if that makes sense. But the design we've been thinking about so far and we're pretty much -- we think it's the way to go is similar to what the C8 study did, and that would be a cross-sectional study.

MS. DAVIS: I have a question.

DR. BOVE: Yeah.

MS. DAVIS: This is Alayna Davis. So when we were talking about the case control for childhood cancers, do you know what number you would need if it ends up expanding to other populations in order for it to be a valid feasible study?

DR. BOVE: I'd have to do a sample size calculation. I know that -- I mean, that's a tough question. In Woburn there were 21 cases. The confidence intervals were wide. So we've learned a lot more than that. So and that's true for -- I did one study in New Jersey where I had 80-some neural tube defects and still ended up with small numbers in the exposed category just because the population that was exposed was small. So you could have a lot of a particular number of cases of a disease but if the percent of that population that's exposed is small, you're going to have trouble, again. So it has to be a sizable population that's exposed, for one thing, and so that, that might be the difficulty.

DR. BREYSSE: Plus another challenge is in that approach is that we're learning more and more about how widespread this contamination is every day, and while we know a lot about some areas, there's a lot of

contamination around the country we don't know about. So you'd want to make sure that, if you had a case and came from a place where the water hadn't been sampled yet, we might be less -- our ability to find that person as truly as being unexposed might be problematic. There are water systems that are being discovered -- you know, every month we hear one or two more of them -- at ATSDR. And so as the testing expands, and as tests -- water systems that haven't been sampled as part of the EPA unregulated contaminate monitoring rule gets sampled, we're finding exposure is more widespread than you might think just from that sampling.

DR. BOVE: Yeah. The UCMR looked large systems and a sample of small systems, so maybe took maybe 80 percent of the population roughly, but then there's a large 20 percent or so of many thousand small systems that haven't been tested, so.

DR. BREYSSE: And lots of well systems.

DR. BOVE: Well, then there's private wells too on top of that, yeah. So that went back to what we talked about earlier, that it is difficult to study these rare endpoints, but, you know, we'll have to see what, what information we get from other sites, what additional testing is done in these small systems and where other

sites we may be able to identify that could be included in a national study.

There were a lot of questions about historical reconstruction of exposures. What do we mean by physiologically-based pharmacokinetic modeling? And so what we mean by that is that modeling sort of a mathematical technique that looks at absorption of the chemical, how it's metabolized and distributed throughout the body and how it's excreted, and modeling that. And using that information along with the amount of contaminants in the drinking water and also -- to the extent that we can get good information on how much people drank, with all that information, then you can start historically estimating what the serum levels were over time. And if you have a serum measurement currently, you can use that to help calibrate those estimates.

So that's -- basically what the C8 study did for PFOA and PFOS. I haven't seen anyone do it yet for PFHxS. I don't know if there's a model yet for that, but we're going to be talking with experts in the field to see what -- what's feasible in terms of historically reconstructing serum levels of PFHxS as well.

MS. AMICO: I have a question about that.

DR. BOVE: Yeah.

MS. AMICO: Andrea Amico. I had emailed a bunch of people from DES EPA, City of Portsmouth, earlier this year. At Wurtsmith Air Force Base they were able to test water in old fire hydrants that hadn't been used for a long time, and that was able to give them some historical levels of PFAS chemicals from the 90s. And I had emailed and asked if there was any sources like that on Pease, that we could look back and see if we knew back in, you know, whatever year what the levels might be, and it sounds like there is potentially one place that they can test, but they feel -- they, meaning DES and EPA -- feel that it's not safe for them or it would cost a large amount of money to safely extract this water, but I don't know if that's something that we should consider as part of our study, if that would be helpful if we could extract old water, and that would give us some historical levels.

DR. BOVE: There are some issues with that, and I'm not the person to ask that question -- to answer that question actually, but there are people in my -- on our staff that have looked at Wurtsmith in particular and whether those -- that analysis of the hydrants is a good approach to understanding the historical levels of PFAS. So there's some question about that. And I'm -- again, I'm not the best person

to answer that. But if it -- and so I will go back and actually ask that question.

MS. AMICO: Yeah.

DR. BOVE: But we can -- I mean, any historical information you can get on the water system, including how the wells were used and even any sampling data for the particular chemical is useful. So that's on the other side of the coin. So I'm not sure that the hydrant testing is useful or not.

MS. AMICO: Okay. Well, I guess just know that there is potentially an older source of water here at Pease. It sounds like it's difficult or would be costly to safely extract the water, but if we feel that it would give us valuable data in terms of prior exposure it's something we should think about.

DR. BOVE: Right. Okay.

DR. BREYSSE: When did you bring that up? I'm just curious.

MS. AMICO: I emailed I think back in January, and I heard about it at a RAB meeting in July, that there is this possible source.

DR. BOVE: Yeah. They did test the hydrants at Wurtsmith, yeah. The water had been sitting there for quite a while. Again, that may have had some effect on the levels, so. Okay, so I'm not sure how --

DR. BREYSSE: We've got plenty of time.

DR. BOVE: We have plenty of time? Okay. Okay. So there were questions, again, on the exposure side of how we would characterize in utero exposures based -- occurring in utero and breastfeeding, during breast-feeding, and again, that is difficult. It was done, though, in the C8 study, so it's possible, at least for PFOS and PFOA, so it is possible to do that. And again, we're going to be talking to experts who know how to do this, and see what the situation is with PFHxS, if, if it is feasible.

And then there's also the impact of pregnancy, breastfeeding and menstruation on elimination of PFAS and taking that into consideration, and that's -- also would have to be done if you're going to model historically your serum levels, so that has to be taken into account as well.

Okay, and then the last thing -- so any other questions about the exposure assessment and issues concerning exposure assessment? No? Okay. And if you think of other issues, 'cause I've gone over a lot of stuff here, we can -- you know, we can discuss them as well.

One last thing on -- that has some -- that's more applicable to a protocol is how we would report results

to the participant, to the general public about both the study itself, the particular results, both the biomarker results and the PFAS results. And again, we would work with you on that. There are models out there that Laurel can talk -- has -- and her organization has, has developed. So we will work with you to come up with the best way to do that. We didn't address that in the feasibility assessment 'cause that's more of a protocol issue. Okay.

