CHE Partnership Call
Infertility and Environmental Contaminants:
Science and Strategy Reports From the Latest Meetings
March 16, 2005

Call Transcript

Background information is available on the CHE website at:
http://www.cheforhealth.org/resources/background%20resources/infertilityresources.html**.**

1. Welcome: Michael Lerner, Ph.D., President, Commonweal

I think we have a really remarkable call, today -- growing out of a very extraordinary workshop, led by Linda Giudice and Shanna Swan and Alison Carlson last month. I'm delighted by the outcome of the conference, and by the opportunity for a number of the key people at the conference to present some of the work that was explored. I'd like to ask Pete Myers to begin.

2. First Speaker: Pete Myers, Ph.D., CEO, Environmental Health Sciences

Thank you, Michael. Several of us on this call had the extraordinary opportunity in January and then in March, to participate in two complementary meetings. Both of these meetings were driven by signs in the scientific literature that fertility is being impaired. These signs are evident not only in the scientific literature, but also in trends of numbers of people seeking help in achieving successful fertility.

There are -- as many of you now -- a wide array of scientific studies relevant to this issue. The meetings explored these things, from complementary but different angles. The first of these was a Copenhagen workshop on environment, reproductive health, and fertility, organized by one of the world's experts on male reproductive health -- Niels Skakkebaek. It was a meeting exclusively of scientists, and it grappled with some very challenging and exciting new data on links between environment and fertility. The second meeting, *Understanding Environmental Contaminants and Human Fertility*, was organized by Linda Giudice, Shanna Swan and Alison Carlson.

There will be two work products from these two separate meetings. The Copenhagen meeting will produce a special volume -- a scientific volume of papers -- that should be coming out probably in about a year. The Stanford meeting will produce two different documents. One will be a consensus statement that will parallel the consensus statement that came out of the initial wingspread document, from the wingspread meeting of 1991. Some of you may be familiar with that. The second paper coming from the Stanford meeting will be a lay person's interpretation of what went on -- written by a writer who was commissioned to participate in the meeting and produce that document.

They were amazing events and we've got some excellent people on the call today, to report in greater detail what transpired. So, thank you.

3. Second Speaker: Ted Schettler, M.D., M.P.H., Science Director, Science and Environmental Health Network

Good morning. I'm just going to say a few words about the Copenhagen meeting. As Pete mentioned, this was the latest in a series of meetings convened by Niels Skakkebaek and colleagues in Denmark. This group has been studying the parameters of reproductive function, and specifically male reproductive function, for some time and has developed the concept of testicular dysgenesis syndrome, which consists of decreased sperm counts, male reproductive tract birth defects -- such as hypospadias and cryptorchidism -- and testicular cancer.

The idea is that these observations are linked, and that they result from in-utero disruptions of normal development. So many of the presentations sort of brought some new science to bear on this topic. Fetal factors, for example, involve both the sertoli cells and the leydig cells. You also see a failure of the gonocytes, which are the primordial of the germ cells, to mature and recede properly, so that they inappropriately persist in the testes.

At this meeting some new material was presented on epidemiologic observations, as well as laboratory studies and environmental factors. I'll just give you a few snapshots from some of the papers. For example, there was a presentation on new observations reported from a Swedish database. It showed that testicular cancer risk is higher for a male if his brother has testicular cancer than if his father did. And, that the closer in age his brother is, the higher the risk. So this observation supports the notion of a potential environmental factor playing a role.

There were a number of presentations on phthalates, which is a family of industrial chemicals that are used in a wide variety of consumer products. Exposures in the general population are quite widespread. Phthalates cause a mixture of abnormalities in laboratory animals -- in particular, in the male reproductive tract. More data were presented on the different target tissues of the male reproductive tract that are affected.

Earl Gray, for example, presented some information on mixtures of phthalates, where he concluded that mixtures are additive. That is, you add a variety of phthalates together, and you do get an additive effect. But you can't derive a single potency factor because of the different target tissues that are involved in the male reproductive tract.

There was a presentation on some new metabolites of one of the phthalates, diethyl hexyl phthalate, or DEHP, which were relatively new and are important, because these could influence epidemiologic observations, since the monoester, which has traditionally been studied, is not the predominant metabolite, and may not be a good measure of exposure.

