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convenes the

THIRD MEETING

PEASE COMMUNITY ASSISTANCE

PANEL (CAP) MEETING

May 30, 2017

The verbatim transcript of the
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Panel held on May 30, 2017.

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C O N T E N T S

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VETTER, SHELLEY, CAP

P R O C E E D I N G S

(6:15 p.m.)

WELCOME AND INTRODUCTIONS

DR. BREYSSE: So welcome. My name is Patrick Breysse, and I'm the Director of the Agency for Toxic Substances and Diseases Registry, ATSDR. From here on out we'll just call it ATSDR 'cause it's too big of a mouth -- mouthful otherwise. It's a bit like IBM, where nobody remembers what IBM actually stands for. People know ATSDR. They often get confused about what it stands for.

So welcome. And I guess this is the third Community Assistance Panel meeting that we've had. I've had the pleasure of making one of the other two. I'm sorry I missed the one, but I'm happy to be here tonight. Why don't we begin by going around the room with introductions? And maybe we'll start with the ATSDR staff, and then we'll just continue to the CAP.

DR. BOVE: Frank Bove, ATSDR.

DR. CIBULAS: Hey, good afternoon. I'm Bill Cibulas. I'm the acting division director for the Division of Toxicology in Human Health Services. And I will be replacing Jimmy Stephens on the CAP, so this is my first meeting. I'm a toxicologist by training, and I have been with ATSDR for over 30 years, so I've been

involved in a lot of community assistance groups, and I look forward to seeing how I can support this group.

CAPTAIN SOMERS: My name's Tarah Somers. I'm with ATSDR in our Region I Boston office.

COMMANDER MUTTER: Hi, I'm Jamie Mutter. I am the Pease CAP coordinator with ATSDR.

MR. DIPENTIMA: Rich DiPentima, member of the CAP from Portsmouth.

MS. AMICO: Andrea Amico, Portsmouth resident, founder of Testing for Pease, and a CAP member.

MS. DALTON: Michelle Dalton. I am a member of the CAP, and Testing for Pease. My son attended daycare on Pease Tradeport when he was young, and I also work on Pease.

MS. DAVIS: Alayna Davis, CAP member, obviously, local resident, and my son attended daycare, and also cofounder of Testing for Pease.

DR. DURANT: Hi, I'm John Durant. I'm an environmental engineer and I'm a professor at Tufts University and a member of the CAP.

DR. CLAPP: Dick Clapp. I'm an environmental epidemiologist and a member of the CAP.

DR. SCHAIDER: I'm Laurel Schaider. I'm a research scientist at Silent Spring Institute in environmental engineering and environmental chemistry,

and technical advisor to the CAP.

MR. SULLIVAN: Hi. I'm Mark Sullivan, CAP member, and I own a business here at Pease Tradeport.

MR. SHEEHAN: Jared Sheehan. I do environmental compliance for the Pease Development Authority.

MR. HARBESON: Rob Harbeson. I'm a parent of kids who went to daycare. I'm the chair of the board of directors of Great Bay Kids' Company at Pease, and a member of the CAP.

DR. CARIGNAN: I'm Courtney Carignan. I am a researcher at the Harvard T.H. Chan School of Public Health, an environmental epidemiologist and a scientific advisor for the CAP.

MR. STONE: Tim Stone. I'm with Stone Home Environmental and an environmental scientist, hydrogeologist. And I have a business in Portsmouth.

MS. VETTER: And I'm Shelley Vetter, and I'm the owner of Discovery Child Enrichment Center that's located on the base.

DR. BREYSSE: Fantastic. So the agenda tonight is rather simple. We'll move on in a moment to the action items from the last meeting, but the majority of the time is scheduled in order to discuss the Feasibility Assessment report, the draft, that we've submitted to you all. And we call it a draft because, as we -- it's

the philosophy of ATSDR that, when we come into a community to do a study, we work with the community to do the study and make sure the community has input into what we determine is feasible and understands the rationale behind the decisions that are made about what can and can't be done.

It's all part of, I think, our commitment to working with communities. And so we will consider it a draft until such point as we get comments back from the CAP members. We will address those comments, and at that point it'll become a final Feasibility Assessment. But this represents our take on what we think is feasible.

Then we'll have some -- we'll take a short break, then there'll be some time for questions in the audience, and if we have time we'll talk about new CAP members and other CAP concerns before we adjourn. So any questions or concerns about the agenda? Great, so why don't we start with a review of action items from the September CAP meeting.

COMMANDER MUTTER: First, Pat, I think we have some ATSDR staff on the phone.

DR. BREYSSE: Okay.

COMMANDER MUTTER: That might want to introduce themselves. If you can hear me.

MS. RUCKART: Yeah. Perri Ruckart, ATSDR. Can you hear us?

DR. BREYSSE: Is there a volume button on that phone you can turn it up? It was Perri Ruckart.

MS. CORY: Hi, it's Janine Cory, also from ATSDR.

COMMANDER MUTTER: That's better. Thank you. Just a few housekeeping items before we start. As you can see, we have a microphone that's passing now. We wanted to do that in order to get the PA system so the community could hear what's being said around the table. So if we could do the same format of putting your tent up, name tent up, if you'd like to speak, and I'll be coming around with the microphone.

And then, let's see, also we also have a transcriptionist that's going to be recording this meeting, and so if you could say your name before you speak so he can record that in the transcript, that would be wonderful.

Let's see, bathrooms are out the door, down the hall, on the right. And emergency exits, there's one right here in this room, and then out the front door where you came in. So with that, let's go ahead and move forward with the action items from the September 7th CAP meeting.

ACTION ITEMS FROM SEPTEMBER CAP MEETING

MS. MUTTER: The first action item is for the U.S. Air Force, and the action item said: The CAP would like to know how many U.S. Air Force bases use AFFF. How many are closed, and if any have reopened as a business community? And the response was: ATSDR deferred this question to the U.S. Air Force, who provided the following response: AFFF is used to extinguish petroleum-based fires on DoD bases and commercial airports. We have jet fuel at almost all installations. The number of installations we are using AFFF is 180 which includes active Guard and Reserve.

Regarding closed bases, we have 40 closed locations, some are not bases. All of them are being re-used in various capacities.

The next action item was for ATSDR. Mr. DiPentima recommended the ATSDR add HDL and LDL cholesterol to the total cholesterol, to get ratios to see if there's any correlation, because they may have high HDLs or very low HDLs as well.

And the response: The studies proposed in the Feasibility Assessment plan to obtain measurements of total cholesterol, LDL, HDL and triglycerides.

The next action item is for ATSDR. Dr. Bove

suggested inquiring if NIOSH can tack on an assessment of exposure to AFFF in a future firefighter study, as they currently have a large cohort they are following. ATSDR can inquire if NIOSH would be interested in looking at AFFF.

The response is: Based on conversations with NIOSH researchers, they feel that AFFF exposure would be difficult to study in these cohorts primarily because the majority of the members of these cohorts were not exposed to AFFF, i.e., those in San Francisco and Chicago and probably a majority in Philadelphia as well. These are the three cities that were studied.

The last action item is for ATSDR. Captain Somers suggested asking Brian Goetz to give an update on the water treatment at a future meeting. And the response: Mr. Goetz gave a presentation to the Pease CAP on January 9, 2017.

And with that, the action items are finished, and we can move on to the Feasibility Assessment discussion.

DR. BREYSSE: Okay, do we have a new CAP member?

SENATOR CLARK: Yes. State Senator Martha Fuller Clark. I represent the City of Portsmouth and the following communities which are Durham, Lee, Madbury, Newington, Newfields and Newmarket.

FEASIBILITY ASSESSMENT

DR. BREYSSE: So I thought we'd begin by asking Dr. Bove to give an overview of the Feasibility Assessment. I know we've presented that to the CAP before, but there may be members of the audience who have not heard the overview, and we'll start with that.

DR. BOVE: Okay. So we've sent out to the CAP now the full Feasibility Assessment and a brief overview of the Feasibility Assessment that we sent a couple weeks, months ago, which has changed slightly, based on some changes that were made to the Feasibility Assessment. And then we also have comments from the Air Force and our responses. So you should all have that.

So the overview actually does do a pretty good job, I think, of summarizing what's in the Feasibility Assessment. The Feasibility Assessment we have a lot more detail about the sample, how we did sample size calculations. There's a whole appendix that goes through the literature that we are aware of, the epidemiologic literature. There's also material in the appendix that talks about some other sites where there's been also AFFF contamination of public water systems, and so we mentioned those in the appendix as well. So the Feasibility Assessment's huge, and, you know, I don't want to take up too much time going

through this 'cause I do want to hear from you any questions, and also comments and suggestions and so on, on the Feasibility Assessment.

But anyway, the Feasibility Assessment reviewed what we know about the situation here, the water contamination, the use of the three supply wells, the production of those supply wells, to gather a sense of what might have been at the tap, because there weren't any measurements done before the Haven well was closed at the tap. So we went through that information, also the information from the Pease blood testing program in 2015 as well, to get an assessment of the kinds of exposures, the levels of exposures that occurred.

And we also looked at the literature on PFAS, to see in particular whether the two chemicals that were -- the key chemicals in the drinking water. Those are PFOS, which I can't remember how -- what it stands for, but I can look it up, I guess. It actually -- let me see if I have it here. It's perfluorooctane sulfonate. And PFHxS, which is perfluorohexane sulfonate. That’s the chemical names. To see what the literature looked like for those two chemicals in particular.

And the literature has a lot of information on PFOA, which is perfluorooctanoic acid, because of a lot

of research that was done in West Virginia and Ohio. They call it the C8 Studies. And that was the key contaminant in those studies. So there's a lot more information on PFOA.

For PFOS there's less information. There are studies done in other countries. There are studies that have used what's called the NHANES data; it's a national survey. And there have been studies in other parts of the U.S. But for the most part PFOS has been studied less than PFOA, and PFHxS has been studied even less. So the -- that's basically what the literature review found.

We also did the literature review to get a sense of what has been studied, so that we could then make a proposal of studying -- following up this research, because it's still at an early stage in terms of the human studies. So that was a good portion of the Feasibility Assessment.

And we had three criteria that we used. One was we wanted to have a -- if we wanted to do a study, if it was going to be feasible, it should provide meaningful and credible results. And the key there is that it would have sufficient validity, it wouldn't have biases, but also it would have sufficient precision. That means having a large enough sample

size so that we can measure any excess with some kind of precision, so that there wouldn't be a lot of uncertainty in those risk estimates, for example. So that was the first criteria.

The second one was scientific importance. We wanted to make sure that whatever we did would further the science and knowledge about the health effects of these chemicals.

And the third is public health significance. And here it was -- if you wanted to base interventions in the future, you want to have a sound basis for that, and we'd hope the study would help provide that basis, and also be useful for other communities that are exposed to similar chemicals, similar situations.

And then all three sort of combine with the idea of trying to be able to answer the communities' concerns and questions about what might have happened, based on this exposure, what kind of health effects they might have had.

So that's -- so in reviewing the literature, reviewing the situation at Pease, we felt that all three criteria were met at least for some health endpoints, that there was enough sample size, enough people exposed, that probably could be recruited, that some health endpoints could be looked at with pretty

good precision and with good validity.

So we proposed two studies, both cross-sectional studies, which will give us at least a baseline of what kinds of effects have happened, and could be a basis for a longitudinal work follow-up in the future.

But we focus first on the cross-sectional studies. And the first one was a children's study, and we thought that we could probably recruit about 350 exposed children, but that was sort of a minimum. We want to try to get at least that many. And we also have a group of unexposed children that were similar to the exposed children, except they didn't have any exposure to the contaminated drinking water. So we came up with 350 exposed, 175 unexposed, just to -- for starters. We thought that that was feasible to recruit. And we did a number of sample size calculations, which is all in the larger document.

And based on those sample size calculations -- again, we identified a whole list of health endpoints from the literature review that were worth following up. And then we did the sample size calculations to determine which ones made sense to do with the kind of population we could recruit, which ones we might be able to look at but there would probably be some problems with uncertainty, wider confidence intervals,

if you will. And then those endpoints that are probably not feasible because you just needed larger populations to study them, okay? So we had those three different categories.

And so for the children's study with 350 exposed children, we were looking at an age range when we do this study of those who would be between the ages of four and 16. In the earlier version of the overview I think it was five and 15. We expanded it to four and 16, to be a little bit more -- to be more similar to some of the studies that have been done, and also it fit the range of a particular neural behavioral test we've been looking at as well, so we expanded it that way. And by expanding it that way we might be able to get even more than 350 exposed children. We might be able to get up as many as 500, we thought.

So we did sample size calculations, a situation where there would be 500 exposed children and 250 unexposed children as well, just to see what that would look like and what other endpoints, then, would be more feasible. So we did those calculations, and we have a list in the overview of the endpoints that are feasible with just 350 exposed and 175 unexposed children. And those were looking at lipids, cholesterol, okay, looking at measure of kidney function. It's called the

estimated glomerular filtration rate. That was feasible. To look at a growth hormone deficiency, that was also looked at in the Ohio and West Virginia studies. And to look at overweight and obesity, which is looked at, I think, in an NHANES study, that we could look at here.

Then there was a second group where we might need -- we probably would need larger than 350 exposed children and 175 unexposed. And we possibly could look at it if we got up to 500 exposed and 250 unexposed. And those were involved with uric acid, which is another way of looking at kidney function, to some extent; elevated cholesterol; looking at neuro-behavioral endpoints, such as IQ, and some of the elements or symptoms of AD -- of attention deficit-hyperactivity disorder, although not necessarily the disorder itself but some of the characteristics or deficiencies that ADHD children have; thyroid function was -- we could look at as well, if we got up to at least 500; sex hormones, which were looked at in one -- in a few studies, particularly in West Virginia and Ohio studies. And then a couple of endpoints to look at immune function, such as asthma and atopic dermatitis. And then to -- it may be possible, although we'd probably need more than 500, to look at

vaccines, antibody response to vaccines. But that was a little bit more questionable whether we'd have enough to do that.

And then there were those endpoints in the children's study that we couldn't look at very well. Looking at ADHD itself would've been difficult -- could be difficult. Autism spectrum disorder would be very difficult. Some of the other ones that have been looked at, for example delayed puberty would be difficult. Thyroid disease itself would be -- you could look at thyroid function but thyroid disease is kind of rare in children, so that would be difficult. And childhood cancers would be very difficult because they're not -- they're rare.

So that's the children's study. Now, for the adult study we thought, and this would be adults aged 18 and over; that would be the age range there. We were thinking that it might be possible to recruit 1,500 exposed adults and a similar number of unexposed adults. So we went with that as our basis, and did the sample size calculations on that. Again, we'll -- we don't know how many we really could recruit, but there were a sizable number of adults who participated in the Pease blood testing program, and so we thought that we could do a little bit better than that possibly, and

that's where the 1,500 came from.

So based on that, if we got 1,500 exposed and 1,500 unexposed adults, there were quite a number of endpoints that were feasible, including lipids again, uric acid, thyroid disease, if we just went on reported thyroid disease and not confirmed them with medical records.