So what we -- now, there were a couple of comments on -- that are relevant to the feasibility assessment in particular, and they had to do with sample size calculations, because that's pretty much what the feasibility assessment was -- a good deal of it was about. One was why did we do a 2-to-1 ratio for children and a 1-to-1 ratio for adults? We did that for a couple of reasons. The main reason was that we thought it would be harder to recruit unexposed children. Also there were fewer children that had participated in the blood testing program, so we thought that we would maximize our recruitment effort into getting as many of the exposed children as possible. And so that's why we did that. We could do a 1-to-1 ratio, and we will do those sample size calculations for a 1-to-1 ratio. It won't change the

outcome -- the way we've tiered the outcomes but we'll do that.

Similarly for adults we could do a 2-to-1 ratio for adults. Again, I don't think it's going to change the tiers that we -- the one -- you know, the likelihood that it could be studied at Pease and, and not likely unless there's a multisite study and definitely not likely those three tiers. We can do -- and we'll do those sample size calculations.

And then there were a request that we do sample size calculations for the -- to show the sample size calculations for the tier 2 and tier 3 endpoints, and we'll do that. Let me see if there's anything else on that. Yeah, so those will all be in the final feasibility assessment.

And then finally, other issues have been raised that aren't really necessarily part of what a protocol would be about or a feasibility assessment would be about. How would the studies be conducted? Can ATSDR conduct these studies? Would ATSDR get other researchers to do these studies? How would that work? And so that's a good question. We haven't really made up our minds on that as far as -- right?

DR. BREYSSE: Sorry?

DR. BOVE: Okay. How, how the studies will be

conducted? Can ATSDR conduct the studies? Do we have the capability ourselves to conduct them? Will we give -- give any money we have to other researchers so that they would conduct the studies instead, how that would work? We haven't made any decisions on that.

DR. BREYSSE: Correct. So we're exploring different models to get it done, and no decisions have been made.

DR. BOVE: All right. And then the second issue was --

MS. DALTON: I have -- excuse me, I have one question. This is Michelle Dalton. Who makes that decision as to whether ATSDR does it or gives it to -- is it ATSDR that makes that decision?

DR. BREYSSE: Yes, we'll decide.

MS. DALTON: Okay.

MS. AMICO: Can I ask -- Andrea Amico -- a question about that? What is your experience with conducting a national health study of this nature?

DR. BREYSSE: So we have --

MS. AMICO: -- in terms of ATSDR doing a study like this?

DR. BREYSSE: So we have experience doing national studies, and I'll point to the -- probably the most recent one is the national study of the Camp Lejeune,

which requires us to follow people across the country, as the Marines went across the country. What's unique about this is it's going to be site-focused work, and so every site's going to have its unique characteristics. It's going to almost be a collection of five or six mini-independent studies, and so there might be some efficiencies -- and by the way, we're committed to community engagement in each of those communities so we're going to have, you know, community groups across the country engaging with us. And then we're going to probably have a national panel of some kind to help steer things nationally. And so it just -- we're exploring different -- we want to be as efficient as possible. We want to be as timely as possible. We want to get something in the field as quickly as possible. And as we all know there are barriers when you do things as part of the federal government that people not part of the federal government don't share, and so we'll consider what some of those barriers are as well as the efficiency of getting the work done as quickly as -- and as scientifically rigorous as possible.

MS. DAVIS: This is Alayna Davis. So one question that I have, and I know that we can't predict this, but is if we solely use ATSDR, what if there are cutbacks

and people let go and laid off from the government with, you know, just natural procedures? And then what do we do? We have to replace those? Would it compromise the study? I mean, that's why I think this question comes up, because we're -- you know, we're wondering how much experience there is but we're wondering how much we can see it through to the end.

DR. BREYSSE: And so those are all things --

MS. DALTON: Without compromising it.

DR. BREYSSE: -- those are all things we're going to consider as we plan going forward. So there are many levels of decision-making that will play into that final decision, and staffing and long-term commitment, and -- will all kind of lead into the overall discussion.

DR. BOVE: One plug for us is that we do think that community involvement is key to this -- to this national study, and in particular community involvement at each of the sites. So that is, you know, something we feel strongly about, as Dr. Breysse has mentioned.

So anyway a second issue that was raised was what kind of actions will result from the studies, what kinds of interventions, in particular medical monitoring was mentioned in some of the comments. And this again wasn't part of the feasibility assessment.

It's not clear that it would be actually part of our protocol necessarily either, but these are issues that we'll -- we've been considering all along, medical monitoring and other, so we'll consider that and keep -- continue to consider that.

DR. BREYSSE: So we're constantly surveilling the publications, the literature, and as data become available we consider all our recommendations, not just those about medical monitoring as well, so we're constantly evaluating what we know, and when we think we know enough to change our recommendation we'll do it, whether it comes from this study or some other study.

DR. BOVE: Right. I don't expect that any actions will come just out of this study but will come out of all the studies that are being conducted, so that we have a firm basis, whatever we do, a firm basis from the input of other studies.

Finally the last thing that was mentioned, and it's very important and we'll reiterate it here, that the CAP will review the final version of the feasibility assessment. The CAP will review the draft of the protocol and will see the final protocol and will have input in other -- any other health activities we intend to do, both at Pease and at any of the other

sites. The CAPs there will have that similar input, so that -- we're committed to doing that.

MS. MCNAMARA: Will the CAP have any input into whether or not ATSDR does do the study? I would think that there would be a lot of confidence in long-term national studies, particularly outcomes that might come from the study if ATSDR actually did the research rather than farming it out to people.

DR. BREYSSE: So as we decide, we'll discuss it with you. And like with everything we do, we're happy to get your input and we'll actually be thrilled to kind of hear what you have to say. Anything we do, you know, has to stand the test of the broader support, and we'll communicate that and we'll get your input and hopefully we'll -- whatever path we choose we'll convince you is the right path forward.

We will be involved. I don't want to give the impression that this is something that's going to be totally farmed out. That's not going to be the case. It's just a question of what's the best way to get a multisite study into the field, and there are lots of models to do this. NIH does this type of study all the time, so we're going to -- and the CDC, other parts of CDC have done multisite studies before, so we're trying to garner as much sense from these studies about what

works, what's successful. And so we'll share that with you without a doubt.

MS. MCNAMARA: Okay.

DR. BOVE: So I just want to make one more comment, and that is that I really appreciated the comments that we received. They were very good. I think they'll help us steer the protocol, and I think we'll get a better product out of it, so thanks for your comments.