Shanna Swan presented new data on a cohort of families and children that she is studying, where she measured phthalate metabolites in maternal urine, and then measured the anogenital distance in the male offspring. This is a measure that's been used in laboratory animals frequently, but this was a novel approach in a human

population. She showed that the anogenital index -- which is the ratio of the anogenital distance divided by the bodyweight… She showed that the anogenital index was inversely related to the levels of four different phthalate metabolites in the maternal urine -- suggesting that there was incomplete masculinization of the male reproductive tract in the most-highly exposed boys.

There was an interesting presentation by Katerina Main on breast milk levels of phthalates and correlations with hormone levels in male infants. She found, for example, that the levels of phthalates in breast milk correlated inversely with measures of leydig cell function. For example, monobutyl phthalate, which is the metabolite of dibutyl phthalate was inversely related to the level of free testosterone. So this was a new observation in human populations that certainly is consistent with what's been seen in animals.

Then there was some interesting information on wildlife and domestic animal studies -- continuing the work that Lou Gillette has been reporting for some time in his wildlife populations. One, in particular, stood out -- where the presenter reported carcinoma in-situ cells in the testes and spontaneous testicular tumors in horses, dogs, rabbits, cheetahs, elans(SP?) and birds. In one instance, a correlation was found between testicular tumors and nonylphenol levels in body fat. This is in elans(SP?), where for those of you who don't know this animal -- and I didn't -- it's an antelope from Africa.

Then finally, there was a series of good presentations on puberty onset and the relationship to environmental factors. Data implicated diet, bodyweight, social factors and some environmental contaminants. No clear picture has yet emerged. It appears to be a complex mixture of a variety of factors that are having an influence on the timing of puberty onset.

Then there were a couple of presentations on female reproductive tract development and function. For example, some indication of polycystic ovarian syndrome is likely to have a prenatal origin -- although the details are not well understood. This requires and certainly invites more investigation.

An interesting presentation ended it all with some new genetic studies on sexual differentiation. They outlined some of the details of the role of the retinoic acid receptor in causing gene expression or expression of the gene that's required for meiotic germ cell division in males and females. They've been doing this in an animal model, where they use rodent testes and ovaries, and show that retinoic acid receptor is essential for triggering this gene expression which then triggers meiotic cell division, as opposed to mitotic cell division -- which is a major difference between the male, in the reproductive development. The presenter noted that retinoic acid can be turned on and off by P450 enzymes -- and then suggested that environmental contaminants could be playing a role here -- in terms of when retinoic acid receptor is actually operative. This then offers up a potential explanation for how environmental contaminants could influence sex ratios in populations.

So that's just a quick overview of some of the interesting papers. As was mentioned, the entire proceedings are going to be published in a journal to come out sometime within the next year.

4. Third Speaker: Linda C. Giudice, M.D., Ph.D., Director, Women's Health@Stanford, Center for Research on Women's Health and Reproduction and Chief, Division of Reproductive Endocrinology and Infertility, Stanford University

Good morning, everyone. I'm going to discuss briefly the workshop that we had at the Vallombrosa Center in Menlo Park, California -- called *Understanding Environmental Contaminants and Human Fertility: Science and Strategy.* This workshop was funded by Women's Health @ Stanford, CHE, the Compton Foundation and also the Mitchell Kapor Foundation.

This was a workshop that was conceived by a number of people -- and I'd like to acknowledge them as part of the program committee and the advisory committee. Including Shanna Swan, Edith Eddy, Pete Myers, Michael Lerner, Phil Lee, Steve Heilig, Ted Schettler and Lou Gillette. It was coordinated by Alison Carlson in an expert and tremendous way.

The workshop evolved from multiple discussions over several months about, "What is it that we really know about contaminants and human fertility? And who are the stakeholders?" So as we planned the workshop, we could've gone in several different directions. We could've made it only scientific. We could've made it only patient advocacy. We decided to be as inclusive as possible, although we really had to limit the number of invitees, because of the size of our budget.

The meeting occurred over a day and a half and an evening. It addressed several things that I'd like to just outline briefly. One was the issue of infertility economics -- both personal, as well as to society. Then, an overview of what we know and what we don't know about the effects of the environment on infertility. Then, a discussion ensued, led by Lou Gillette, about lessons from wildlife and ecotoxicology -- very much along the lines that have just been mentioned.

We then had an overview of environmental contaminant effects on male as well as female fertility factors and reproductive tract function and development. These were talks and discussions led by Russ Hauser and Germaine Buck Louis. The issues of adult exposure versus in-utero exposure were also described. Jerry Heindel from the NIEHS talked about fetal origins of adult reproductive disease -- a very unique perspective, and a very important one.