One of the studies that were done in Ohio and West Virginia looked at self-reported thyroid disease without confirming them, and then looked at it with confirmation, and it makes a difference. If you try to confirm it, you cut the number of disease in half practically, in that study anyway. So, so if you confirm it with medical records it may be more difficult to study.

Cardiovascular disease, hypertension, osteoarthritis and osteoporosis, and looking at some of the immune function parameters. They were all feasible with 1,500, we thought.

Those that we thought might be possible but it'd be better if there was a larger sample size include liver function, thyroid function, thyroid disease confirmed by medical records, endometriosis and pregnancy-induced hypertension.

And then finally the ones we thought were -- would

require a lot more than we could probably recruit at Pease, but there are, as I said, other sites that have similar exposures to AFFF through drinking water contamination, and if we could link studies together then we could look at some of these. These include liver disease, kidney disease, ulcerative colitis, rheumatoid arthritis, lupus, MS and possibly kidney cancer. But again, these would be difficult to impossible to evaluate just using the Pease population.

We also put forward an idea of looking at former military service and civilian workers. We have looked at a similar population at Camp Lejeune. The exposure there was trichlorethylene in drinking water and perchloroethylene, so it's a different situation, but we have done studies there looking at the health effects of these chemicals in the drinking water, and mortality and birth outcomes and so on. So we thought we could possibly look at Pease Air Force Base and some other military bases combined, and look at, at least, causes of death and cancers, like we're doing at Camp Lejeune. So we put that forward but we basically said it would be not impossible, but it really wouldn't be that feasible to just do the study at Pease, but we'd have to combine it with other military bases with similar exposures and similar contamination.

So that was basically what we thought was feasible, what was not so feasible and so on. And that was the gist of the Feasibility Assessment. So I think what I'd like to do is open it up for questions and comments from the audience here, from the CAP.

DR. BREYSSE: If you can make it just -- lift your tent up and we'll bring the microphone to you, if you want.

DR. CLAPP: Yeah, this is Dick Clapp, and the question I have is what about other bases, or the Pennsylvania bases, for example? Is there still ongoing discussion about a combined study with Pease and, whatever it is, Warminster, and the other one?

DR. BOVE: Yeah, it's Warminster and Willow Grove are the bases, and the towns are Warrington, Warminster and Horsham. And there was contamination at these bases in the past. One of the things about these bases and also Pease is that there also was trichloroethylene contamination in the past, not as bad as Camp Lejeune, but still there was that to keep in mind if studies were done at bases. I'm sure if we looked at other bases we'd have some similar problems as well, with other contaminants possibly in the drinking water in the past.

But this had to focus on Pease, and that was the

charge. So we haven't really developed an assessment of those sites. We have some sense of the situation there. We have some information in the appendix about that. Some of that also needs to be validated by the water companies themselves in those three towns. So we -- you know, this is still a draft, so we did work with those water companies and put that information in the appendix, but again, the water companies probably will want to review that and will probably make some comments. But that's as far as we've gone so far.

DR. BREYSSE: If I could add to that. We recognize that this is a national-scale problem, and we're interacting with dozens of communities directly, as we speak, and a number of other communities indirectly through our cooperative group of partners, and through just normal interactions we have with state environmental health directors. And so we recognize it's a national problem.

And really, to address the health concerns, we recognize adequately, across all these different concerns with different study designs for different types of endpoints, it's going to require a national commitment to this. And we're -- at ATSDR we're committed to scoping that out and exploring resources to do a national study. But this was a -- the

Feasibility Assessment was ordered by the Air Force specifically to look at what could be done here at Pease.

DR. BOVE: Also, I think one other thing about the Philadelphia sites, some of the water systems there are much more complex than here. Here the water was blended from the three wells, and so you could get a good sense of what the contamination was at the tap there. There are pockets that received high levels of the contaminants. There are other pockets that didn't. There was water being brought in from the outside so that -- you have to know the water system very well, especially, I think, Warminster in particular, but all three of them had some complexity to them. It was more like Woburn or some of these other places where you have to know which wells serve which areas of a town. So it's not as easy to get a sense of the situation there as it is at Pease.

MS. AMICO: Hi, this is Andrea Amico. So I guess the -- I think the biggest point I want to drive home -- and thank you so much for putting this together and giving us these opportunities, but I think a cross-sectional study is not what the community wants, and my understanding of the cross-sectional is that you would test these endpoints just one time and look for

something, and if we don't find anything, then what's the plan after that? I think really what we're looking for is longitudinal, and I think one of the biggest questions in the community that has been brought forward from day one is how has this exposure affected my health or my children's health over time.

So if we just do a cross-sectional study we're getting one snapshot in time, so if the study gets up and running in a few years, we draw blood on 350 kids and we don't really find anything significant, does that mean we just walk away and say there was no problem? You know, I think that doesn't leave me feeling very comfortable, so I think that would be the most important message I want to send tonight, is that we need something more long-term, and we need people monitored over time, not just once.

The other thing I want to say in terms of a national study, I do understand the scope of the work here is Pease, but it's very obvious by the things that you have spelled out that we need these other communities to give our studies more power, particularly if we're looking at things like cancer and endpoints that are concerning to our community. So I'm grateful that there are things that we can do just here, and I'm happy for that, but I do not want to lose

sight of a bigger picture, that we need these other communities and that they should be part of this process too.

I know, for Testing for Pease, we have contacts at many of these other communities. They're absolutely wanting to be part of this work. They want to be part of a national study. They want -- they have the same questions as we do, so I think we need to be approaching this at a national level as well.

And I mean, I have so many notes, I don't want to monopolize the time here, but I guess a question more about a detail, when you talk about the endpoints and the different health effects that we would look for as part of the study, would somebody be conducting a health history and seeing if there were maybe certain endpoints that we weren't testing for but we would recognize a common thread?

DR. BOVE: Well, we would put together a questionnaire that would ask for a complete medical history.

MS. AMICO: And how -- and like you had said sometimes there's self-reporting, and then there's actually looking at medical records. So would somebody be -- would you be obtaining medical records on everybody participating or would it just be by self-

reporting in a questionnaire?

DR. BOVE: We would ask, as part of the consent process, that we could have access to the medical records, and also school records because we want to look at neurobehavioral issues.

MS. AMICO: Okay.

DR. BOVE: Learning disabilities, ADHD, for example.

MS. AMICO: My other question was in terms of an adult --

DR. BOVE: But one other thing, a lot of this stuff would be in a protocol, so we do go into some of this in the Feasibility Assessment, but it isn't a protocol so we would develop a lot of this as part of our protocol.

MS. AMICO: Okay. In terms of an adult study, we have -- there is a daycare that's been open for over 20 years now, so we have some folks that were part of the blood testing that were kids 20 years ago or 15 years ago. How would they fall into this study if they were exposed as kids in daycare 15 years ago, and now they have their blood tested? How would you account for that in the study? Would they fall under the adult study or -- they obviously wouldn't age into the kids' study.

DR. BOVE: Well, we did put a period of time where you could be eligible for the adult study, and that was based on how long PFHxS, for example, is resident in the body. How -- the half-life, for example. So the half-life's about eight and a half years, based on at least one study. And so we figured that we wanted to -- the range we thought was 2008 onward, up until the time the Haven well was shut down, that that would be -- if you were at Pease at that period of time, then you would be eligible for the adult study.

DR. BREYSSE: Whether you were there as an adult or a child, as long as you're an adult now.

DR. BOVE: Yeah, because you have to be over 18 at the time of the study, right? And you had to be at Pease during that period, between January of 2008 and May of 2014, when they shut the Haven well down. Now, these are arbitrary. You know, we can go back in time, further back, given that there is a long half-life for PFHxS. We just -- we're concerned that if you do blood testing, and the exposures were so far in the past, that we're not sure what the blood testing would tell us very well at that point, so that was the consideration there.

MS. AMICO: Okay.

DR. BOVE: But again, you know, that's open for

discussion. This is not written in stone. This was based on hoping to be -- if we did this study, that it would be on the ground sometime next year or certainly by the year after that, and how far then these exposures were, if we start it then.

MS. AMICO: So I have two more questions. The last question is -- or the second to last question is: What are the action items? And is this typical that you would see in a Feasibility Assessment that we do do a study, and we do find that there is adverse health effects in this community or there's something that we find in the study? What are the action steps that are taken? Is that addressed in a Feasibility Assessment or a study? Like what would then happen?

DR. BOVE: No, but that's a good question. You know, I'm thinking what happened in the C8 studies, where they had medical monitoring, based on some of the results of those studies.

By the way, the C8 study had a longitudinal component to it, but a lot of it was not funded and it hasn't been completed. So it's difficult to do a longitudinal study, even though it's very important to do that; we agree with you. But the funding issue is always a problem, even with the cross-sectional study, but in a longitudinal one it's even worse. But there

should be follow-up actions based on the study results, yes.

MS. AMICO: And is that typically spelled out before a study starts?

DR. BOVE: No. I don't think so. Anyone else? By the way, other people can -- if they don't like my answer or want to add to it, or whatever, speak up, by the way, if you can; we'll take the mic around, but not in my experience; I'll put it that way.

MS. AMICO: Okay. And so I guess my last question would be where do we stand on the status of funding for the study?

DR. BREYSSE: So we submitted a request to the Air Force to our annual plan of work funding, and maybe Colonel Costantino can comment on that.

COLONEL COSTANTINO: Sure. So, Colonel Joe Costantino from the Office of Deputy Assistant Secretary of the Air Force. So we did receive a request for the study, and our team. You know, we're kind of -- this is kind of new to us as well, because at most of our bases, when the community has health questions, we ask them to come in and answer the questions, like they're doing here, but we typically don't go this far because we know what the public health actions are. So the contaminants that we have

concerns about, the effects are known.

So we're kind of working our way through this process as well, and when the request came in for the study our legal team looked at it and said we don't have authority to enter into this type of funding arrangement because we don't have authority in this area, so we can't fund the study that's being discussed here.

MS. AMICO: All right, well, I'd like to comment on that.

COLONEL COSTANTINO: Sure.

DR. BREYSSE: This one microphone's going to be fun.

MS. AMICO: So if I understand you correctly, the Air Force is saying that they cannot fund a study for the Pease community.

COLONEL COSTANTINO: Correct.

MS. AMICO: Okay. I think that's terribly disappointing, and I think that the fact that we have gone through this whole process, you know, with the ATSDR for a year -- our contamination was discovered three years ago, and I think, to stand up and say that you wouldn't fund a study, why did the Air Force direct us to ATSDR and direct us to go through this process, to have us put all of this time and energy and hope

into a health study to give our families some answers, and then for you to stand up and say that the Air Force won't fund the study is terribly disappointing, and frankly unacceptable. So I -- is there any more detail that you can give us as to why you would not fund a study?

COLONEL COSTANTINO: So we did a couple years ago, if we back up a little bit, go back to the blood testing, a couple years ago. The community and the State asked us to pay for the blood testing or do the blood testing, and it's really the same question. We don't have the authority to go into a community and do that kind of work, and without authority there's no funding.

So what we told you two years ago was we're not the community health experts for environmental contamination. We have a federal partner who is. And so what's playing out here happens at every installation, right? And you were asking us the health questions, and we said, look, we're, we're the Department of Defense; that's not our area. But we have an agency that can answer all your questions for you. So we absolutely seeked [sic] out their involvement here to address your questions. So where this was going to go, we had no idea, quite honestly.

So when the request came in -- it's not an Air Force request; it's a Department of Defense request. And so the legal team for our Deputy Assistant Secretary of Defense for Environmental said we -- there are certain things we can pay for; Feasibility Assessment is one of those. We can pay for public health assessments, public health consultations, which are being done here. There's one on-base and one off-base.

So there's a line that's drawn on what we can do, and paying for a study to do a community health research is just something we can't do, and that was a legal review by our Secretary of Defense team, and it's been briefed to members of Congress and their staff since we kind of got to that point in the process. Again, this is new to us as well. We didn't know two years ago we would say we can only go this far. We didn't know that.

MS. AMICO: I'll let other people comment.

MS. DAVIS: Hi. I'm Alayna Davis. I have a question for you. So you might not want to sit down. So my question is, if you're saying that you are not going to fund a study, then why did you give feedback to ATSDR on the Feasibility Assessment?

COLONEL COSTANTINO: That's a great question.

MS. DAVIS: Because you shouldn't have given feedback in the first place, and if you're not going to fund a study, then you shouldn't have any input at all.

COLONEL COSTANTINO: Okay. So you highlight exactly the point I'm trying to make, which is we -- because we could pay for the Feasibility Assessment, we did. But because we paid for it we have obligation for spending taxpayer dollars that we have to review it and provide oversight and management of that Feasibility Assessment.

To do this study correctly, like all of you are talking about, it should be a national study and it should be sites other than Department of Defense because there's many other exposures out there. You don't want the Department of Defense in the middle of that process, right? That's exactly what we're saying is, we should not be in the middle of the community and ATSDR, and saying -- having any input to what a health study should or shouldn't be. That's not our role here. That's exactly the point.

MS. DAVIS: Then why did you give feedback on the Feasibility Assessment?

COLONEL COSTANTINO: We paid for the Feasibility Assessment, like Dr. Breysse said. So we have to -- we have an obligation, everything we pay for, right? We

have an agreement with them. So when we transfer money, we have an obligation to review what is being done. That's a taxpayer responsibility, right? That's my responsibility of spending government funds. So that's an agreement and a relationship that we have with them. Is that, I guess --

MS. AMICO: No.

MS. DAVIS: No. It doesn't really make sense. Can you guys give us anything?

DR. BREYSSE: So give you a little background first, and the challenges that I face is, ATSDR, I think, is a gem of an agency that has never quite reached its true potential due to limitations in resources. So for example, the money we have this year is about half of the real spending dollars in what we had in 1999. So because our funding has been flat, relatively flat, over many, many years, with inflation and stuff our resources are half of what they used to be.

And now in the world we live in there are new challenges come up all the time. The old challenges never go away, the new challenges come up, so we're trying to do more and more and more every year. So two years ago or three years ago this was a -- just a blip on the horizon. Today, you know, we're over our heads

in PFOA/PFOS issues across the country, just as an example.

So we're struggling with how to meet our mandate, and our mandate -- Colonel Costantino is right, our mandate is to address exposures and make sure the appropriate public health actions are taken and then to address community health concerns. So that second part of our mandate is what we're struggling with tonight.

And so I'm not here to tell you we know how we're going to fund this. Our first thought was we turn to the Department of Defense. We're exploring every opportunity we can. Everybody I talk to about this -- it's a national issue. I raise it, the need for resources for ATSDR to address this. I talk about it endlessly. You know, the picture I try to build is what we want to do is exactly like you said: We want to establish multiple sites that we look at, and we'd build a cohort large enough for the cross-sectional sites, but there's still some local relevance to the sites that we look at independently as well.

And in a national study we're also, just to be clear, we are talking about, you know, longitudinal efforts, we're talking about cross-sectional efforts, we're talking about retrospective efforts looking at cancer, so we are exploring all sorts of designs to

address all these endpoints 'cause they're not going to take one study. And so we know all that has to be done.