MS. DALTON: Frank, I have one question. This is Michelle Dalton. Are we going to be able to receive a copy of all of the comments that were submitted and your responses to those?

DR. BOVE: Yeah. There's two ways we can do that. One is what I've done was -- what I've done was actually respond to each person's comments. We can do it that way or probably more appropriately is to group the comments and the responses together, and not attribute it to each particular person. But I've done it both ways so that each comment I received I have a response to. But I got some help from the staff in my office to consolidate the comments and the responses, so I think that's probably what we'll do, and that'll be part of the feasibility assessment.

DR. BREYSSE: And just to be clear, I think it's

unethical to ask people for their comments and not respond to them in a meaningful way, so we will do that.

MS. DALTON: Okay, thank you.

MS. AMICO: I have a question. This is Andrea Amico. In terms of the protocol you said the CAP would see the final feasibility assessment, the protocol of that. Will the community see that, at large, or is that something that'll just be internal to the CAP? I guess my question -- I think I have heard at other meetings that typically a protocol is not made public to the people that you're studying 'cause there could be biases to that, so I'm just curious if you mean just the CAP or if you mean the entire community.

DR. BOVE: Well, we -- for Camp Lejeune we've shared reports with the CAP, with the idea that we would get the CAP's feedback, and the idea would be for the CAP to be in touch with the community so that we'd have a good sense of what the community was thinking, but that the CAP would review it and not distribute it to the public. We did that with the water modeling and we did that to some extent with the protocol for the cancer incidence study, and so that's probably the approach we might take, but just for the reasons you're saying.

MS. AMICO: Right. Okay. Thank you.

DR. BREYSSE: But we would hope you would share the sense of things and the outline of things and the approach with the community, to make sure that we're getting, not just the collective wisdom of this group, but of whoever else might be talking to you as well.

DR. BOVE: Yeah, in particular, I mean, the issues around the best way to recruit, the best way to get the word out about the study, any issues that might occur with requesting school records. I know one comment was about could you get school records? Would the parent consent to that, and so on, and so these are issues that you can bring to us from your discussion with the community, and, and see if there are problems with the protocol in that sense.

MS. DAVIS: This is Alayna Davis. So I have one question that might be for ATSDR and one for the New Hampshire Department of Health and Human Services. So would it be possible, and I guess the first question would be for Dr. Chan -- have people that have been exposed in Newington as a result of the contamination here on base been able to be blood tested?

DR. CHAN: So the blood testing was open to anybody that was exposed on the Pease Tradeport, so I think the answer to your question is yes.

MS. DAVIS: Well, they wouldn't -- it wouldn't technically be Pease Tradeport but the site 8 flowed off Pease Tradeport into residences in Newington, and there were three residences --

DR. CHAN: The private residences.

MS. DAVIS: Yes.

DR. CHAN: Yes. We actually reached out to them directly and offered blood testing to them.

MS. DAVIS: Okay, so they were eligible.

DR. CHAN: They, they were eligible.

MS. DAVIS: Okay. So I was just wondering if they could be included in the study also because they were, you know, exposed through Pease, but also they have residential usage which might be different than what Pease is as a business tradeport.

DR. BOVE: Yeah, if we do a multisite study, well, most of the people will be exposed residentially. Pease is actually unique in some ways, that the exposures are workplace exposures. So most communities it would be residential exposure, so yes. Yeah.

DR. SCHAIDER: Hi. This is Laurel Schaider. I was wondering if you could talk a little more about the timeline for turning around the, the next -- I guess the final feasibility plan, for comments, and then the protocol and how that sort of meshes with the timeline

for the potential budget that would fund this.

DR. BOVE: Yeah, we can turn around the feasibility assessment rather quickly; although we have to go through clearance again for the final document so, but I don't expect any problem, major problems, there. We've already went through most of the big hurdles already, so we've already responded to the comments and any feedback we've gotten here, and so it shouldn't take long at all. And as I said we're working on the protocol, but for that I guess we'd have to see about the legislation?

DR. BREYSSE: Yeah. It's tied into the legislation, support for the legislation. We're developing a protocol, as we talked about last time, because I'm always optimistic, and so we want to be ready to go should things fall into place, and so we're not going to wait. And we actually have a work group now that's beginning to talk and plan for the national study, so again we're trying to plan for that. The funding, you know, it's -- you know, this is -- these are unusual times, and I -- you know, I don't care to comment on the timeline for the funding or what's happening in Congress other than recognizing that we have a lot of legislative supporters for this effort, and we'll have to just wait and see how things work

out.

DR. BOVE: But I would venture to guess that we would have some kind of draft protocols for the next meeting of the CAP, I would say. It depends on when we meet, and going through, again, our -- what we do with a protocol is we, we do have it peer-reviewed by independent peer reviewers, and we do that for all our protocols. And so we would want to do that. Whether we do that before or after having presented to you, I'm not sure how that would work, but at some point in the development of the protocol you will be presented with what we are thinking. It won't be that much different than what you've heard already, and then you'll be able to comment on it. Okay? So I, I would -- our next CAP meeting is what, three or four months from now, roughly?

CDR MUTTER: We'll have to talk about it at our next conference call.

DR. BOVE: Yeah.

CDR MUTTER: Our monthly conference call.

DR. BOVE: Yeah, so we could have a draft by then.

MS. DAVIS: This is Alayna Davis. So the final protocol, would that have more details on the recruitment so that we can give you some feedback on whether we think that's feasible or not?

DR. BOVE: Yes.

MS. DAVIS: Okay, thank you.

DR. BOVE: Absolutely, yeah.

MS. AMICO: This is Andrea Amico. So will you have to go through the OMB process if we get this money through -- you know, through this NDAA and -- 'cause I guess we've heard before that the OMB process can slow things down a little bit or a lot a bit, I guess.

DR. BREYSSE: As it stands now we will have to.

MS. AMICO: Okay.

DR. BREYSSE: And the OMB process can easily add six months to a year and a half, maybe, to the review process.

MS. AMICO: Is there any way to go around that?

DR. BREYSSE: I think there has to be legislative language that would change that requirement.

MS. DAVIS: This is Alayna. So if we do source out the study would that change the OMB process, if say for instance, NIEHS is the primary --

DR. BREYSSE: That's one of the things we're talking about, so I don't want to use the word source out, but if we give grants, and, and -- but if we want to have -- as you've said before, there's an interest in having ATSDR stay involved, if we want to stay involved, there's a threshold of involvement that we'd

likely exceed that would require OMB approval anyway. So we're exploring all options, but chances are, if we want to have access to the data in any meaningful way, we'll have to go through OMB.

DR. BOVE: That would be true of NIEHS too. And if you -- again, if you give out grants one of the things you'd like to have with the national study is uniformity in the way the data's collected -- all the procedures uniform. And so if you'd give grants to different researchers you can't guarantee that, so that's one drawback to giving out grants. That's a reason why you'd want to have one entity making sure that everything's done the same way, whether it was NIEHS or ATSDR or whoever. If it's the federal government we have to go through OMB. That's the requirement.

MS. AMICO: Is there anything we can do now to start that process? You know, is there anything we can start working on or submitting or? We're not --

DR. BOVE: Well --

MS. AMICO: -- we're just not far enough along yet?

DR. BOVE: Having the protocol developed, going and having it peer-reviewed, having it -- however approval, all that needs to happen before it goes to

OMB, so yes, getting through that process, all those steps, which aren't -- shouldn't take too long, would be important to do. And then the OMB process -- the OMB process could be shorter than six months. It's just that we've also had experience with a year or more as well, so we've had both kinds of experiences, quick turn-around and long turn-around, and it may have to do with what -- how OMB feels about the legislation itself; who knows. But we can have it ready for OMB, you know, and go through those hoops so that might help shorten the process, so we'll work on it that way.

SEN. FULLER-CLARK: Senator Martha Fuller-Clark, just follow-up. If you've been able to package the protocol and it's been accepted, reviewed and so forth, and all the entities are on board, does that mean that you might have a chance of getting it through the OMB faster?

DR. BREYSSE: Not necessarily.

DR. BOVE: Not necessarily.

SEN. FULLER-CLARK: Not necessarily.

DR. BOVE: Not necessarily, but at least it will be -- it'll be ready -- you know, the clock will start, you know, sooner. That's the idea.

SEN. FULLER-CLARK: Okay.

DR. BREYSSE: So the steps are, you know, internal

peer review, external peer review, not necessarily in this order, human subjects review, OMB review. And I include you all as part of the external peer review. But the external peer review's also going to be the scientific panel that we talked about before.

DR. BOVE: Yeah.

MS. AMICO: So am I understanding correctly though that the legislation could be written in a way where OMB would not be needed?

DR. BREYSSE: So I'm afraid I'm not going to comment on that --

MS. AMICO: Okay.

DR. BREYSSE: -- right now. It's really -- I think we just have to be careful. We can't comment on, on legislation that's going to affect what we do. That's just a line we can't cross.

So any other questions about the feasibility assessment discussion? If not we're kind of right on time for a break. So why we don't we take a ten-minute break? Come back at 7:40.

(Break, 7:30 till 7:40 p.m.)

DR. BREYSSE: Where all good CAP members should be in their seats.

QUESTIONS FROM AUDIENCE

DR. BREYSSE: Well, there's questions from the

audience. So we have 20 minutes or so for the questions from the audience. What I'd like you to do is say your name, and use that microphone at the end of the table. Questions or comments.

MR. DALY: Geoff Daly from Nashua. One thing that has not come up tonight is what have you in place in and around Pease and Newington to filter the existing water that will pass the EPA Clean Water Act?

DR. BREYSSE: So I can't comment on that, but if the Air Force would like to talk about efforts to provide water filtration it might be more appropriate.

COL COSTANTINO: Yeah, I -- let me try to scoot up here a little bit. Colonel Joe Costantino, United States Air Force Office of the Deputy Assistant Secretary. Can you be more specific? Can you help me --

MR. DALY: We know a number of wells within the Newington area are contaminated.

COL COSTANTINO: Private, residential wells.

MR. DALY: Yes. And then you've got wells here on the site.

COL COSTANTINO: Right.

MR. DALY: Those wells must be feeding your own site system. What are you doing to filter that water to make sure it meets EPA Clean Water Act?

COL COSTANTINO: So you're asking about discharge standards, right? Meeting discharge --

MR. DALY: In other words you're drawing it from your well --

COL COSTANTINO: Right.

MR. DALY: -- distributing it. How are you making sure it meets --

COL COSTANTINO: Well, so I'll take it for a follow-up, but my answer is everything that's being done on the tradeport is in conjunction with the regulator, so every action we're taking, any systems that we're putting in and any discharges that are made are approved by the regulatory agencies that we're working with. I can give you more specifics at a later time but that's what I can tell you right now.

MR. DALY: So New Hampshire DES is still recommending that you use granulating activated carbon to filter the water?

COL COSTANTINO: We -- that granulated activated carbon is being used to filter for drinking water, yes.

MR. DALY: And how long has it been operating and how many changes of carbon have you had to undertake in the past three years?

COL COSTANTINO: Right. So some of that work is actually subbed out to the City of Portsmouth, and

they're actually doing pilot studies, and I -- so I defer to --

MR. DALY: Pilot studies still?

COL COSTANTINO: To do exactly what you're asking, to test and answer those questions that you're proposing.

MR. DALY: Well, there are many military bases, and one of them Dr. Bove mentioned was Camp Lejeune, the most contaminated military site in the nation. They've got children and officers and military personnel down there who have died over the past 17 years, and they put activated carbon in, and it failed miserably. You spend hundreds of millions of dollars and it's still not cleaned up. So why are we still studying? Why don't you go out into the industry, where there are experts in this type of micro-filtration? It's terrible. You've got a public system here. You've got a gentleman here with a business, and you're exposing him to contamination.

The people in Newington, yes, they've got wells but those wells, they know, were contaminated from your base. We've got a situation in Manchester airport right now. You've got a situation just up the road in Brentwood. You probably know about it, Chief. Triple AF has contaminated numerous wells in Brentwood, where

they have their firefighting demonstration system.

I mean, we've got to stop this. We've got to be open and transparent. If you've got a system running here in Pease, let's know about it. Let the public know about it.

DR. BREYSSE: So we can have as a report back at our next meeting an assessment of the water technology, clean-up technology?

COL COSTANTINO: What I'd recommend is we have another public forum called a restoration advisory board.

MR. DALY: I've been through that.

COL COSTANTINO: Right. Right.

MR. DALY: And got nowhere.

COL COSTANTINO: That's where the questions can be better asked.

MR. DALY: Do I go to submit a FOIA?