So I can't tell you tonight that we know how to fund this, but we are not giving up and we're not walking away, and we're exploring every opportunity we can, and we will work with you if you have any ideas or suggestions as well. But we are limited in terms of the resources I have on hand right now, that we couldn't afford to do this -- to do the adult study and the children's study with a smaller sample size. It's going to be somewhere between, you know, ten and $15 million to do the cross-sectional studies. And I'm not good at numbers but ATSDR's annual budget is what? $74 million. So I'd have to make, you know, 12 million of our $74 million just to do this, and sacrifice everything else that we're struggling to do as well. So we just -- I don't see how we can do it on our existing funding. While we have the authority, we don't have the resources. So that's the challenge we have right now, but I'm not giving up. And we're pledged to work with you and explore every avenue we possibly can to get resources to get this study actually in the field.

MS. SHAHEEN: Thank you so much. I'm Stefany

Shaheen. I'm a member of the CAP.

DR. BREYSSE: I didn't see you come in.

MS. SHAHEEN: Sorry to sneak in. A few questions. One, the ten to 15 million number you quoted is for a national study or specific to Portsmouth?

DR. BREYSSE: Portsmouth. Just a cross-sectional -- two cross-sectional components, children and adult.

MS. SHAHEEN: That's what I thought. And I just -- I'm curious with -- from the Air Force, if there is precedent in the Air Force covering other health studies that were specific to a particular community, like Camp Lejeune.

COLONEL COSTANTINO: So again, for the Air Force, no precedent. This is a first. This is a first for us. So we -- and that's why I said, as we work through this process as well and make progress, every step along the way our team received direction from Department Of Defense when there's questions, and this was the question that came up, is what could we fund, and that legal team said we could not continue on with this.

MS. SHAHEEN: But I am correct in that there is prior precedent of other branches of the Armed Services paying for a study that's been administered by ATSDR,

looking at the overall health effects of other contaminants on a population of people, right? Is that correct?

DR. BREYSSE: Yes.

MS. SHAHEEN: Okay. So it's perplexing and I think worthy of further advocacy on behalf of this group and on behalf of our Congressional delegation and our governor to better understand the legal determination for why now, all of a sudden, in this particular community, at this particular moment in time, it's not appropriate for the Air Force to reimburse for a health effects study that is trying to assess the long-term health implications of contamination that was caused by the Air Force.

So that's -- I pledge to do that. I hope we as a CAP agency will do that. I'm not willing to take -- I mean, I appreciate the Colonel's report back. I understand that you're the messenger here, but I don't think we collectively can afford to take that as final word on this matter, because there is precedent of other branches of the Armed Services paying for this -- studies of this nature.

I don't think it's ATSDR's responsibility to come up with the funds to cover this study. I don't think anybody around this table would suggest that's the

case. Certainly just the size of the budget versus the cost of the study would suggest it's impossible.

I think our collective concern, when we started this process -- and many of us have been here from the very beginning, and we understand this is unprecedented and we're in uncharted territory, all of us, relative to this particular set of contaminants. We were hoping to get answers for the community. And we, I think, as a community understand that these answers may be a long way away. We recognize, and I think we need to continue to do work on the important role that ongoing monitoring, whether families who have been exposed are part of the health study or not, can play and what should families be looking for if their kids have been exposed or they themselves have been exposed. So that's work we can be doing in parallel. But we collectively committed to the community that these studies were going to happen. This is an issue of emerging concern. These are contaminants people really don't even begin to understand the full scope of long-term health effects, and something positive has to come out of this. And I think we all want to work to ensure that that happens. And I challenge all of us, in light of the fact that there is precedent with other branches of the Armed Services paying for similar studies in

other communities, to assume we're going to find a way to make that happen and we're going to advocate for it to be so.

SENATOR FULLER CLARK: Senator Martha Fuller Clark. From the comments that you made you said you don't have the authority to move forward. What needs to change to give you that authority?

COLONEL COSTANTINO: So if the basic question is what federal agency has the authority to do this type of community health research, there are no changes needed because they are the agency who does this work. So we -- we've been asked that question already, and there's no change that we are requesting for Department of Defense. We weren't seeking any changes to authorities.

MS. SHAHEEN: That's not the question.

COLONEL COSTANTINO: There's no authority --

MS. SHAHEEN: What would you need to have --

COLONEL COSTANTINO: Someone would have to change the law, is my understanding, 'cause our legal team is saying we don't have the authority, as they read the EPA's law, CERCLA and DoD policy, they said no. So --

MS. SHAHEEN: So how is the law different today from where it was when the Camp Lejeune study was --

COLONEL COSTANTINO: Right, I understand your

question. The same office controls the answers to all the services.

MS. SHAHEEN: Right.

COLONEL COSTANTINO: Right. So it's a good --

MS. SHAHEEN: But that's the question. Right. So until that can be answered I don't think we can take it face value that the Air Force can't fund the study.

COLONEL COSTANTINO: Right.

MS. SHAHEEN: 'Cause the department --

COLONEL COSTANTINO: So I want to be clear, the department -- this is a Department of Defense answer.

MS. SHAHEEN: Right.

COLONEL COSTANTINO: So.

MS. SHAHEEN: Thank you.

MS. DALTON: Hi, this is Michelle Dalton. I just wanted to comment and ask you a question on your prior comment about having the national study and not wanting the Department of Defense in that national study.

COLONEL COSTANTINO: So we're okay with being included in that study. So we -- we're not saying we don't want to be a part of that study, 'cause certainly we have sites. There are many non-DoD sites. My comment is the position is, if there is a national health study, it should include other than DoD sites because there are other sites out there. There were 64

community water systems based on EPA's UCMR drinking water testing that were above the lifetime health advisory, right? We only had a couple of those, I think one Air Force and maybe a couple more DoD. So what we're saying is, to answer the question fully for everyone to benefit, if you focus solely on DoD you're missing a big portion of exposed population and potentially other health effects. That's all I was saying.

MS. DALTON: Okay.

COLONEL COSTANTINO: We certainly have data to share and information.

MS. DALTON: Oh, I'm not finished. Thank you. And so I just wanted to bring it back to Pease specifically, and the Air Force has claimed responsibility for the contamination on Pease, so why would the Air Force or the DoD then say that they can't claim it? If they took responsibility for the contamination why can't they fund the studies?

COLONEL COSTANTINO: So what's very clear is our environmental responsibility, which is the information, the briefings that you get at the Restoration Advisory Board, right, and the focus there, and we talked about this a couple years ago, was to make sure those exposures were mitigated and any appropriate clean-up

actions were taken. So that's very clear. That's very clear to us; we have that role, responsibility, and we have very dedicated funding to exactly do those things, and it can be used for nothing else. That's called our DERA funds.

But what we don't have -- and it tells us to what extent we can involve and engage ATSDR, but it's only up to a point, and that's what our reading was back from our team, was you can go up to this point but when it gets into the community and taking blood and looking at health records, that we could not fund that piece of it.

MR. DIPENTIMA: I'm Rich DiPentima. I guess I'm a little confused which is easy to do. You said the Air Force legal team -- the DoD legal team said you are not authorized to conduct studies. Is that the basic --

COLONEL COSTANTINO: Community.

MR. DIPENTIMA: In community.

COLONEL COSTANTINO: The community.

MR. DIPENTIMA: So conducting the studies is the word I want to focus on. It's ATSDR who would actually be conducting the studies and doing all the work in terms of getting the review board approvals, doing all the work to get reviews of records and medical -- dah-dah-dah-dah-dah. The only piece the DoD would be

involved in is writing a check to ATSDR to do all the work. So I don't really understand the legal issues here. The Air Force is not conducting any studies at all. You're contracting, like you contract with many people to do many things that you don't have authority to do yourselves. You're contracting with another federal agency and just writing them a check to do the work that you're not particularly legally authorized to do. So I don't understand the legal distinction here.

COLONEL COSTANTINO: I probably can't do a much better job than what I've communicated already, except with authority comes funding. That's what we're talking about here. So the federal agency that does the work has the authority and therefore can request the money to do those things, right? We fly planes; we can ask Congress for money to do that. Congress has very specifically endowed them to do these community health studies, and with authorities comes funding. It goes hand-in-hand. That's the way we're -- that was the assessment that came out, is without authority there is no funding. And so I'm probably repeating myself here. I can't give you much more depth than probably what I'm saying, so.

MR. DIPENTIMA: I just want to -- I mean, obviously you have authority -- when you go to Congress

and you ask the Congress for money to buy airplanes, you have the authority to fly those airplanes. You're flying the airplanes. ATSDR is not flying the airplane. Some other agency's not flying the airplanes. You guys are flying the airplanes. So you have, I mean, multiple sources of funding within DoD, some of it are, you know, discretionary funding that's not earmarked to certain projects.

And I'm just curious why the DoD is saying they can't fund something in a community because they don't have the authority, but they don't need the authority to do the work that's being done by another agency. They just need to provide the support that's necessary for the other agency to do what they have the legal authority to do.

COLONEL COSTANTINO: Yeah, I don't -- it's the same question and same answer. I guess I can't -- I can't go more beyond what I've said already, I think. Again, this has been presented back to House Armed Services Committee, several members of Cong -- we've covered this ground, and they've asked us the same question, and I don't know where it's gone from there, but we've addressed this quite a bit at the Hill, and we gave an entire briefing of our entire approach to dealing with PFOS, PFOA emerging contaminants, and the

funds that you're talking about are environmental restoration funds. Those are the funds we do have in this area, and that's what I was explaining earlier, is under CERCLA -- under DoD instructions and policies they draw the boundaries and the lines on what can or can't be done, and beyond that...

DR. CARIGNAN: Courtney Carignan. So I have a couple points and a couple questions. So I guess the first point I want to make, which I think I might make at every meeting, is that there's a community in Sweden, in Ronneby, Sweden that identified their contamination at approximately the same time as the Pease community discovered their contamination, AFFF. And Sweden -- the Swedish community has gotten a health study underway, actually within a year of discovering a contamination, a children's study, and they are well, you know, underway with that. And so in terms of regulation I think it's worth taking a look at what is it about the Swedish regulatory program and policies that allowed that to happen so quickly and how might we reconsider ours, so something to think about.

Another point I want to make is AFFF is a unique exposure, a unique exposure to a unique mixture of PFASs, so I guess one question might be, what are other responsible parties that have released AFFF, and, you

know, is one solution to combine the Air Force and these other PRPs in our request for funding? I'm not aware -- I know that you said commercial airports. I don't know that contamination has been discovered at commercial airports, where that finer training would be done.

And I guess a question for you, in terms of your authority, is, you know, you're not allowed to, so you say, fund a health study. Does medical monitoring also fall into that lack of authority?

COLONEL COSTANTINO: Yes.

DR. CARIGNAN: Okay.

COLONEL COSTANTINO: Yeah, 'cause that was a question a few years ago with the blood testing, so essentially it's the same question.

DR. CARIGNAN: Well, I think in medical -- in terms of medical monitoring, I mean more of what was recommended after the C8 health study, and they released a medical monitoring plan where they're looking at specific endpoints, so they're health endpoints, not levels in blood.

COLONEL COSTANTINO: Right. That would be the same. And not for research purposes but for --

DR. CARIGNAN: Not for research purposes, right.

DR. BREYSSE: So if I could address one issue that

you raised, anywhere there are large possibility of petroleum-related fires you're going to have AFFF present. Any fire you can't put out with water, essentially, you're going to use the foam.

So I was out in the State of Washington recently, and they're -- the state is looking at all their drinking water sources as part of kind of this emerging contaminant concern, and they found a number of private wells that were impacted at high levels, and they had no industrial source, no airport, nothing, nearby. And they scratched their heads for a bit, and finally someone looked back in the records. There was a tanker crash, and the tanker caught on fire, and they sprayed the foam all over the tanker, and then like good practice, they washed it off the road, and there was an aquifer recharge area right there alongside of the road, and these chemicals are -- persist in the human body but they're also environmentally persistent. And so this was about six years ago that this fire happened, and the contamination was still in the drinking water at that period of time.

So conceivably anywhere there are large petroleum areas where there's a risk for that, AFFF is being used. What I don't know is we haven't been -- nobody has come forward to us and said here is a site that's

contaminated because of, I'll just say, an oil refinery, for example. We have not been highlighted any of those. The sites that we know of are industrial sites, where they use it in industrial settings, military sites.

But it's inconceivable that there aren't other places. And as Colonel Costantino said, we know already there's 65 communities that have, or recently had, PFAS levels above the EPA health advisory level. That's only for people with PFOS recognized. And we don't know a lot about what's driving those sites as well. So one thing that we want to do is we're exploring GIS analysis, looking at potential risk factors of that as well. So we're trying to figure that out.

DR. CARIGNAN: So one thing, Laurel and I helped coauthor a study last year looking at the UCMR-3 drinking water data and PFOS contamination, and one thing that it found was that detection of PFOS in drinking water was correlated -- associated with proximity to Air Force military fire training sites with manufacturing facilities and also waste water treatment plants. But also the UCMR-3 monitoring program, it had a size requirement, and so if you look at where monitoring was done you see that it was

basically not done in small communities where you might have some of these sources that you just noted. And so I'm wondering what agency's jurisdiction is it to look for -- you know, monitor for PFOS in smaller drinking water sources near, you know, sites that might have used AFFF, for example.

DR. BREYSSE: I don't think anybody has that authority, but we are working with states very carefully. We have a PFAS tool kit, for lack of a better word, that we're making available to state environmental health departments. They're saying -- giving advice like that, to very aggressively look at smaller water systems. We know from a couple sites we looked at in a lot of detail, there might be one sentinel larger water system that was contaminated. They look at all the smaller systems around it and the contamination is actually much wider. But you wouldn't know just by looking at that one sentinel system, so you're absolutely right.

So this just speaks to the magnitude of the problem and the challenges in vetting it. So, you know, we're a resource to state and local health departments, and we come in when a state or local health department invites us or when the Air Force -- the DoD invites us or EPA invites us as well. And so

we're reaching out as aggressively as we can to all state environmental health departments to try and get a better picture of what the national scale is.

And, you know, right now we estimate there's tens of millions of Americans that we know of that are drinking water that -- at or above -- or reasonably or above this level, and the reality is it's probably an order of magnitude higher than that, just based on all the things you just said.

DR. BOVE: Let me throw something out, though. In the Feasibility Assessment, in the appendix, we do have the UCMR data. But what we did -- or what was done was to look at the combination of PFHxS and PFOS together. So if you look at the list of water companies that are in the top ten, you'll see that -- well, top seven, that one, two, three, four, five, out of the seven were due to military base contamination, so it is true that, if you look at the UCMR data without, you know, distinguishing the different PFOSs and so on, you might say that there's all these sites all over the country; however, if we're looking at AFFF contamination, and we're looking at the places where it's the highest, they're military sites, almost all of them.

Now, keep in mind at the same time that, when I talked about the three Philadelphia sites, and they're

in the top seven, it's not the entire population that may be exposed. It may be pockets that are getting high exposures and other parts that aren't, and that's true particularly for the third one on the list, Security Water System in Colorado Springs, where the -- there is water being brought in which is not contaminated, and then there's the wells that are. So that all these water systems -- some of them are -- and again, Pease is a very simple water system compared to these, so you have to keep that in mind.

And you have to keep that in mind with the UCMR data in general because they're not taking samples necessarily in the distribution system, at the tap, but at the -- at a particular supply well, and if the supply well's a low-production well and it's being swamped by other wells, then you don't really know what's at the tap very easily, okay? So keeping that in mind, though, as I said, if you look at the UCMR data with the idea of where the AFFF contamination is, and you look at the PFOS and PFHxS together, you see that the military sites are in the top seven, so just keep that in mind.

DR. CARIGNAN: So I guess what I was wondering about is like fracking. Is it used to -- if there's spills at fracking sites or pipelines, those types of

places? I mean, they're so rural that they just wouldn't be monitored, and, you know, might not have been identified yet.

DR. BOVE: That's a good question. I don't know.

MS. SHAHEEN: So in the spirit of Courtney's line of questioning, in terms of the timing and what it's going to take to move us forward to get the health study funded and underway, I have a couple of other questions for the Colonel. One is, can you point to -- you know, you mentioned the fact that you had ruled out -- that Air Force had ruled out its response to PFOS and PFOA and how it was addressing this. Can you speak to whether any other communities are at the point we are, in terms of getting beyond a Feasibility Assessment and being ready now to move forward, and have they approached the Air Force because of an Air Force-related contamination, to do a study of this nature?

COLONEL COSTANTINO: Trying to think of the numbers. We have five or six bases where it's off-base, I believe. We have different categories at different bases, but anyway, for those, they fit the model that I described earlier, where we have contamination off-base, and they're similar in that we've had town hall meetings in all these places, and

we followed the same process where we engage ATSDR. That's one of the agreements we have with them, is when we have sites and there's contamination off-base, we ask for their support and expertise to address the community health concerns, so very similar process. And some of those are more than a year ago. None of them have stood up a CAP or asked for it, so none of them are this far along. So the answer is no, there are none others. But we have several others that are similar.

MS. SHAHEEN: And just a follow-up. You had mentioned that -- when Courtney asked about the health monitoring, that that was why the Air Force hadn't funded some of the earlier blood draws, but as far as I recall, and other people can correct me, you may know better, but we never requested the Air Force to do that screening because the state stepped up and did it. So I just -- what I'm trying to figure out is I'm assuming you're delivering us a message you've heard from the legal team, and that our challenge, collectively as a CAP, is to go back and advocate among our members of the Congressional delegation and other folks at Department of Defense that there actually is precedent and there is a role for the Department of Defense to play in funding this study, and so I want to make sure

I -- you know, I -- it's not as if there is a precedent for the Air Force to say, in this case, in this community, no, we're not going to fund that lab work because it's health monitoring, 'cause we didn't ask, as far as I know --

COLONEL COSTANTINO: We were asked.

MS. SHAHEEN: By whom?

COLONEL COSTANTINO: So I came in -- that's when I showed up in the job. That was ongoing discussion. So we did have -- we did have some Congressional inquiries to pay for the blood monitoring, and we -- when our answer came back similar to the one that I'm sharing with you this evening, the follow-on is, what you can't pay for it can you help execute? Do you have people who can come draw blood? So we were specifically asked if our medical team could come up here and support that as well, and the answer was the same, with -- along the lines of authorities.

MS. AMICO: I guess I just want to be clear about something that I didn't give the Air Force authority to contaminate the water and contaminate my children, and for you to stand here today and say that there's no funding for this process, I just -- I'm blown away, that that's an acceptable answer. There's other people in this room that are affected by this, that are

concerned about their health, people that have health effects that are worried that it's a cause of -- from drinking the water here, so it just -- it's mind-boggling to me that -- you know, I understand that the Air Force didn't intentionally contaminate the wells here, but they did. They used AFFF. They contaminated the water. Thousands of people have been impacted here and across the nation, and the Air Force absolutely needs to take responsibility for this.

And I echo what Stefany said: We're not taking no for an answer. Like it's not going to stop here. We're not just going to pack up and go home tonight. All of these people came out on a weeknight, they left their families at home, to discuss this process that has been ongoing for over a year.

And I feel like exactly what Alayna said, if you folks had no intention of funding studies -- it's been very clear for a long time this is what we were working towards, are these studies. So if there was never any plan to fund it, you should've made that clear a lot sooner in the process.

So we have jumped a lot of hurdles. We have overcome a lot of obstacles in our community, and I guess the way I feel about it is we're just getting started. It doesn't end tonight, and I'm up for the

challenge of continuing to advocate, because our community will absolutely get health studies and monitoring and get the answers we need, and I will not stop fighting for that. And I want you to take that message back to your legal team and back to the Pentagon, and I want them to understand that, that we're not going away. [applause]

SENATOR FULLER CLARK: So again, to follow up on this discussion, and I think it's clear that people are very concerned and disturbed, my question to you is, how do we get you that legal authority? What language needs to be changed through the Congressional delegation? What explicitly can you recommend to us in terms of creating a pathway to make it possible for the Air Force, who, I believe, you know, has accepted the responsibility but are -- you've encountered legal barriers, and we need to find a way to remove those legal barriers. So can you provide us with any guidance and suggestions?

COLONEL COSTANTINO: I think I can. I hope I can. Our position has been -- and we've shared it with Dr. Breysse and his team, as we went over to the Hill we went jointly with Dr. Breysse. Our recommendation is for any provision or funding to go directly to ATSDR, and not have DoD in the middle of that process. So

when I said earlier we weren't seeking different authorities or different solutions, our -- we've worked with ATSDR and gone across and said we will go together to Congress with them and state this is a problem that does need to be funded, and we drafted up some language to support that. So our recommendation is for efforts to go wherever -- whoever has the authority to approve this funding, for it to go directly to them. That's what we're saying.

SENATOR FULLER CLARK: So can you provide us with that language that you've drafted so that we also --

COLONEL COSTANTINO: Right.

SENATOR FULLER CLARK: -- can find a way to be supportive or to help push this?

COLONEL COSTANTINO: So I will -- let me check. My answer's yes, but let me make sure that I can do that. I don't see why not. Let me check. That's a due-out I have for you, is, if we can provide you the draft language that we put together to support them -- and our senior leaders said they would go with ATSDR hand-in-hand and say we support this as well, because the authority lies over here, and not with us. It lies with them, is really what we were saying.

DR. BREYSSE: I will echo that. So the commitment -- the DoD supports the need for a study and

recognizes the challenges in trying to get resources. So it's never been an absence of the recognition. It's just the lack of authority on their part and the challenges in the budgeting process that creates a barrier, perhaps.

MS. SHAHEEN: So I just want to pick up on where Senator Martha Fuller Clark left off and where Andrea left off, because time is of the essence here. We have been at the table now for 18 months at least, and again, I respect you very much for being here, Colonel. I'm grateful to you for your service. I'm grateful for your time. I know that you're delivering a message that is not of your creation, but the Department of Defense has a $600 billion budget, and ATSDR has a $74 million budget. To go back to the legislature to be advocating for funding, a new funding stream, that's going to somehow magically be directed to ATSDR, to do a study on a population of people that were contaminated -- no, that are dealing with a contamination that they had no connection to, that then sets a precedent for all these other communities where there may or may not have been contamination caused by the Air Force, we're talking years before we ever would see any federal funding coming directly to ATSDR, realistically. I, I mean, just knowing how the process

works, that's the reality.

There is precedent in the Department of Defense for funding long-term health studies. They did it at Camp Lejeune. And our challenge, and I don't put this on the Colonel to solve this challenge; it's our collective challenge, to figure out how they were able to go about doing that. How did that funding come to ATSDR for purposes of that study? 'Cause it's very parallel.

And so again, I appreciate what message the Colonel's delivering. I know what he's telling us is what he needs to convey. We can't hear it, frankly, 'cause we don't have the latitude or the luxury to hear it, because, as Andrea said better than I can and very articulately, there are families who are waiting for answers. I know they may not get them in this study but they can at least feel like that something good can come from this, and we can learn something from it for future communities, for future generations and for themselves. So I appreciate the message. I hear what you're saying. I don't accept the answer because there's a precedent with Camp Lejeune and Department of Defense funding long-term health studies. We have to figure out how that precedent -- you know, what, what language they were able to hold onto that justified the

funding of that study, and make sure that they can use that same language to justify the funding of this study. $600 billion budget compared to a $74 million budget. The reality is it's going to be a long time coming.

Those kids who were exposed in childcare are going to be graduating from college before we see Congress getting funding directed to ATSDR for this purpose by itself. Now, again, I wish that were not the case. I wish ATSDR's budget were ten times the size it is, but the reality is the idea that we're going to get Congress to move as fast as we need them to move, I think, is not the right direction for us as an agency -- or community advisory group to go down. We got to figure out what precedent is in place for Lejeune and figure out how we can get that applied here.

MS. DAVIS: Okay. My questions were related to the mention of TCE and how that certain members that were exposed are going to be eliminated from the possibility of being able to participate in the study because of it, because of the cofounding [sic] factors. Are those specific to cancer or is that all at endpoints?

DR. BOVE: I think that what we were trying to say

is that if -- that Pease and Warminster in particular had TCE contamination, we'd have to take that into account, whether we would limit the study to those people who arrived at the base after the TCE contamination was over -- in the case of Pease it would be somewhere around '84 or '85, I think it is -- or whether we -- what we would do about the TCE exposure. 'Cause that complicates not only cancer -- we were focused on cancers and causes of death for the civilian workers and the service people at the base. So for those endpoints TCE is a problem.

For the adult study we're talking about, where we're looking at effect biomarkers like cholesterol and uric acid and so on, that's a different story, and we weren't -- we were only limiting the adults to a certain time period, so most -- and the time period only starts at, what, 2007 or 2008, so that would be after, of course, the base was closed. So the adult study, where we're talking about effect biomarkers, this isn't an issue at all. It's the study where we're proposing where we look at mortality and cancer incidence, similar that we're doing at Camp Lejeune. And then we'd have to take into account that there were TCE exposures. So for those endpoints, mortality and cause of death and cancers, yeah.

MS. DAVIS: So the endpoints that are feasible, you're saying, it doesn't impact. It's just the possibility of including other sites to maybe analyze other endpoints that we can't analyze here because of the number and the population?

DR. BOVE: No. What I was saying is -- we were talking about an adult cross-sectional study, and the time period that we were talking about is it starts in 2007. So if you were at the -- at Pease any time between 2007 or 2008, it was, and the time the Haven well was shut down, you would be eligible for that study. TCE isn't an issue there because the TCE was over a long time ago.

It's only the studies we're talking about where we're going to look at service people and civilian workers at the bases in the past, okay, so -- it's an issue. And we were going to just look at mortality and cancer incidence for that study. And we would include several bases to do that, okay. So we'd have to take into account TCE, whether we limited the study to people who weren't exposed to TCE or somehow tried to factor that in, which would be complicated, it would be a problem to have that exposure as well. Is that --

DR. BREYSSE: Well, it's not an issue for what we proposed here, but if we begin to explore the national

study, we're going to have to -- where we acknowledge the national study's going to have different designs for different endpoints. We'll have to make sure that we understand the confounding or the bias that might produce by the TCE and figure out if we could account for that adequately, so there are some bases where TCE exposure is quite high, and there is PFAS at those bases as well. So if we look at putting a cohort together with the type of questions you want to ask, the type of design, we'll have to consider that.

DR. BOVE: And for example, there's a site called Wurtsmith in Michigan where the TCE contamination was astronomical. It was Lejeune levels. And they also have PFAS, but the PFAS levels are -- I mean, the big elephant in the room is the TCE. And so there it would be difficult to look at PFAS when you have a thousand parts per billion of trichlorethylene in your drinking water. I mean, that -- you know. So that's what I'm talking about. You don't have that kind of situation at Pease or at Warminster. You have -- it's more comparable. The TCE isn't enormous like that. But even so I would want be able to -- we would want to be able to factor that in somehow.

Now, it's not impossible. If you look at the Faroe studies. You know, there's PCEs, there's

mercury, there's all kinds of things going on there. So there are methods you can do to try to tease out the PFAS contribution to whatever you're looking at, so it's not impossible. It's just that if you wanted to design a study, you would probably like to do it, if you can, just focusing on PFAS, and not having these other exposures involved. It's not impossible, in other words.

MS. DAVIS: So I have one more question, then I'll go back to that. So in terms of -- I know right now we're just considering the cross-sectional as being the feasible path, and our goal is to eventually turn that into longitudinal. So at what point do we -- so do we do the cross-sectional, and if there's positive correlations between some of the endpoints and the cross-sectional, then we decide to carry those over to a longitudinal? Like how do you decide which one -- what to include in a longitudinal?

DR. BOVE: You could do it that way. I'm not so sure that would be the best thing to do. There may be -- you may not see something in a cross-sectional study as you might see longitudinally, so I would also look at the literature, where any longitudinal work is done, for example. Or any endpoint that you saw in another study that we didn't see here, that you might

want to double-check and make sure that it doesn't show up in the future. So I wouldn't just limit it to those where I've seen a correlation.

But in all these studies you do have to start somewhere, so a cross-sectional study is one way to start. You know, you can identify a cohort that way and follow them in the future, as Dr. Breysse was mentioning. So it doesn't rule out longitudinal at all. The only -- in fact, as I said, the C8 study had a longitudinal component to it; they just ran out of money, for some reason, and so couldn't do more longitudinal work than they did.

MS. DAVIS: So that was the reason why I was asking, 'cause we've had concerns that some of the health endpoints wouldn't show up 'til later on.

DR. BOVE: Right.

MS. DAVIS: And so, you know, at the end of this cross-sectional there might not be a correlation, but five, six, seven years from now there will.

DR. BOVE: Right, for example, cancers.

MS. DAVIS: Yeah. And so is the process then that all of the endpoints that we're studying in the cross-sectional would carry over to the longitudinal, should the longitudinal be taken up later on? And then that way we're not missing anything or eliminating

anything from possibly having a delayed response?

DR. BOVE: I think that we'd have to look -- you know, if we saw an excess and we wanted to follow it and see if that continued, that would be a reason to continue. The other -- as I said, the other approach as well is to look at the literature and see what's there and what we did or did not see in the cross-sectional study, and make a decision that way. So it would be sort of an iterative process, if you will. You know, you look at the literature, you'd see what you saw at Pease and decide which ones you'd want to follow.

And then you'd also keep in mind that certain endpoints you wouldn't expect to see in the cross-sectional studies, but you'd only see it if you follow these people over time, right? So again, it depends on the endpoint you're interested in for one thing, whether you'd want to follow it over time or whether the cross-sectional would actually answer your question. So any other epidemiologists in the room want to hype in and --

DR. CLAPP: This is Dick. A lot of the blood tests or liver function or kidney function tests are best done in a cross-sectional study, in my opinion. They will diminish over time.

DR. BOVE: Yeah. So it really depends on the endpoint.

MS. DAVIS: Alayna Davis. And then is -- one small follow-up to that. Is there anything that would eliminate an endpoint from being carried over to a longitudinal study? So like, you know, say there wasn't anything that we could foresee right now as a relationship after the cross-sectional does -- I mean, what's -- is there a procedure in place that says, then you don't take it further or is there certain criteria it has to meet to be taken further into a longitudinal?