COL COSTANTINO: I'll be glad to take all of your questions and answer them --

MR. DALY: I appreciate that.

COL COSTANTINO: -- to the (indiscernible) so we can -- no, I'll be glad to take all of your questions. I'm just -- I didn't know if you were at the RAB. I wanted to offer that up to make sure you knew that it existed.

MR. DALY: Yeah. Because, you know, Dr. Bove and Dr. Breysse said six months, 18 months to get the protocol organized. In the meantime people are still consuming the water, still being exposed.

COL COSTANTINO: People are not consuming water above EPA's health advisory.

MR. DALY: Seventy parts per trillion lifetime exposure.

COL. CONSTANTINO: Correct.

MR. DALY: Lifetime. And if you go on to their website, which is slowly being taken down, people have put questions up: If I continue to consume the water will I still be affected? The answer came back no, but you've got Johns Hopkins, Yale University, UCLA saying, wait a minute; it's bioaccumulative. If you've got it in your liver or kidney, or something like that... There's a young man in Merrimack right now that's got stage 4 thyroid cancer. He moved from the Midwest. Within one year he went to stage 4. His well was measured at 288 parts per trillion. He's now dying. Twenty-four years old. And we cannot allow this to happen.

DR. BREYSSE: Thank you, sir.

MR. DALY: Okay? But I'll get you all your information and I'll email you accordingly. Thank you.

COL COSTANTINO: Very good. Thank you.

DR. BREYSSE: Any other questions or comments from the community members that are present? Hearing none, we'll move on to update on future health studies, which we touched base on a little bit as we went through the review of the feasibility assessment and as my introductory comments.

UPDATE ON FUTURE HEALTH STUDIES

DR. BREYSSE: So as everybody's aware, there are potential plans afoot to fund a national study, and as I said before, we're moving forward with our initial planning phases to think about what that could be and what the best way to move forward with that is. And as we get anything more concrete to say we'll share it with you, but for now we're just exploring options.

We're looking to an external group of scientific experts to help inform what we say, which we would normally do at a protocol developing phase as well. And so we're going to look to potentially this pilot effort here at Pease to help inform that study, and I think that's probably about all we can say about the, the study at this point. And we appreciate the support for us that you guys have expressed here today and elsewhere as well in terms of our efforts.

MS. AMICO: Can I ask a question? Andrea Amico. Can you talk a little bit about what you envision these others sites? Are you planning to set up CAPs at these other sites or -- and how, how would we all stay connected?

DR. BREYSSE: So there will be CAPs at these sites. It's our philosophy that we don't study communities; we collaborate with communities to address health concerns, and that requires developing a relationship with the community, maintaining that relationship, getting input, partnering with the community. And the best way to do that is through a community assistance panel, such as we have here, at least if there's going to be a long-term commitment to a study. So let -- I want to be clear that we engage with communities all the time in ways that don't involve a community assistance panel, but when we have a long-term arrangement or engagement envisioned that's when we want to make sure we do that. So we will have a CAP at all the local sites, and we'll have probably a national CAP that represents -- have representatives from each of those local CAPs, to help make sure that efforts across communities -- or at least you all know what the community concerns are across the country as well so that we can integrate that, in a sense. So

it'll be a bit of a challenge. We've never done that before. We've had individual CAPs before. We've never had a pooled CAP such as we'd likely have for this case.

MS. AMICO: Where are you at in the CAP process with any of these other sites? Have you --

DR. BREYSSE: We have no other CAPs right now. So we haven't chosen the sites yet. One of the things that's part of the protocol development is we have to think about what the characteristics of a site are that would allow us to recruit sites. And we're just at the nascent stages of that thinking right now. So until we get sites identified and communities engaged, that's the point at which we'll constitute CAPs. And if the funding comes through we will put money aside for community assistance panels and supporting community assistance panels, so some of the resources will go to support that effort.

SEN. FULLER-CLARK: Senator Martha Fuller-Clark. Could you explain a little bit more about how you're going about identifying those sites and choosing one site over another site?

DR. BREYSSE: I can't, because we haven't developed the criteria yet. And so I think we need to -- we're getting a little bit ahead of the game.

We're trying to think of this, as I said, think this through in advance of any potential funding, but we're talking about potential funding right now, and so we don't want to get too far ahead. I don't want to commit to what the appropriate criteria are for a site, other than to say, you know, we're looking for sites that will allow us to do a large study as efficiently as possible. We're looking for sites that have a range of exposures. We're looking for sites where we think we can characterize what the historical levels were in the water as efficiently as possible. And we're going to target enough sites to get a sample size that Dr. Bove will calculate, or, or some other epidemiologists will calculate, in terms of the numbers of people we would need, you know, to, to reach the endpoints we're trying to look at. So I can't even commit to the number of sites we'll have right now or what the characteristics of those sites are.

SEN. FULLER-CLARK: Thank you.

MR. SULLIVAN: Might it be possible -- I know it might be not your jurisdiction, but to get the results of that conversation that's going to happen after the fact between this gentleman and this officer -- 'cause it intrigued me, his comments, and --

DR. BREYSSE: You mean for you guys?

MR. SULLIVAN: Yeah. Please. I don't know who we'd ask for that.

DR. BREYSSE: Any reason why that can't be shared with the CAP more broadly?

COL COSTANTINO: I mean, I'd have to have it checked, legal, but I don't think there was anything he was asking that I wouldn't be able to share.

DR. BREYSSE: Okay, thank you.

MS. AMICO: Can I just ask one more follow-up? So -- how do I want to phrase this? Is there the potential that where you haven't set up these other CAPs yet and you don't even have the criteria, that could slow down our process at all? If, if we get the funding. Because we're a pilot, we can move forward even if they're not organized yet.

DR. BREYSSE: Yes.

MS. AMICO: Okay.

DR. SCHAIDER: Hi, this is Laurel Schaider. I was wondering if you could talk about the process of picking the external advisors and does the CAP weigh in on who those external advisors would be?

DR. BREYSSE: So right now what the process is, I ask my office of science to constitute an external review panel. And beyond that I don't know where they are exactly. So we have an office of science, and I

know the PFAS study team's probably -- generates some names. We can -- there's no reason why we can't ask you guys for recommendations if you want to provide some.

Recognize, though, that, if we do choose a grant route, and you thought you might want to apply for the money, you probably shouldn't be one of the external advisors at that point, if you know what I mean. Just in case.