DR. BOVE: Again, I would be a little nervous of ruling something out, especially if I saw in the literature that there was, you know, other studies have found it. So if you didn't see it in the cross-sectional study, if I didn't -- if we didn't expect that endpoint to be seen longitudinally, if we didn't see it cross-sectionally, and if we didn't see it in the literature, then I would move to rule it out. In other words, I would want to -- I would be careful about ruling something out without exploring, you know, the different -- you know, what was seen in other studies and what I would expect to see. So I can't -- you know, I would be cautious, in other words. Is that helpful?

MS. DAVIS: Yeah. I just didn't know if there was like a protocol already in place that says, no, you can't do that. You can't move on with that endpoint because you didn't say -- you know. So I -- it's good to know that you'd keep it open for interpretation.

DR. BOVE: Also 'cause the research is still, in my opinion anyway, at an early stage with PFAS. So to rule out something, even with the literature we have now, is a little iffy, and I would want to see more literature. Of course you have to do studies to improve the -- build the literature, of course. But you know, I wouldn't rule anything out at this point.

MS. DAVIS: And then the last question is, is you know, the -- including the other sites for the endpoints that aren't feasible right now is part of the Feasibility Assessment. So what is the next step in terms of getting that going and, you know, what is -- what's the procedure? And we would like to be updated on every step of that process, because, just because we can't do it here at Pease, we'd like to either be a part of the national study or know how it's progressing.

DR. BREYSSE: So we're in the process, again, absent funding, but thinking that if we do get resources we want to be as ready to go as possible, of

conceptually designing what a national study would look like.

And like I said before, there are different designs for different endpoints. What would those designs be? Or maybe scope out sample size issues associated with that. And so we're, at least conceptually, trying to build a model for a framework for what a national study would look like. And then we -- should the resources become available that would get us that much further down the road in order to get it started.

So conceptually we imagine identifying a number of sites that would be included in this pool, the cohort. And there would be site-specific analyses that we'd do, and then there would be a pool of analyses to be done. There'd be a retrospective component to it. There'd probably be a longitudinal component to it. There would probably be a cross-sectional component to it. And so that's -- we've asked our epidemiologists to come up with this framework, and Frank is on that panel. And they're moving along quite efficiently I'm told. We should have drafts of something to at least start considering in the relatively near future.

MS. DAVIS: Okay. So can we keep that on our agenda, to get regular updates on the progress of that?

Thank you.

MS. DALTON: Hi, this is Michelle Dalton. I have a few questions that actually they tie in with what Alayna was saying, and I hope I'm not beating a dead horse, but the cross-sectional versus the longitudinal study, the study that you have proposed here, is that just a cross-sectional or is it a cross-sectional longitudinal?

DR. BOVE: It's a cross-sectional at this point.

MS. DALTON: Okay. Can we build it to have longitudinal components?

DR. BOVE: Sure. Sure. Again, though, we'd have to do the cross-sectional study first.

MS. DALTON: First, okay. So that's the first step.

DR. BOVE: Right. The -- what isn't cross-sectional is actually the thing we mentioned, about the military personnel and the civilian workers. That's a retrospective cohort study, actually, so that's not a cross-sectional study, and again, looking at mortality and the cancer incidence.

But the two studies we're talking about here, the adult and the children's study, are cross-sectional. You can always add a longitudinal component, but again, it's going to require funding, and then what endpoints

are you going to look at longitudinally. I mean, you know, again, there's no hard and fast rule here which ones you'd want to follow. There are, as Dr. Clapp mentioned, there are certain endpoints you'd expect to see in a cross-sectional evaluation, that would be harder, actually, to follow over time, or you'd see it diminish because the exposures -- the effect of the exposures are starting to diminish the effect. So we'd keep all that in mind, and we'd have that discussion with you.

MS. DALTON: Right. Okay, great. In terms of the national study, what -- I know you say drafts in the near future, and probably hesitant to give out any sort of a time frame, but we know how slow that this process has worked, with just one site, being Pease. So in terms of a national study, I mean, are we talking years and years from now?

DR. BREYSSE: So the document produced is just a framework, right, so it's not going to be a full-blown Feasibility Assessment, like we have here. And so that'll be produced in the order of months.

MS. DALTON: Okay.

DR. BREYSSE: And of course, but anything we make public -- so remember I've been at this job now for two and a half years. And I'm still learning a lot. And

everything we make public has to be kind of reviewed and vetted through the CDC. And so once we've decided that we're going to share it with you, we'll get it properly vetted, and hopefully -- we're learning more and more about how to make sure that system works more efficiently than it has, in this case in particular, and hopefully it won't take that much longer.

MS. DALTON: Okay. And then it will be probably years from then until a study can actually start, going through the correct protocols.

DR. BREYSSE: Well, so the first step would be identifying the resources to do the study, the resources to design the study. All right, 'cause just designing the study will be a big effort.

MS. DALTON: Okay.

DR. BREYSSE: All right, and that will involve identifying, you know, the sites that will be involved, and interact with them, like we are with you, trying to understand the exposure, trying to understand what's in the water, how long it's been in the water, how it's distributed across the water, and looking at the demographics of the area, the range of exposures. There will be a lot of data collection as a big part of that process as well. And then that will all feed into this big cohort design of some type somewhere down the

road.

So it will be an iterative process. It will involve some site-specific assessment work, some biomonitoring work. You know, we don't have biomonitoring at many sites. To help understand what the actual exposures are, looking at the water system, understanding it like we've invested in Pease. So we'd have to do a lot of that across these sites as well. So that'll all take time.

MS. DALTON: And I guess the reason why I keep asking about this is because a lot of those endpoints that are going to be studied in the national study are what we consider the big-ticket items, you know, the cancers and the big, you know, health impacts, that I know that I personally am concerned about as well as a lot of the community members, so that's why I just want to keep talking about it, making sure that we understand what's actually happening.

Last question was in regard to the studies. In the children's study it says the ages go up to 16, and then the adult study they need to be 18. What happens to those people who are 17, in the middle?

DR. BOVE: Again, we can expand the ages in either direction. Trying to just be similar to other studies; although other studies have used a wide range of

different ages for the children. In NHANES studies they start at 12 because they don't have PFAS measurements for those under 12, so they're limited right there. But studies done, in Taiwan, for example, sometimes just looked at 12- to 15-year-olds. Sometimes it depends on the endpoint as well.

So, you know, I was trying to figure out what age range would match at least some of the studies. And so originally I was thinking five to 15. So I actually increased the range a little bit because I saw that it was feasible to do that. We could expand it to 17. I don't know how many more people we would pick up doing that.

MS. DALTON: I'm just thinking in terms of the Pease population and how we're a rather small group, expanding it to 17. If it doesn't, you know, water down the study or --

DR. BOVE: No.

MS. DALTON: -- with the data, would we want to.

DR. BOVE: No.

DR. BREYSSE: That's the kind of comment we like. We'd be happy to consider that.

MS. DALTON: Okay, great.

DR. BOVE: 'Cause that would fit in with some of the NHANES work, for example, if we expand to 17. Most

of the adult studies are 18 and over, so that's more in line with that. There are some that start at 20, but really that's --

MS. DALTON: Okay. Thank you.

DR. BREYSSE: And that age defines adult.

MS. DALTON: Thank you.

DR. CARIGNAN: Courtney Carignan. So I guess I want to go back to the medical monitoring question because I have a history. I worked on a site -- sort of part of the reason I went back to get my doctorate was I was working on a site where there was trichloroethylene contamination, and I was working on that site for three years, and during that time there was no medical monitoring. We were just abandoning wells, trying to reduce exposure, and I kept asking, you know, the PRP, why isn't there medical monitoring? Why aren't we telling these people that, you know, this exposure has been associated with liver and kidney cancer, so that they can, you know, be talking to their physician and keeping an eye out, and when I left -- shortly after I left that site one of the women who lived there was diagnosed with liver cancer, and she had to have three-quarters of her liver removed. And I couldn't help feeling like, if that had been in place, that, you know, maybe her life would've been extended.

And so every day, every week, every month that ticks by I feel like we are missing an opportunity to help families be proactive about their health and the health of their children. And so, you know, here we are, talking about how we're going to get a study funded, talking about how many years we're looking at before we have a study underway, before we have any data, and I think it's worth taking a little bit of time to think about, you know, what are things that we can do now, what are sort of the things that we can put in place with the resources that we have now, and with -- that is within your jurisdiction or it is within the ability of the CAP or Testing for Pease that we can be taking a proactive approach, and helping communities be proactive and get their questions answered.

So one thing that comes to mind is, you know, we have these blood samples that have been collected on almost 300 children. Do you know, have those blood samples been saved? Are they archived in any way? And I ask because one of the most sensitive endpoints is the vaccine response. And so if you look at some of the studies from Philippe Grandjean's group, they show very strong dose response between PFOA, PFOS and PFHxS, and decreased immune response to vaccinations to

diphtheria and tetanus, and if you look at the PFHxS levels at Pease, in the children, and you compare them to the levels in those graphs, you see that the levels of PFHxS in Pease are, you know, off the graph.

And so in the Grandjean studies, none of those levels actually reached clinically significant levels. So they didn't go low enough so that you wouldn't expect the children not to be protected against the vaccinations, but one of the things I wonder is if these high exposures to PFHxS might result in some of the Pease children not having enough immune response to be protected against these vaccinations, and so to me that's sort of a pressing question, right, especially in this age of, you know, anti-vax movements and we have a greater risk of children, you know, being exposed to these diseases that, you know, we like didn't get this eradicated, and actually if you look at those studies, if you have a before-and-after vaccine titer, then you actually need a very small sample size, much smaller than you would expect in anything like 60 children, maybe.

And that's not that expensive. And we already have prevaccination data on 300 children, so we could potentially roll out a study very quickly to look at vaccine titer post-vaccination. You want to look about

a month after vaccination to do the study, and what it does is, having the pre- post-, it reduces all the noise that you get in the data, and so you could -- I think that might be something that could be done in a shorter period of time if you could, you know, roll a pilot in a short amount of time, if you had funding to do that.

I guess another point I wanted to sort of bring up is the CAP has -- many times Andrea and Lindsey, I think at every meeting, talk about what can we do now to be proactive against our health -- proactive about our health and the health of our children, and I wondered, you know, again, and thinking about what we can do now, could we potentially form a group with physicians, and engage them, and talk about the physician fact sheet and talk about how to talk to their patients about this, and sort of engage them more, because what I hear from physicians is that, you know, they don't really have time to read a lot or they don't have time to do that search, do that, but I'm wondering if their patients are approaching them and asking them these questions, and asking them to be involved in some type of group, if they might be interested to be involved, and I'm sure that there are physicians in these communities across the country who

are interested to be engaged, and is there an opportunity for them to do that if they come to ATSDR or elsewhere?

And then I guess the fourth point, kind of going back to the PFOS reduction strategy, so if you go online and you see what people are asking, a lot of people are wondering about how can I reduce the levels of PFOS in our bodies, but there isn't actually a good sort of review out there, 'cause you know if you search the internet you can find all kinds of things, and I think it would be helpful to people to have sort of some really solid information about what studies have been done, what did they find, you know, what are some hypotheses that are out there that could potentially be investigated in terms of thinking about interventions for reducing levels in your body and also, again, for protecting your health. So.

DR. BREYSSE: I'll take the vaccine question. So Ben is here, but I don't know if they -- if we are -- if any of the blood samples are --

DR. CHAN: I don't think so.

DR. BREYSSE: Dr. Chan?

DR. CHAN: My name is Ben Chan. I'm with the Division of Public Health, Department of Health and Human Services. I don't know 100 percent whether we

still have the blood samples stored or not. The blood samples, when they were collected, there was a consent obtained to hold the blood samples through the course of biomonitoring, but the plan was not to hold them long-term.

The purpose of the blood draws and the blood testing was not meant to be a research study, and so to store blood samples long-term for the purposes of research would have involved a different consent process, if you will. I just emailed or texted somebody to ask that question 'cause I'm not 100 percent sure whether or not we still have the blood samples from the 2015 testing. We may, we may not; I'm not sure.

DR. BREYSSE: But if you do and they weren't collected with that use in mind, you'd have to go back to those people and re-consent them for --

DR. CHAN: Yes, that is correct.

DR. BREYSSE: -- additional purpose.

DR. CHAN: That's correct. Because the purpose is now different from what the original consent was for.

MS. SHAHEEN: Stefany Shaheen again with a couple follow-up questions about national study versus local study, and as we think about continuing to advocate for the funding to do the studies, it would be helpful for

us, I think, to build consensus about is the request local or is it to be part of a broader national study, or both. Can you speak to the -- obviously there's huge cost differences. Is there an opportunity to do a local study on the magnitude of, you know, ten to 15 million, you quoted, and have that data be incorporated into a broader national study?

DR. BREYSSE: Yes, I believe so. And in fact it might be valuable to do, just as a pilot, to see what works, and get some data that would help us refine the sample sizes for other calculations. Well, so it could be lots of practical reasons why to start in a single community and begin to collect the data and look at the challenges, the burden, the recruitment efforts and all the practical stuff that goes with, you know, to do something on a larger scale.

MS. SHAHEEN: That's just what I was hoping you were going to say. And can I ask as a follow-up, would you -- and I mean I know we're not there yet, but can we design the local study or is there anything you would recommend we do now such that having Pease be the pilot community would better position us, and the learning that can come from that in order to suit it well for part of a national study?

DR. BREYSSE: So the next step would be, if we had

the resources, would be to -- and Frank alluded to this, this is not quite a study protocol but it's got components of it, so to begin to transition this into a full protocol with a data analytical plan and all sorts of other details. And so that would be the next step --

MS. SHAHEEN: Okay.

DR. BREYSSE: -- to making this kind of --

MS. SHAHEEN: Okay.

DR. BREYSSE: -- happen.

MS. SHAHEEN: And then in terms of the ongoing health monitoring, 'cause, again, I think our collective challenge as a community is, one, to make good on the promise we've made, which is that we're going to do everything we can to get to the root of what the risks and long-term exposures are as a result of the contamination, and obviously health monitoring is a more immediate and universal way in which we can try to touch anybody who's been exposed, and that population is going to be different inevitably from those who choose to be part of a longer-term health study. Can you speak at all to ATSDR's role in helping a community like ours with ongoing health monitoring in terms of establishing standards, setting guidelines, giving recommendations for families?

DR. BREYSSE: So let's just be clear, to distinguish between the health monitoring that you do as part of your normal clinical care versus the monitoring that we do as part of a health study.

MS. SHAHEEN: Correct, yep.

DR. BREYSSE: So we're talking about now the normal kind of --

MS. SHAHEEN: Normal clinical care.

DR. BREYSSE: Yeah, so we have developed guidelines that we're putting in this tool kit I referred to before --

MS. SHAHEEN: Right.

DR. BREYSSE: -- that reference quite heavily the medical monitoring suggestions in the C8 study. They seem to be, I think, the most developed guidelines out there, and we cite those guidelines there, and we have some physician education materials that -- and Tarah, we'd be happy to work with for your local medical community, to help discuss those issues with them, if there is an opportunity to do outreach, as Courtney suggested, so we can certainly begin to do that. That would be the best place to start, I think, in terms of the most vetted medical monitoring guidelines that I think are out there in the community right now.

MS. SHAHEEN: And can those be adapted for

individuals so they can be armed going into their clinician so they understand what to be asking for, what to be looking for, or are the materials really geared toward the medical community?

CAPTAIN SOMERS: The materials -- well, there's a couple things. There is some fact-sheet-like materials, which are pretty short reads, that were geared towards physicians, but I think most community members would find them pretty accessible to read. And then there's online like training -- not training. You know, that's more geared toward medical professionals. It goes more into some of the study findings, and that's a little -- I mean, community members can certainly watch it, but that's more geared towards the professionals, but we can go to -- I think some of you have already --

MS. SHAHEEN: Yeah, some of --

CAPTAIN SOMERS: They're on our website. They're readily available. We can make sure all the CAP members get it again.

MS. SHAHEEN: So I think, collectively, as a CAP, we should be thinking through beyond those materials, you know, how do we (a) get those materials into the right hands; and (b) beyond those materials, what else might be most useful. So beyond that training is there

any other role ATSDR has played historically in other communities related to health monitoring or is that sort of education and outreach in that --

DR. BREYSSE: Education and outreach.

MS. SHAHEEN: Okay.

DR. BREYSSE: In fact, just mention, so we support the pediatric environmental specialty units, which is also meant to be a medical resource for pediatricians in particular.

MS. SHAHEEN: Okay. One last final question on the national study. As you're looking at criteria for other communities that might be involved, and you alluded to the fact that a majority of them are military base, potentially --

DR. BOVE: For AFFF.

MS. SHAHEEN: Right, AFFF. Is there any other -- you know, again, 'cause this might help us in terms of coalition building for funding, any other criteria or things that you're thinking about relative to which communities might best be suited to be part of a national study?

DR. BREYSSE: So that's all stuff -- you know, as Frank has alluded to, there's no always just very clear right answer when you design an epi study, about what to include, what not to include. There are different

approaches, different questions you might ask.

So if you start with the notion that we want to understand firefighting foam, because it's a unique mixture and it's got a lot of components that are different from you might see in a community that's exposed from a manufacturing contaminated place. In that situation you might want to say, we're going to stick to places where firefighting foam is used, and we want to eliminate ones where it's not used because we want to look at this mixture. All these things are mixtures, first off.

But if we want to -- if we decide we want to look at, more broadly, at what the profile of risk is for PFAS as a family of chemicals, not AFFF as a subset of that, then you would expand it more broadly. So those are all things that have to be discussed, and, and -- but the strengths and weaknesses of doing a broader study versus a more narrow study debated, the resources to expand it would need to be discussed, the feasibility to do it needs to be discussed. That's all part of what we engage in as we pursue a national study. Is that fair?

MS. CARMICHAEL: All right, my name's Lindsey Carmichael, and I'm wondering if you can speak to what you see as the next steps for your agency with respect

to our community, in particular how you see the physician guidance or education document. I wasn't under the impression that that was finalized. It is finalized? Okay. I didn't realize that.

DR. BREYSSE: Very, very recently.

MS. CARMICHAEL: Okay. Yeah, so just next steps, what do you see, moving forward, for your work with the Pease community?

DR. BREYSSE: We'd be happy to engage in any outreach activity that we could partner with you to do. And so we can sit down and talk about what that is, whether it's direct physician outreach, whether it's more community outreach or if it's a combination of both. We'd be happy to participate in that as much as possible, and we have a regional office in Boston that's just committed to providing that support.

CAPTAIN SOMERS: And I believe -- but I believe when the state started their blood serum sampling there was some outreach to physicians, so we would probably, you know, go back and look at that, and use those networks again, because they're networks that are established, and Kim McNamara, she's not here tonight, she might have additional networks for, specifically like this Portsmouth area. We would reach out to them too. So we can certainly do that again.

MR. DIPENTIMA: Can I add to that?

CAPTAIN SOMERS: Yeah.

DR. BREYSSE: We're not done. We'll go back.

MR. DIPENTIMA: Rich DiPentima. I want to add to that because the CAP -- before the CAP was set up we did a lot of work working with the medical health community, in Portsmouth and beyond. There were webinars set up that were done by Dr. Wolfe down at Children's Hospital. We had worked with Dr. Chan. A lot of information went out to local healthcare providers. A lot of this groundwork has already been done in terms of what kinds of health effects physicians might want to be looking for in their patients that have been exposed to the PFOS and PFOA. So this is not new. This has been out there. It may need to be reinforced with the community, but this was done two and a half years ago, and that information is still viable, it's still accurate. Unfortunately the problem we still face is that we lack the studies to validate whether the work that is being suggested possibly to be looking for, for health effects, is valid or not. So without the health studies that we need to do and without the funding to do those health studies, we're stuck in neutral, and that's where the quagmire is at this point.

DR. BREYSSE: But the whole world's in that position, right, because this is an emerging contaminant. There's enough information to worry about it, and the data aren't there to say exactly what you need to do, unfortunately.

But the other thing I'll mention, that maybe Tarah, you can touch on this as well, we're completing a public health assessment for the community as well, and that report will be coming out.

CAPTAIN SOMERS: Yeah, so ATSDR, several years ago, when this first started with the Pease community, like we do with many other sites, we are writing two health consultations. One is for the public drinking water system and one is for the private wells that were around the Pease community. So those are two documents that will be created by ATSDR. They're in review now. They're -- we have a draft. They're in review. I can't give you an exact timeline of when we'll have them, unfortunately.

Again, because these are contaminants that are new for us and other agencies to deal with, we wanted to be sure that the methodology we're using we can apply consistently across the country as more of these sites come up and more documents are written, and that we're using the best available science that's out there right

now for us.

And again, like you've heard this evening, PFOA and PFOS, there's more information on that. There's more numbers to compare to, if you will, so if we have numbers in the drinking water system, there are some reference doses we can compare to, to decide if this is potentially a health effect or not a health effect for the community. For some of the other contaminants in the AFFF foams, there's not a lot of information out there yet to compare to, so it has taken longer than we had initially hoped it would take, but, you know, we want to make sure the best document we can get out there is out there. So those two documents are still coming.

DR. BREYSSE: And then we have to be careful that we're consistent across the country, because we have different regional offices producing similar documents, and we don't want to be saying things even subtly different from -- to one community than we are saying to all communities. So that creates an added, I think, challenge to us to make sure that that's as right as we can make it.

MS. CARMICHAEL: Lindsey Carmichael is my name. So can you speak a little bit to the process going forward with regard to completing the Feasibility

Assessment?

DR. BREYSSE: So we will get comments back from the community. We'll address those comments. We'll have another round of discussion with you. Obviously there may be some comments that we can't address, and we want to make sure we discuss that, and we round that out as best as possible. And then at that point we'll address them, and we'll reach some consensus about what we were able to change and not change. And we'll call it a final Feasibility Assessment at that point. And what was the time frame you asked?

COMMANDER MUTTER: June 30th.

DR. BREYSSE: June 30th.

MS. CARMICHAEL: Thank you.

DR. BREYSSE: Now, if you can get comments to us quicker, you know, we'll address them, but we wanted to make sure we gave you a reasonable period of time.

MR. HARBESON: Rob Harbeson. I just want to follow up on a comment that Stefany made with regard to this potentially being a first step as part of the national study. I know we're looking at a cross-sectional study, and so we're only looking at certain endpoints because of the numbers of people we have available to test, but obviously the value of a national study is looking at larger numbers of people

and getting results across the board. So would we be desirous of expanding the data that we collect as part of this study so that it can be relevant as part of a later national study or are those two necessarily discrete and separate things?

DR. BOVE: No. And I mean, we broke it up at the endpoints into three criteria: Feasible, not feasible, possible feasible. I mean, we would -- if we thought that we could get funding to do several sites, okay, like the Philadelphia sites, for example, or maybe Colorado Springs sites or so on, then those endpoints that we had as possible now become feasible, and we would collect the data for that anyway. So we can collect the data for almost all of the endpoints we mentioned here. The question is whether you're going to be able to say something credible about it, believable.

MR. HARBESON: So it's what's relevant to this study versus what could be participated in the larger study later. I just don't want us to lose an opportunity to collect the data.

DR. BOVE: Right. Now, it's more of, if we just did Pease, what endpoints could we do something with and make a case for, credibly, and what endpoints -- the uncertainty would be so large that it would be

useless, pretty much, to look at that. But if -- you could still collect that information, even if -- you know, but what we're talking about in the national studies, we're actually looking at a couple different approaches. One is based on the Pease Feasibility Assessment, that approach, looking at biomarkers of effect, like we're talking about here. Another approach is to use a questionnaire and ascertain outcomes that way, with medical record review, for example. So that would be a different approach. And using biomonitoring data for that. Other approaches -- a lot of it has to do with how also we're going to define exposure. We're going to have biomonitoring data for that or are we going to be able to predict what the serum levels are based on what's in the drinking water, which is possible for -- at least for PFOA and PFO, okay. So we're looking at all these different possibilities. But the Pease approach here is definitely one that we're thinking about expanding to larger sites. I mean, that's definitely on the table.

MR. HARBESON: Well, and I think to that end I think I'd -- I would personally like to see us collect as much data as we can towards as myriad endpoints as we can, because I think we're all interested in the

information that could come out of a national study, really for our parents and for our community.

DR. BOVE: Right, and again, this isn't a protocol, though it looks a lot like one. I want to point that out. But it's not a protocol. And so in a protocol we would actually define what endpoints we're going to look at and how we're going to collect it in a lot more detail.

DR. BREYSSE: And there's a subtle difference here. We didn't write this up as a pilot study for a national study. We might have concluded things differently had that been the case. So if we start going down that road, we will, as we said, we'll reconsider, kind of, some stuff that might provide some interesting input that might provide good pilot data. But the feasibility criteria we put here was really just in terms of what can we do here, and in terms of public significance here, we can't collect data that we don't think has any public health significance 'cause we just don't think we have the sample size that we need.

DR. BOVE: And all these endpoints that we have in here have been looked at, either at the C8 study or in using NHANES data, with larger populations. So they're feasible if you can get more sites involved.

COMMANDER MUTTER: Would you like to break or continue on?

DR. BREYSSE: I'll defer to you all. Should we keep going or is there a need for a facility break?

MS. AMICO: I'd like to keep going, I mean, just the time and I want the community to have an opportunity for input too.

DR. SCHAIDER: Thanks. Hi, Laurel Schaider. I wanted to follow up on the discussion of mixtures. We know that AFFF is a complex mixture of many different compounds so when we're doing blood tests now we're measuring PFOS and PFOA and the ones that stick around in our body for a long time, but over the years people have been exposed to a complex mixture of them, and so to some degree we might be looking at the health effects of PFOS or PFHxS, and to some degree it might be this kind of cumulative mixture, and we're not identifying all those compounds. So I guess I was wondering if you could comment on that challenge and how to tease apart and attribute any effects to one compound versus another, and whether that raises challenges for combining across sites, if you think the composition of foam is kind of similar enough, or if there might be differences in the foam used at different sites.

DR. BOVE: Well, if you just look at AFFF foam, and what we're seeing in the both biomonitoring and within the drinking water, it would be difficult to tease out PFOA, I think, PFOS and PFHxS, for example, 'cause they're sort of correlated to a great extent in the AFFF, so it would be difficult. So what you want to do there, if you really wanted to tease this out, you would design a study to include other types of mixtures. So you might want to include a site where the PFOA was big and another site where PFOS was key and PFHxS wasn't there, and so on, so you would be -- may be able to tease things out if you did it that way.

So -- you know, if -- it's similar in many ways to how we looked at disinfection byproducts in the past. You know, we don't know to this day what most -- half of the disinfection byproducts in the drinking water, what they are, you know. There are so many of them. And when we study it we look first at trihalomethanes because that was measured, you know, and we said that these cancers were related to the trihalomethanes but it could've been in one of the other contaminants in the water we didn't even measure or didn't even know existed, other than theoretical.

So, you know, it's kind of -- it reminds me of that situation, the PFAS situation, where you get

different kinds of mixtures of these chemicals in the water. You only measure a small number of them. You only have information on a small number of them. And so that's all you can -- you know, it's sort of looking under the light post for the key thing, but that's -- you're stuck with that because that's where the science is, so -- and I don't know if that answers your question.

It really depends on what you want to do and accomplish in a study. If the goal is to see if AFFF is associated with particular diseases, and the mixtures are kind of similar, then that's -- you design the study that way. If you wanted to tease out individual effects of PFOA, PFOS and PFHxS, first you need a lot of people to do that, for one thing, but also you'd have to, I would think, vary the -- have different populations exposed to variable amounts of that mixture.

DR. BREYSSE: But that kind of research would lend itself to animal research very, very handily as well --

DR. BOVE: Yeah.

DR. BREYSSE: -- so we are working closely with the National Toxicology Program at NIEHS and other toxicology groups who are investigating the effects of these chemicals in animals, and whether there might be

some clues as to what that might help us look at as well.

But we are, you know, able to measure in our current biomonitoring suite, nine or ten different PFAS chemicals, so we will look for the family of chemicals as well. And we are also developing urine methods, 'cause some of the shorter chain chemicals are excreted much more rapidly, and so you need a urinary method there. So we're looking at urinary measures as well.

And the industry is changing their formulations all the time, so it is a bit of a moving target, as they try to move to chemicals that are less biologically persistent, less environmentally persistent. That doesn't mean they don't have any toxicity, but, you know, I think it's still a good move to make, and so the industry is reformulating all the time, and so that presents a challenge as well.

DR. SCHAIDER: Okay. I just have a couple more questions. One was how you go about reporting results back to participants about their blood PFAS levels and the other health endpoints that you're looking at.

DR. BREYSSE: So we don't do that directly 'cause right now the biomonitoring that's done, you know, it's done at the state level, but we have model letters that we've developed that could be a resource for states,

that could help us communicate with people the results, feedback as part of the tool kit that we've developed to provide to state health departments.

DR. SCHAIDER: And do you do any like testing of the report back in the community, to see how people respond or to provide any suggestions for how those results were reported back?

DR. BREYSSE: We don't have any, but if you want to help us with that, that'd be great.

DR. SCHAIDER: Yeah. Well, I'd be -- we'd be happy to do it at Silent Spring Institute. We do a lot of that, so --

DR. BREYSSE: Yeah.

DR. SCHAIDER: -- definitely. And then one last question. I know we kind of moved on from the funding question, but I guess I'm still trying to figure out a little bit the difference between the situation here and the situation at Camp Lejeune and how much of that was TCE being a regulated drinking water contaminant and whether that explains some of the difference or just kind of what the difference is in terms of responsibility for health study.

DR. BREYSSE: So I'm going to have to defer to some of our colleagues who have a longer history at Camp Lejeune. Camp Lejeune predates me by a decade or

two, so I'm not quite sure, you know, how we got to the point where the DoD stepped up to fund the studies.

DR. CLAPP: Senator Burr.