So we can't -- we have to be careful that any discussions we have publically would not give a competitive advantage to one institution, should we go that route. Everybody has to be on equal footing. If not, having been on the grant-writing side before, you know it's -- you don't like to think that somebody has a leg up that you don't have.

Any other questions? So we already did the website discussion. So we're a little bit ahead of schedule, which is not a disaster because I did notice that that Redhook Brewery was just down the road when I drove in again tonight.

CAP CONCERNS

DR. BREYSSE: But now we have a CAP concerns, if you want to raise any concerns that we haven't already

talked about.

MS. AMICO: This is Andrea Amico. I think I just want to continue to stress at every meeting, I know it's come up at other meetings, the desire from the community to have some type of medical monitoring program in place and just understanding is that something you think that could be part of this national study or be something that is developed, or where ATSDR stands on medical monitoring, because even if we do get the study that is different than medical monitoring in that not everyone's going to participate in the study, but people today want to know what they can do to monitor their health and protect their health, so.

DR. BREYSSE: Yeah, so the study will inform any decisions about future medical monitoring. And the types of tasks we're going to be doing are tasks that could also be done in a clinical setting, but it's not designed to develop medical monitoring protocols per se.

But we do give advice about medical monitoring, and I'm trying -- I don't know if I brought it with me. And, and we recommend, you know, for example, we reference the C8's medical screening recommendations. But we don't take a stand on whether people should do -- get medical monitoring or not, if I remember

correctly. Sorry, I'm just trying to see if I can put my hands on it.

So we say health effects associated with PFAS -- this is in our -- one of our fact sheets; I wish I knew which one -- but just for example, we say health effects associated with PFAS are not specific because they can be caused by other factors. There are no guidelines to support laboratory testing to monitor PFAS health concerns at this time. However, if a patient is concerned about -- this is guidance to physicians -- is concerned about PFAS exposure, discussing routine cholesterol screening can reassure the patient that his or her concerns and some other possible health effects can be screened based on these symptoms. Then we go on to talk about other things, and we actually mention the C8 guidelines, if they want to look at those.

So it's probably not as strong as you would like, if you should get monitoring. So we don't say medical monitoring is advised. We don't say it's not advised either at this point. I think we're just trying to stay a little agnostic until we feel more strongly.

Once we make a recommendation at CDC, that's a big deal. And a recommendation like that would have to be vetted and peer-reviewed rigorously across the agency.

And I wouldn't propose something for it if I didn't think we would get successfully through that process. And right now the science is probably not strong enough to be the basis of a CDC medical monitoring recommendation. For example, I sat through last year and watched what CDC went through to make recommendations about opioid prescription, and it's a very serious recommendation at that point when CDC puts their name behind it.

MS. AMICO: Well, I guess I -- my response would be that this issue's only getting bigger. We're only seeing more people exposed and that it's something I hope that the CDC continues to pay attention to because, whether it's difficult or not, it's the reality of the people that have drank this water, that we face that question every day. When I look at my kids I wonder every day: Are you going to be okay? You know, you're sick again; is it because you drank the water? You know, so I understand it's a challenging process but I want you to understand, from a mom of kids that have drank this water, that I really want to know what I can do now to keep them safe and, and not just wait until it's not a difficult task or it's -- you know. I think we need to err on the side of caution here, and that's one of my frustrations is

that I feel like we give the chemicals a benefit of the doubt; we don't give public health the benefit of the doubt when it comes to these chemicals.

DR. BREYSSE: And I understand that frustration. I will say that a year or so ago we actually had a recommendation in writing that said we don't recommend medical monitoring, so at least, you know, we've taken a step to a more neutral posture at this point, so that's, I think, a partial success.

MS. AMICO: I think the other thing I'd like to say too is that our community experiences a variety of responses from healthcare providers, just here in New Hampshire, you know. Some providers are much more open to medical monitoring on an individual patient and are willing and then we have other people that are really hitting barriers, with their providers saying, I will not provide medical monitoring for you. I've read what the guidelines are, and I just don't think we need to do that, anything other than your routine annual exams. And people aren't comfortable with that, and they're frustrated with that. And that's the other thing; we need something more streamlined, I guess, that why can I get medical monitoring for my children but somebody else can't? And that's something we're facing quite a bit here in New Hampshire.

DR. BREYSSE: I understand, and that's important that we hear that, and we'll be as aggressive as we can about reevaluating our recommendations as the science evolves.

MS. DALTON: This is Michelle Dalton. I also wanted to just piggyback on what Andrea was saying, that my family was actually one of those families that was denied any type of blood testing for my son. He was in utero exposed when I was working on Pease, and then after, breastfed. He attended daycare. He has high levels of these contaminants in his blood. And just recently I went for his annual exam and was talking with the physician, and the physician said basically I needed to educate him on what these chemicals were and the C8 health study and what their potential health effects were.

Long story, short, we had about an hour conversation that kind of turned into debating over whether or not we should be monitoring for these types of, you know, potential health effects. And in the end he said, I'm going to review all of the materials from ATSDR, from New Hampshire DHHS, and I will give you a call. He called me a few days later and said, no, I'm not going to recommend them because I'm going off of what the recommendations are from higher-ups.

DR. BREYSSE: Was he aware of the C8 study medical monitoring --

MS. DALTON: I did tell him the C8 study of medical monitoring, and his response to me, off the -- you know, off the side, was he needed to make sure that that was a legit website because he had never heard about it before. So.

DR. BREYSSE: I think it's -- you could really reasonably reassure him it's not illegitimate.

MS. DALTON: That's what I was trying to tell him, but anyway, so I was denied. My son was denied any type of, you know, future monitoring. And what really got me was that the amount of time that he took debating and researching and pushing back other patients and making them late for their appointments probably cost more money than him writing the script and saying, okay, I understand, you know, your concerns. This is -- you know, here's the blood slip to do this, or the lab slip to do it. And so his decisions were based off of the physician guidance.

MS. DAVIS: This is Alayna Davis. So I've had the same experience when I went to my physician and actually produced my son's blood level results, and then followed up with them to say, could you please, you know, have a conference with me about this. It

wasn't as long a conversation as Michelle's, and it pretty quickly went to the annual exam will cover it. The New Hampshire Department of Health and Human Services doesn't make any recommendations regarding this and we aren't going to do anything additional.