DR. BOVE: Yeah, I was going to say that the CAP was very effective in getting their elected representatives to put -- and to encourage the DoD to fund it, so that's --

DR. SCHAIDER: That's our challenge.

DR. BOVE: Yeah, that -- I don't think that, for example, that the present study we're involved with, the cancer incidence study, would've gotten funding without that kind of effort by the CAP. And also I don't think the water modeling, that was key to all the studies, would've been completed without that kind of effort. And also the CAP, by the way, not only helped on that end, but provided important information that we wouldn't have gotten otherwise, so there's -- all these studies that we were able to do at Camp Lejeune, and continue to do, a lot of the key information that went into those studies were provided by the retired Marines and civilian workers themselves to us. So that they -- the CAP and others who were working with the CAP played a key role on all this.

DR. SCHAIDER: Okay, thank you.

MS. AMICO: Andrea Amico. I guess one final

question I have is that we've heard tonight that there's no commitment for funding, but I want a commitment from ATSDR that this process is going to continue to move along, so we hope that there will be funding, and we're going to fight for it, so I would hope that we're going to continue with the study design and moving forward. We're not going to put this process on hold because we don't have a funding source. So do we have your commitment that --

DR. BOVE: That's not on hold.

MS. AMICO: Okay. Thank you.

MS. DAVIS: My name's Alayna Davis. I'm going to go back to Lindsey's question about follow-up from tonight and what the next steps are. So you said that you want comments from the community and from us, so can you give us an idea of specifically what you need for feedback from the community? And when I say that I mean are you looking for them to say I want this health endpoint versus this one, as an example, and then who do they contact? If there's an email or some method, how do they get that information to you?

DR. BREYSSE: Well, I think we're specifically, you know, expecting comments back from the CAP as representatives of the community. So when we talk about that, we're really speaking to you.

DR. BOVE: However, there's no reason why you can't bring this up with your neighbors, whoever, who are interested and getting feedback that way and getting that to us. That would be important as well. As I said, the CAP at Lejeune provided a lot of information, but some information they sought out from other retired Marines, and people actually -- people who ran the water system at the base too. There was efforts there too. So that, you know, so it's up to you, what, what information you can gather from your community that might be important in this regard, so that's -- it's up to you.

MS. DAVIS: Okay, so the CAP is going to disseminate the information to you on the feedback from the community.

DR. BOVE: Yeah.

MS. DAVIS: There isn't going to be a specific email or anyone that the community outside of us would have available to them?

DR. BOVE: Well, we would rely on the CAP to do that, actually, 'cause I think that --

MS. DAVIS: Okay.

DR. BOVE: -- you would be better placed to do that anyway than we would.

DR. BREYSSE: And then you could relay it back to

us.

DR. BOVE: Yes.

MS. DAVIS: Okay. Just wanted to get it clear so that we know it going forward, so that if someone asks us how do we get the information, that's how we do it.

DR. BREYSSE: Yeah. Unless you prefer some other mechanism, but I think that's probably the most efficient way to make sure we capture it.

MS. DAVIS: Okay.

DR. BOVE: And actually the Feasibility Assessment's already changed to some degree based on input from the CAP already, so, you know, we're responding to it. I mean, we really do appreciate the feedback, and we need it.

MS. DAVIS: Okay. Thank you.

MS. DALTON: Hi. Michelle Dalton. I have one last question, 'cause I do want to give the audience the opportunity to comment, 'cause I know that it's starting to get late. My question was regarding the blood samples that DHHS had collected back in 2015. Aside from the consent issues, are those samples helpful for you and this study or for any other study that we're considering? And the reason I ask is because we have already gone through taking blood from children and adults, and we have been pretty vocal in

the entire process that we wanted to make sure that DHHS has kept those samples, and they did not discard them. So I want to make sure that, number one, that they're not discarded, since we have been vocal about that from the beginning; and two, are they helpful to you?

DR. BOVE: I can't answer the first one. I think that they probably will be discarded because I think that's what the whole consent process was about. But that doesn't mean we can't use that information, okay. And actually in the Feasibility Assessment we talk about how that could be used. For those who have already given blood, we can use their new blood testing to compare that, and help with our estimate of what historically their serum levels were. Okay, but we would -- in order to do these studies we'd have to collect new blood because you can't look at these biomarkers. Even if they consented to do something additional with their blood there wasn't enough collected, at least from the children, to actually look at a lot of these biomarkers. So we'd have to collect blood to get that.

MS. DALTON: And then the consent is actually using that data. That's what we would need to go back and get that consent for.

DR. BOVE: Well, we -- yeah, I guess we would probably put that in there, but I mean, the person could also just tell us what their blood level was.

MS. DALTON: Okay.

DR. BOVE: I guess we'd have to consent for that. That's not clear to me.

DR. BREYSSE: I think if we want to go back and look at it, in terms of some biomarkers of vaccine effectiveness in a blood sample that was collected in 2015, we'd definitely need to ask their permission to reanalyze --

MS. DALTON: Yep, absolutely.

DR. BOVE: But I'm just saying the only information we have from that 2015 sample is what the PFAS level is.

MS. DALTON: Okay.

DR. BOVE: And I'm assuming that, that you can't get any other information out of that. And for that we can just ask the person what their level was. I don't think you'd have to --

MS. DALTON: I just want to make sure that all of the efforts that we have gone through back in 2015 are not going to just be discarded and wasted, since we did go through all of those efforts. And if we can re-use some of that information, great, but...

DR. BOVE: Well, I'm saying that one way we can use it is to help us in the modeling of historical serum levels.

MS. DALTON: Okay.

DR. BOVE: We can use that information plus the sample we get -- new, new blood sample, to help us with that, so that's -- so it wouldn't be wasted, just for that reason, but I don't think we're going to be able to go -- I don't think these samples are stored so we can't look at it for other endpoints.

DR. BREYSSE: If I can just raise a point of order, we probably have five more minutes before we should probably open it up to the audience, since, you know, that -- the agenda is. And Dr. Chan, you were going to --

DR. CHAN: Yeah, I just have a quick comment to that. So I'm checking to see if the blood samples have been discarded or not. But the consent was that we would -- the consent said that we would hold the blood samples through the duration of biomonitoring, and whether the 2015 biomonitoring and the 2016 biomonitoring is a continuation, I'm not -- I'm not sure what happened with the blood samples.

I will say that we also did share de-identified numbers, blood testing numbers, with the ATSDR, as a

public health partner, to help inform their discussions and their investigation, so we do have a mechanism, and in fact we did share, for internal use only, some of the blood testing results with ATSDR.

MS. DALTON: Okay. Thank you.

DR. BOVE: Right, and that was used in the Feasibility Assessment.

CAPTAIN SOMERS: There's also just like a clinical point -- this is Tarah with ATSDR, Tarah Somers -- you know, when blood's collected it's not always collected the same way. You know, you've gone and got blood draws at the doctor, and sometimes they store it in the pink tube or sometimes the blue-capped tube. So the samples that were drawn, like if you wanted to go back and use those to look at something like cholesterol levels, the HDLs, LDLs, triglycerides, you might not be able to use that blood anyway because it wasn't collected as like a fasting blood sample, to check for cholesterol. So, you know, that's an important thing to remember, just 'cause you have a blood sample, it's not a blood sample, a blood sample -- you know, you can't use it for everything you might want to look at, so just keep that in mind.

MR. DIPENTIMA: Rich DiPentima. I just wanted to -- yeah, I was going to say the same thing. But

again, going back to the CAP, this discussion came up way back when with the CAP, about the blood samples that were collected, and we did suggest at that time that the blood samples be retained in case they might be of some use during any future studies. I don't know what happened but we did bring this up two and a half years ago, so this is not, again, a new item of discussion.

DR. BOVE: Wait, wait wait. For the Feasibility Assessment we assumed that they would be discarded so we didn't take that into account.

MR. STONE: Tim Stone. Frank, you sort of raised a point before, when you talked about disinfectants in water and some of the other studies, and one of the things that has concerned me about a lot of the discussions we have, we have this laser focus on PFOA, PFOS, but there were also other exposures that take place, there's the background exposures, which we've seen in the national average numbers, and things like that. How do you deal with that in these studies, when some of these other exposures may be at least as much of a risk or more than what we're looking at right now, when you -- because of this -- obviously it's out there. We're all exposed to it. We've all been exposed to it. How do we put this into perspective and

how might we better educate everyone about those exposures and the risk, and reduce -- I think we've had some discussion about what proactive things can be done. It's more than just PFAS that we're talking about here right now.

DR. BOVE: Well, I mean, the sites we're -- I mean, Pease is one and the other sites that we've been thinking about have had quite a bit of contamination in their drinking water so that they would overshadow the background -- the so-called background levels you'd get, that you see in NHANES. And you can see in NHANES too that the levels for PFOA and PFOS are sharply declining over time, so about ten, 15 years ago PFOS levels were very high, higher than at Pease, but as they come down, and you can see if you compare it now, that -- like if you compare 2015 Pease blood levels with data from NHANES, it is roughly similar in the period, you'd see the difference between the two, so the drinking water does play a major role in the serum levels, okay.

So we would -- in designing a national study we would want to focus on those sites where there was considerable drinking water contamination would be there -- you know. I mean, it would be exposure-driven in that way. And we would then pick a population that

was similar, like we're talking about at Pease, but not exposed to that drinking water, so you would -- they would have that background exposure level to compare the two, you know, that way.

The analogy with disinfection byproducts is interesting because I did a study where I saw neural tube defects increased with trihalomethane disinfection byproduct exposure, but I was using trihalomethanes as a surrogate. Another study done in California didn't see anything with neural tube defects. And it really depended on what the mixture was, and -- but a lot of that mixture we couldn't measure. So these are -- it does become complicated. If anything -- if the PFOS situation is anywhere similar to the disinfection byproducts, there's a lot of confusion as to what these contaminants can cause because the different mixtures and material we can't even measure may play a role in finding here of a positive association with, say, a cancer or birth defect or whatever, and not finding it here. So these are issues that -- this is part of the uncertainty we're going to be dealing with until more research is done in this area.

DR. CARIGNAN: Courtney Carignan. And just to elaborate on that, so the -- if you have a variable that's varying in a different way than the variable you

are interested in, than that misclass -- it's going to be a non-differential, so you're not going to -- you're able to look at the contaminant that's of interest. Does that make sense? So you know, there's other things that are concerning unless -- unless that contaminant, that exposure tracks with the PFOS exposure, then it's not going to affect your analysis. But I mean, it's certainly true that there's other contaminants in New Hampshire, like arsenic, that can affect immune function, and the New Hampshire birth cohorts phase is designed to look at that, out of Dartmouth, and I've been trying to get them to, you know, extend their cohort to include kids at Pease because they have a whole, you know, method and sampling protocol that would be really great for looking at a lot of these questions, but the question, then again, comes back to funding. Their funding comes from NIEHS. They would have to write a grant specifically at that, and they don't want to do that for some reason, so anybody who knows how to convince them to write a grant on this, I think that would be great.

DR. BOVE: We are exploring that, actually.

DR. CARIGNAN: Oh, yeah.

DR. BOVE: But we haven't been successful either

yet.

DR. CARIGNAN: Yeah, I haven't been successful with that conversation with them either. But now I'm trying to remember what my question was. Oh, back to the historic blood samples, so yeah, we have asked for that repeatedly, and with the immune titer, you need a very, very small volume, so even if out of the 300 children, only, you know, a third of them had sufficient serum, to be able to test immune titer, having that before DTaP vaccination -- so DTaP vaccination occurs at one year of life, a couple times before that, at one year of life, and again before entering kindergarten. And so if you have a child who really have blood levels when they were three, and you could look at immune titer in that child, and then you had got, you know, blood sample after, then you wouldn't have to do -- number one, you wouldn't have to do two blood draws on them to get that pre- post-, all right, getting blood from children is complicated, and it would also really improve your sensitivity to be able to see an effect, so again, I think we go over this at every meeting, we can store the blood samples and be able to re-analyze them, at least just for immune titer, I think that would be really helpful.

QUESTIONS FROM THE AUDIENCE

DR. BREYSSE: So if anybody from the community would like to ask a question, raise your hand and we'll bring the microphone around.

COMMANDER MUTTER: Well, if we can have them come here so we can pick them up on the...

MR. SOMSSICH: My name is Peter Somssich. I'm a State Representative from Ward 3 in Portsmouth, which includes Pease. And even though this is the first time I've joined this group I've been following what was going on. And first of all, I just want to underscore what was just said. I sincerely hope that none of the samples were destroyed because I'm sure the community made a big effort to get those samples and thought -- and what I have seen so far, a bigger effort than anyone else has made in this whole enterprise. So I hope those samples were not destroyed because -- and I'm a scientist so I very much appreciate the complexity and difficulties you're working with, but I also know that sometimes, by the time you get around to your study you might find, wait, there's something we want to look at, and it just happens we have those samples from 2015, so don't destroy any samples, period, okay? Number one.

Number two, while I appreciate talking about

statistics and scientific studies and all that stuff, very important, but the bottom line is we don't have the money, okay. Without money you do nothing, okay? So I heard the Colonel. With all due respect, I mean, he's saying what the Air Force told him to say. I presume it's the lawyers of the Air Force that told him to say this, that they can't fund the study, but I also heard that they accept responsibility for what happened. Well, then you have to accept liability, okay? With responsibility goes liability, and liability means you have to pay for it, and the immediate -- remediation does not just include the wells here in Pease, it includes the health effects of children. That's mediation too. That should be part of the mediation effort, and you need to fund that because you are liable for it. You have to find your own money. You have to turn over the money to fund the study.

And I'm also surprised why they would look at the study before it’s published, what just because they paid for it. They are the people who are liable. I mean, no other place could I hear somebody who's being studied for a potential pollution have a right to look at a study before everyone else sees it. I don't know what they looked it. I'm sure it's the lawyers looking

at the liability again.

So I think, before we talk about all these important issues, medical studies and whether it's cross or latitudinal or this, I think we need to talk about getting the money as quickly as possible because everything else is just a waste of time. We can talk about all kinds of interesting things but people want action; they don't want talk, okay. So we're moving ahead, but number one now is money, and everything else is secondary. You'll have plenty of time to talk about everything else once there's something happening that there's a funding source identified, and I think the Air Force is the funding source, period. So thank you.

MS. MESSMER: Representative Mindi Messmer from District 24. I have a question about the funding issue and the legal issues that Senator Fuller Clark and Stefany brought up, Shaheen. Colonel, I have a question for you. I heard you say the word community. I looked back at a bunch of studies, public health studies, that have been done by the Air Force. They were all done on veterans and servicemen and their families. And when you said community, is that the legal point that you're trying to make, that because this is a community in a closed BRAC base, that you're saying that that's not something you're liable for?

COLONEL COSTANTINO: It is a distinction in that clearly we have very different authorities with our own members, our own employees, so we have done those, and we can do those 'cause the rules are different. I can't give you the legal sort of definition and explanation of where the line is on that, but there is an aspect of that piece of the -- like I mentioned before, that our authority doesn't -- we can't get involved in drawing blood from community members and looking at medical records and all that other stuff, like I mentioned, so there is an aspect to it that is what you're hitting on, yes.

MS. MESSMER: So my follow-up question to that is, then, the base was closed in 1991. You had active service veterans here, and you were -- veterans population, that the study, a retrospective study, should be done in those people to make sure that their health effects are being looked at as well, from prior to the base closing. That's something the Air Force can pay for. It is part of the veterans' -- exposure to veterans.

COLONEL COSTANTINO: I'm sorry, was there a question? I didn't --

MS. MESSMER: Well, it was kind of a statement.

COLONEL COSTANTINO: Okay. All right, I just

wanted to make sure I didn't miss it. Okay.

MS. CONDON: So my name is Suzanne Condon. I'm the somewhat recently retired Associate Commissioner of Public Health for the State of Massachusetts. In that role I directed the environmental health programs for some 30 years and have conducted quite a large number of environmental health investigations, including those where I dealt pretty routinely with the military.

And I think that you have an opportunity to really think a little bit outside the box on this. I mean, we have been talking about another branch of the military and Camp Lejeune, but I do recall that there was never a precedent for the Air Force to fund a public health center near an Air Force base, and in the 90s, I got the Air Force to fund the environmental public health center on Cape Cod, and it staffed several people to help deal with community environmental health questions, and so I think there's a little bit of precedent there.

I also think that, if we look back at some of what was done in Massachusetts, there was a situation where we found ethylene dibromide in our cranberries that came as a result of the military using that particular contaminant on Cape Cod, and I believe that the military spent significant resources to try to help

determine whether the EDB was on the berries or in the berries. At the end of the day it didn't matter, but there was precedent in providing reimbursement for all of our cranberry growers who lost their crops over a period of years.

I also think that -- again, I think the Air Force paid for the PAVE PAWS radar station health investigation, and that was a community health investigation that involved doing monitoring in and around the community area so that we could make a determination as to whether or not the community's health was at risk.

So I guess all I'm saying is there might be some value for the CAP to think about some other areas where, not just the DoD, but indeed the Air Force, has funded some of these types of activities to address community health questions.

And why am I here? I grew up a stone's throw -- I probably have a closer drive back than some of the people who drove further from New Hampshire. I grew up in a town in Massachusetts about a half an hour away from here, and I've been following this, and following all sorts of things, including some of the recent press that you've been involved with, at which I'm a person who's been involved in cancer cluster investigations

for most of my career, so happy to sort of help and weigh in on any of that as well.

But anyway, from your neighbor, you know, just a little bit further away, if there's some way I can be helpful in bringing some of these issues to your attention and to the military's, I think it would be helpful because you have an opportunity to do something here in New Hampshire that you don't have in other parts of the country. You know, my own personal opinion, you can't -- we know we've got an exposed population here. We know we have what appears to be the numbers. I looked at what Dr. Bove put together as well. You've got some pretty compelling evidence to move forward on, so don't let perfect be the enemy of the good. Thanks. [applause]

MS. AMICO: I have a letter that someone sent me that they would like me to read. So Andrea Amico. I have a Pease community member send me a letter. She wanted her name to be anonymous, but she wanted me to read this on the record on her behalf.

Dear ATSDR members, my oldest daughter started at Discovery Child Enrichment Center in September of 1994 at the age of six weeks. She was a powdered-formula-fed baby and attended daycare two days a week for the first five years and three days a week for her final

year, leaving Discovery in August of 2000. Her blood was tested for PFAS in 2015 and the results came back elevated.

At the age of 12 she was diagnosed with osteoarthritis in her spine, and has had multiple procedures to relieve her pain. At age 16 and 17 she endured multiple surgeries to remove cysts off her ovaries and was diagnosed with endometriosis. At age 18 she was diagnosed with polycystic ovarian syndrome and continues to deal with these ongoing health problems to this day.

My youngest daughter started at Discovery Child Enrichment Center in September of 1997, and attended daycare there two days a week for five years, leaving in August of 2012. She was also six weeks old and a formula-fed baby when she started.

She has struggled with ongoing health issues most of her life, constant joint pain, concentration issues and being tired all the time, led to repeated testing for Lyme disease, lupus and arthritis. At one point we were told she was faking these symptoms just to get attention because all of her tests kept coming back as inconclusive. Hormonal issues surfaced at the age ten, which led to more doctors' appointments and more testing.

With the help of some great doctors my daughter was finally diagnosed and her symptoms validated. Between the age 14 and 17 she was diagnosed with polycystic ovarian syndrome with estrogen levels testing near 400 when they should've been 30; rheumatoid arthritis, which had to be diagnosed with Doppler ultrasound because she didn't have the rheumatoid factor or anti-CCP antibodies in her blood. She did consistently have an elevated ESR, which is a measure for inflammatory process, which is what led her rheumatologist to turn towards imaging to diagnose her joint pain issues. Fibromyalgia, secondary to her rheumatoid arthritis.

Hypothyroidism. This was also a challenge when it came to getting a diagnosis. Ongoing systems and repeated tests showed her TSH levels in the normal range. It wasn't until her endocrinologist tested her free T3 and her free T4 that her T4 was found to be low. Once she was put on thyroid medicine her symptoms improved.

IQ, neurobehavioral testing was done because of difficulties in school. Even though an average to high average range was noted, there was a considerable deficit in her processing speed. She was diagnosed with AD/HD. Low IGF-1, insulin-like growth factor was

found.

The continuing health issues of my younger daughter has resulted in ongoing blood tests, four tubes every three months for the last five years, heavy menstrual cycles and weekly nose bleeds. And it is for these reasons that I believe her PFAS levels came back below the national average when tested in 2015.

It has been stated that blood-letting is one of the only ways to rid your body of these chemicals so it -- so isn't it possible that you have a population of sick people who drank the water, but due to frequent blood loss relating to testing, donation or other, their PFAS levels came back much lower than they should? Would their health conditions not be counted or connected to the Haven well because of this?

My children belong to the youngest and earliest population that drank from the contaminated well, and I think they deserve to be included in this health study. For many years I have watched my children struggle with one chronic health issue after another. When they would ask me why they all of -- why they had all of these health problems, all I could say was I don't know. And while I still don't have the -- all of the important answers to that question, we do owe it to them to try and find out. Sincerely, a concerned

mother.

DR. BREYSSE: Any other questions? Comments?

UNIDENTIFIED SPEAKER: I think that mother did a very nice job on that report. Thank you.

DR. BREYSSE: Yeah. It's hard to follow.

MR. MALLOY: Hi, I'm Dennis Malloy. I'm a State Rep from Greenland and Newington. I'm not a scientist, but a couple of comments went by pretty quickly, I felt. My career was as a fund raiser, grant writer and other things. I heard the term grants and some grant activity, and I wanted to know if there was anything more you could say about that or what that would lead to or what possibilities that were there? I didn't catch everything that was being discussed or if it's really a feasible option for this.

DR. BREYSSE: Well, a university or other independent investigator can write a grant to different federal agencies to get resources to do research, independent of what we would do as part of ATSDR.

DR. CARIGNAN: Courtney Carignan. So there -- Laurel and myself and some others have organized a conference that's taking place in Boston at Northeastern next month, to bring together, you know, people involved with PFOS contamination and responding to, you know, contaminant drinking water, and so at

that conference we're going to talk about -- so we've been thinking about, you know, what are other avenues to do studies to supplement what ATSDR is doing or if, you know, the funding doesn't come through.

The National Institutes of Environmental Health Sciences, NIEHS, they, you know, do environmental health research, and so they have grants that, you know, fund a lot of the studies that have been done on perfluorinated chemicals except the C8 health study which was through litigation, and so there are these children centers that are around the country. I think there's 17 of them. And they -- basically they're birth cohorts so they recruit women during pregnancy, and then they follow the children through childhood and into adolescence and puberty, and so there's one here in New Hampshire, the New Hampshire birth cohort study, and the primary contaminant they're looking at there is arsenic, but, you know, they collect and store blood and urine, and they ask all kinds of questions that are relevant to, you know, the questions that are being asked here. So it seems like some of these birth cohorts could potentially, you know, write grants to pull in communities that have these exposures and have these concerns, so one of the things we're going to discuss at that conference is, you know, trying to

identify birth cohorts, so I might be willing to do that.

MS. SHAHEEN: Stefany Shaheen again. I just want to caution us away from thinking that there's some grant funding source out there that's going to step in, for two reasons: one, I think that means we somehow psychologically take our foot off the gas relative to advocating that the Air Force cover this public health study; and for the second reason being that, if I'm a funding source looking at all these different grant applications, the fact that there's a federal agency with a $600 billion budget that has taken responsibility for the contamination and has made a pretty significant step in terms of remediation, I mean, the fact that the Air Force is willing to step up and restore the aquifer, and has been at the table to try to right the environmental wrongs that have already occurred, to say that this study should get priority over some other study, where there isn't necessarily the same kind of resources and/or commitment to remediation, I think, would be hard to justify.

Also the timing. I mean, the reality is to try to get a funding source to step up and spend ten to 15 million dollars on a long-term health effects study, I mean, I think it's a long time coming. And that's

not to say we don't necessarily need to consider plan B, but I would hate for any one of us at this table to walk away thinking it's time to consider plan B yet.

DR. CARIGNAN: So I think that the grant mechanism that we're discussing is supplementary to the study. It's answering different questions. It's using a different study design. So, you know, this ATSDR study has not, you know, proposed to recruit during pregnancy and follow, and so that design can answer different questions.

MS. SHAHEEN: I totally appreciate that, and I think we should be studying as much as we can get resources to study. I just would hate for us collectively to think that, because these other studies may be happening, that they're supplemental, and therefore we don't have to do this other work, so I know that's not what you're proposing.

DR. CARIGNAN: Yeah, and it won't answer the adult questions and --

MS. SHAHEEN: Right. Right.

DR. BOVE: And it won't answer AFFF because there are -- there are cohorts that are being looked at by NIEHS that have been on the field for many years looking at other things, and none of them have to do with AFFF exposure. They're going to be looking at

basically background, so they would be like NHANES studies, only they're birth cohort studies. And they're important. There's no question about it, just like the NHANES studies are important. They're not AFFF either.

MS. AMICO: But most of those cohorts are really -- were developed in places where there was a specific question. So like in New York City it was around air pollution.

DR. BOVE: Yeah, I'm thinking about the Cincinnati cohort, which is not far from where the C8 situation was, but again, it's background.

NEW CAP MEMBER DISCUSSION

DR. BREYSSE: We're about at the end of the day. We didn't have time to do the new CAP member discussion. We can do that, Jamie, on a call?

MS. AMICO: Actually the member that we're thinking of adding is actually here, so I would like to take just a moment, if that's okay. Do I need the microphone?

Andrea Amico. This is an agenda item that I had asked. I know that there's been a lot of talk about recruiting healthcare professionals that can help us in terms of streamlining information out to healthcare

providers. I also think this person that I want to propose would be great in helping recruit children for our study. So we have in the audience tonight Lili Lantin. She's a pediatric nurse practitioner. She works for Pediatric Associates, which is -- Lili, do you want to stand up, just so they know who you are?

MS. WIERBONICS: It's Wierbonics.

MS. AMICO: Oh, Wierbonics, excuse me. Lili Lantin-Wierbonics. And so she's a pediatric nurse practitioner. She works for Pediatric Associates, which is a large pediatric practice for Portsmouth, and they have an office in Hampton. My children go there. And Lili is professionally interested in this, but she's also personally interested, as her children attended Discovery daycare and have elevated levels of PFCs in their blood.

So I think that Lili would be a great addition to our CAP for a couple reasons. She has a professional interest and a personal interest. I think that she works with kids. She has fielded many questions from many parents about the concerns. I think that she would be able to help us, particularly with children's studies, when we talk about those control groups and how we're going to recruit those folks, you know, when we talk about the immune blood work that we may draw or

different endpoints in children. I just think that she would be a great resource.

And so she has graciously agreed to come tonight and kind of understand how our CAP works and consider joining our CAP, and I just wanted to float that out to the other CAP members, that I certainly would love if she would join as a member of our CAP. I think she'd be a great resource.

DR. BREYSSE: Yeah, so I think then the procedure to follow, Jamie, is to --

COMMANDER MUTTER: Well, I'll send -- if I can get her email, and we'll send her resume around and have the CAP vote that way, via email.

DR. BREYSSE: Any other CAP concerns in the final five minutes, that we haven't talked about already?

UNIDENTIFIED SPEAKER: Would our friend from Massachusetts consider joining our group as well?

MS. CONDON: I'll help in whatever way I can but I don't think I fall in the group; I'm just around the corner.

MS. AMICO: Can you repeat your name again?

MS. CONDON: Sure. It's Suzanne Condon, C-o-n-d-o-n.

MS. AMICO: Thank you.

DR. BREYSSE: And to be clear, Suzanne is also an

off-and-on-again consultant for ATSDR as well, so she helps me with things when we need special assistance.

MS. CONDON: And I work in Massachusetts a lot too.

DR. BREYSSE: And so she's a member of our board of scientific --

MS. CONDON: My neighbor told me I flunked retired. But I care about New Hampshire. (indiscernible).

SENATOR FULLER CLARK: So I too have a question, which is, I guess, before we all leave here tonight, trying to briefly define what those next steps might be in terms of our expectation from various vested entities here and from the CAP itself.

MS. SHAHEEN: So I'll give it a try, Stefany Shaheen again, in part because I feel like I made this plea earlier in the evening. I'm grateful to hear ATSDR has committed to continuing moving forward with the scope and definition of what a study would look like. I think we got a consensus to a certain extent that, if we could get the funding for Pease as a pilot part of the national study, that that would be a great way for us to proceed.

Sounds like we have a lot of research to do relative to understanding how the Camp Lejeune

precedent was established and how we can piggyback on that. I know the handful of folks I'm going to call in the morning, and I hope we can all be trying to do some of that research, especially those who are more familiar with the Camp Lejeune studies than I am. Certainly there are folks in this room who I know are going to help do some of the follow-up from a Congressional delegation standpoint. I think starting there for us in New Hampshire is going to be really important.

And then beyond that, in the very near term, anything we can do to leverage the resources that are available from a health monitoring standpoint, I hope we can collectively commit to and think beyond -- I know we did this initially, when this news first broke, but there's new resources now, new tools, that ATSDR has provided. Might there be other creative, innovative ways we can help disseminate that information to community members and to the medical community here?

So in my mind the list is how do we better understand what the Camp Lejeune precedent is and how do we advance the advocacy work that needs to happen in order to piggyback on that, working with the Air Force. And what can we do collectively to make sure the new

resources that are available from a health monitoring standpoint are in the hands of the right people here. And then continue to support ATSDR's work to further define next steps related to the study. I'm sure there are other things but to me those are the three most pressing priorities.

DR. BREYSSE: All right. So looks like time's up so we'll adjourn the meeting. And thank everybody for your continued partnership.

(Whereupon the meeting was adjourned at 9:00 p.m.)

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STATE OF GEORGIA

COUNTY OF FULTON

I, Steven Ray Green, Certified Merit Master Court Reporter, do hereby certify that I reported the above and foregoing on the day of May 30, 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 27th day of June, 2017.

Steven R Green, CCR

STEVEN RAY GREEN, CCR, CVR-CM, PNSC

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