So the State's stance has been clearly stated at several different meetings across the state, not just Pease, that they don't believe that the C8 evidence is conclusive enough to warrant any additional monitoring. So I'm not sure if you're aware of that, but it is a struggle that the community has here. It's a struggle that the Merrimack community and other surrounding communities that have contaminations have, and so that's why we keep coming back to you on this, because the State itself is not supporting this cause for us, and so we need to turn somewhere else where we can get that authority to decide that this would be valid.

DR. BREYSSE: I understand, and it's important to hear the frustrations you're having.

MS. AMICO: And then can I ask, what is ATSDR's position on the C8 health study? Is it you view it as a valid scientific study? And, and also what are your thoughts on the medical monitoring tool that came out of that study?

DR. BREYSSE: So I don't think we -- as a policy

we comment on the validity of any one individual study.

DR. BOVE: I mean, the -- it's a group of studies; it's not just one study. And the three people who reviewed the literature -- and they not only reviewed the C8 studies but also the occupational studies that have been conducted, studies done in other countries and so on. So they looked at all the evidence at the time and came up with a decision as to whether there was a probable link with the exposures at -- the PFOA exposures in particular, at -- in the C8 area and a whole bunch of endpoints. And so the probable link meant greater than 50 percent, or more likely than not, similar to what we tried to do at Camp Lejeune.

So it's -- you know, it's not -- it was done because of a legal court case, true, but that really has nothing to do with the actual assessment. The assessment was done in the usual way assessments are done, looking at all the evidence from all the studies, including the C8 studies, and coming up with a difficult, oftentimes, decision as to whether the evidence was from all those studies reached a more likely than not level.

I don't think they felt that any of them was conclusive, such like TCE and kidney cancer, but they did -- several endpoints were reached that level that

it was more likely than not in their opinion. So that's -- that's how it should be described, as a group of studies, but the assessment done by the three panel scientists was an assessment of all the evidence that was available at the time.

MS. DAVIS: And this -- this is Alayna Davis again. So I just want to point out for those that don't know this, that the reason why we look at the C8 study, I mean, for many reasons, as we're looking at it for guidance, is because that study studied 69,000 people for PFOA at 50 parts per trillion for as small amount of time as a year. And the Haven well, when it was shut down, was 350 parts per trillion. That's seven times the level that the C8 study was studied. So if they're finding probable links at the 50 parts per trillion for as little a time as a year, and the people at Pease were exposed for several years, decades even, in some -- probably for some people, that's a huge concern.

And so I mean, for people that don't know that, that's why we keep going back to the C8 study. I mean, it was a large population. It was peer reviewed. Yes, it was the result of a legal settlement, but both sides, both the prosecuting side and the defense side, had to decide on these epidemiologists and these

scientists, and they had to both agree on whether that was a valid approach, and the people that they chose were okay. So I just wanted to give that as additional feedback.

DR. BREYSSE: Any additional CAP concerns?

MS. DALTON: One additional follow-up. This is Michelle Dalton. Following up to what Alayna said earlier, is there anything that ATSDR can do to help our community or our state in terms of educating the physicians or making a stance on whether or not we need medical monitoring?

DR. BREYSSE: So can I explore that with our staff when we go back, and, and get back to you?

MS. DALTON: Absolutely.

DR. BREYSSE: It might not be a role we could play, but we support a group called the pediatric environmental health specialty units, and their job is to interact with the medical community on pediatric health issues and translate science into medical decisions. So --

CAPT SOMERS: We also have -- this is Tarah Somers, ATSDR -- there is an online program. It's for physicians and practitioners to get continuing education credits, to talk about PFOA and PFOS and the contaminants. Again, it doesn't come out and say these

are the medical tests you as a provider should do. It doesn't do that. It follows more similarly the fact sheet guidance to physicians, but it does give them the background on the contaminants, and they get continuing education credit which is important to a lot of providers. So that is available online right now. It's up there. It's been there for six months or so.

MS. DALTON: Yeah. I think the background information is certainly helpful, but in terms of either making a stance or making recommendations as to what our providers can do to help us, 'cause we're running into roadblocks.

MS. DAVIS: Tarah, can you provide the CAP with that link to how the physicians can sign up for that?

CAPT. SOMERS: Yeah, sure.

MS. DAVIS: Because I'm not sure physicians are even aware of that.

CAPT SOMERS: Yeah. And I mean, it's challenging, certainly, to target like every physician's office in any area, 'cause there's like lots. I know the State, New Hampshire, Department of Health and Human Services has tried to put out information to local physicians. Maybe we could go through the local health department. Kim McNamara, maybe she has other resources to push out more locally, you know, rather than state level,

locally. We can explore that with her, but it is available.

SEN. FULLER-CLARK: So Senator Martha Fuller-Clark. We do have the New Hampshire Board of Medicine, and I don't know to what degree this discussion has taken place with them, but I think that would be another avenue. It would be worth exploring.

CAPT SOMERS: We can look into that. I got it.

DR. BREYSSE: Okay. Anything else?

MR. DALY: Yeah, Geoff Daly. I know we've just talked about drinking water. One of the things the CDC has been looking into, has not come up with any firm decisions, and that is aerosolized water vapor from showers and hot baths opening up the pores of the skin. These particles are down in the nano range, into the angstrom range in fact, and therefore through the skin will percolate, if it's hot. And they're possibly thinking about a warning of taking hot showers, steamy showers, and breathing in the moisture. Especially youngsters. I had a son who loved hot showers. He's now asthmatic, and we live in Nashua. So that's something I think that should be part of your protocol testing. Were the people exposed to hot showers and hot baths during the period of time here at Pease and in the Newington area?

DR. BREYSSE: Thank you for the suggestion.

MR. DALY: It's very important.

DR. BREYSSE: All right.

MS. DALTON: I actually have one other question. Sorry to hold you up; I know you want to get to Redhook.

DR. BREYSSE: No. No, no, no. No. That was a joke.

MS. DALTON: This is Michelle Dalton. It's actually a question for Dr. Chan. Earlier you had mentioned that the blood samples from the 2015 testing were being stored. What about the testing after 2015 and the samples that are currently being taken?

DR. CHAN: Yes. We're still holding those as well.

MS. DALTON: Great. Thank you.

DR. BREYSSE: Great.

MS. AMICO: I'm sorry, one more thing.

DR. BREYSSE: Don't apologize.

MS. AMICO: Andrea Amico. I just want to ask about, you know, we kind of talked a lot about the three-year-olds, the four-year-olds, the -- you know. I just want to know that, you know, if someone had a three-year-old we wouldn't turn them away, if they want them to be part of the study, and like can you describe

a little bit more about if people do want to be part of the study but they're maybe in between these awkward age cut-offs that we have. Would we turn someone away because of just an age or would we consider them, if we understood their exposure and what they may bring to the study? For example, like I'm thinking of some people with children that were here 20 years ago, and they're adults now but -- you know. So how, how can we make sure these people are part of the study?

DR. BOVE: Well, the protocol would be to find the age inclusion so we would have to stick with that, and it would be based on what's the best population to study most effectively. So yes, they would be turned away. I mean, part of the recruitment would be to make sure that people knew what the age of inclusion is. So again, you know, we didn't study everybody at Lejeune either, but the endpoints that we evaluated and the results that we gathered for the mortality study and the overall assessment pertained to all the Camp Lejeune Marines and other service people who were on the base, so even if they're not in the study the results of the study were important to them, and they're getting compensation actually because of that. So you don't have to be in the study to benefit from the study.

The C8 study did look at -- it had 69,000, but if you look at the actual studies that were done it's a smaller, not much smaller, but it's not every one of those 69,000 are in the studies. So but the results pertained to all of them.

So we would have to make it clear in any recruitment that we do that this is the age range. And to make it clear in any of the media and public information we put out that the results of this study will be important for all who were exposed, not just the people in the study.

MS. AMICO: And where do you see kids that were here 20 years ago at daycare but now they're adults? Where do they fall into this? Would they just not be eligible to be part of the study or would they be under adults now, but they were exposed as children?

DR. BOVE: We have to think about that. Again, 'cause we're concerned about whether we could actually characterize their exposures historically.

MS. AMICO: I get that --

DR. BOVE: Because if we get a serum level now, can we -- I mean, and this is a question for the expert panel that we'll be putting together, because we want to have experts not only on the endpoints but we want to have experts on the modeling of the exposure in

particular. And so this would be a question for their consideration too. So we're not going to just base it on what we think.

MS. AMICO: Okay. I think they're a valuable population to look at, if you have adults now that were exposed 20 years ago at daycare. For me as a mom, I'm like I want to know what's going with those, those people now.

DR. BOVE: Right.

MS. AMICO: That's going to provide me a lot of information. So even if they can't be part of this study how do we still talk to those people or capture information from them?

DR. BOVE: Well, one of the reasons --

MS. AMICO: Not as part of a study but something that's meaningful to you guys.

DR. BOVE: Well, one of the reasons we want to look at civilian workers and military personnel is that they did have this exposure 20, 30 years ago. And then look and see if we can find particular cancers and causes of death among them, that would stand out. So that would look at those endpoints.

The endpoints we're talking about in the children study and the adult study at Pease and other sites would inform that as well. You know, more recent

exposures and particular endpoints. So all this stuff will be important to anybody who was exposed regardless of when they were exposed, I would say.

MS. AMICO: Okay. And I guess, kind of leading on to that would be -- and I think I've asked this question before, but do you guys create any type of registry where people can report to you, you know, health effects they may be having, even if they're not part of a study? Does ATSDR keep track of that data in any way or if people are willing to give that information to you?

DR. BREYSSE: So we don't normally set up registries like that. And we're currently not planning on doing that. We think we need to invest in a carefully designed study that has cohorts of people defined, based on criteria that we think are most valuable, to provide the most meaningful information that we think we can.

DR. BOVE: However, what we could use is maybe a ongoing mailing list. If we want to follow people over time, and one of the things we'll ask in the consent and -- I mean in the questionnaire is: Is there a person or a couple of people that we can contact who will know where you are, so that we can -- if we want to follow these people over time and re-interview them,

and maybe even get an additional blood sample, or whatever, that we'll be able to track them down. So in that sense we would -- it's not a registry, that's what you're talking about, but we would probably need to set up something so that we can continue to track people over time.

MS. DALTON: This is Michelle Dalton. Even if a registry isn't something that you typically do, is there a way to do that for this study?

DR. BREYSSE: I don't know the answer to that right now but historically we've tried to do that in the past, before I came on board, and the efforts were found to be fraught with difficulty. And based on the resources it took to do it and maintain it the decision was that they're probably not the most valuable way that we can approach these health concerns. Now, what Frank was talking about was, for the people in the study, if we do it right we can build in the opportunity for coming back to them over time, to follow them and so on. In a sense a cohort is a small registry, if you want to think of it that way. And those are people that we'll have very detailed information on about their exposure, their exposure history, their health history, so we know to contact them over time, will probably provide us a unique

opportunity to look at the health history of the people exposed that we know a lot about.

DR. DURANT: Could I just ask -- follow on to Andrea's question? This is John Durant. So with the adults, how do you propose to quantify their historical exposures, going back in time? Just briefly, what are your -- what's the approach?

DR. BOVE: Well, we would probably use something similar to what the C8 study did. But again this is something we would -- we want to have an expert panel to actually discuss this with us. But what the C8 study did was they did have PBPK modeling of the PFOA and PFOS, so they had those models to use. And then with the -- they also had to estimate historically the water contamination levels, so that was additional modeling that had to be done for that, which we've done at Lejeune, so we have some -- and at Toms River, to some extent, so we have some experience doing that. The PBPK modeling, we have some experience but not with PFOA and PFOS, so we'd have to develop that expertise, and again, with other researchers in the expert panel that would be able to do that. So with those two pieces plus any information we get from the participant, him- or herself, about their water consumption, and then their serum level from the --

which is what the C8 study used for calibration purposes. So that's set.

DR. DURANT: So it would be individualized?

DR. BOVE: Yeah, yeah. Right, that's the easy way to put it, yeah.

DR. BREYSSE: Thank you all very much. I love coming up here.

(Whereupon the meeting was adjourned at 8:25 p.m.)

CERTIFICATE OF COURT REPORTER

STATE OF GEORGIA

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I, Steven Ray Green, Certified Merit Master Court Reporter, do hereby certify that I reported the above and foregoing on the day of August 28, 2017; and it is a true and accurate transcript of the proceedings captioned herein.

I further certify that I am neither relation nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 26th day of Sept., 2017.

Steven R Green, CCR

STEVEN RAY GREEN, CCR, CVR-CM, PNSC

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