David Keefe and I talked about the medical context -- what are the clinical syndromes that we don't have any explanations for, and for which there are some associations with environmental contaminants? David talked about some of his work on arsenic.

Shanna Swan talked about reproductive epidemiology, and had I believe a similar talk in the previous meeting in Copenhagen. But this really was a very important piece of this, to put this into the context -- without which a lot of our data are not very firm. We also had presentations by reproductive health and professional associations. The American Fertility Association, Resolve, the ASRM -- the American Society for Reproductive Medicine - the Association of Reproductive Health Professionals, the Society for the Study of Reproduction, the Society for Gynecologic Investigation… I can go on and on.

These were extremely helpful -- to hear from the patient advocacy groups in terms of what the needs and what the unknowns are, as well as on the professional side, how

helpless essentially many professional organizations feel, because the answers are not always out there. We also talked about environmental health funders and policy perspectives. This discussion was led by Phil Lee, Pete Myers, Jerry Heindel and Catherine Dodd, who came from Nancy Pelosi's office.

Perhaps the most difficult but the most energizing sessions were on strategic planning. What is it that we know firmly? What do we know with certainty? What do we know that's likely? Then what do we know is uncertain? So just to give you a couple of examples, we know that males and females are different. Their reproductive tracts may be affected differently by different environmental contaminants. Mixtures are pervasive. DES has an impact on reproductive function. There were two superb presentations by Marget Braun, known for her DES research advocacy, and Mary Lou Ballweg of the Endometriosis Association, with regard to the power of advocacy and the need for more research. Likely conclusions are that exposures in-utero and perinatally and in the adult are likely responding differently to environmental contaminants, and may have different reproductive outcomes.

Then examples among the uncertainties: what do we do with an occupational history of a patient? Is there an increase of intersex children and embryos? Mixtures are pervasive, as we know, but the nature of interactions is uncertain.

So overall, this was, I believe, perceived by everybody -- and we certainly got a lot of feedback -- to be a very energizing meeting. It was a unique meeting in that all stakeholders were in the room, talking with one another. We had a mission to take a look and state what's on the horizon, with regard to what each of us can do. We concluded, also, with the planning of another meeting -- which will be more on a broader scale. So-called Stanford Summit -- that we are in the process of trying to put together, now. Thank you.

5. Fourth Speaker: Jerrold Heindel, Ph.D., Scientific Program Administrator, National Institute of Environmental Health Sciences, Division of Extramural Research and Training

I'd like to start by noting also the uniqueness of this meeting. I think this could be a real model for future meetings. I was really surprised, and actually very excited and energized to see the extent of interest by the advocacy community in the role of environment and diseases and dysfunctions -- especially reproductive diseases. I'd never attended a meeting like that before, and I thought it was a really terrific mix. It really helped with the end product.

To go back and focus on the science, I think what came out of this meeting is really that a revolution is taking place in science. It's a revolution in the way we're thinking -- in the technology -- and the way the technology is going to advance the science. And how that's going to change our approaches.

Where we start is in looking at what people are exposed to. We now realize that people are exposed to all kinds of things -- a huge mixture of dozens of different things. We used to wonder what people were exposed to. Now data is coming from all kinds of places and studies indicating that we are exposed. So the question is not, "Is there exposure?" That's now a given. The question really is, "Are the exposures high enough?

And that there are critical windows of exposure that can affect reproduction and fertility."

Russ Hauser, in his talk, mentioned some specific examples of dibromochloropropane, high-dose lead, ionizing radiation, and DES -- that are known reproductive toxicants. I think that really sets up really a proof-of-principle that there are things out there that can affect fertility and reproduction, especially the DES story. That is a situation where we have human data, and significant animal data. In every case, the endpoints from the animal data and the human data match very well -- indicating that at least for DES as a model of estrogenic chemicals, animal models can really go a long way to help us understand what's going to happen in the human.

The bottom line still, here, is that in 2005, there is no definitive causal link between environmental exposures and reproductive problems -- including fertility -- if we're looking at environmental exposures and environmental irrelevant concentrations.

The meeting had some things that addressed that. One of the points is that in order to really get at this problem, we have to study vulnerable populations. We can't just study everybody, because humans are so diverse. We have to know more about the genetic polymorphisms, and put people in different categories according to their polymorphisms, which will affect their susceptibility -- in order to get a better, more accurate picture of the effect of toxicants on fertility.

The other thing is, we have to be able to link exposures to the disease and the dysfunction. Here again, we had some very nice talks. One was on sperm counts. The neat thing about sperm counts is that they're constantly renewing every 60 days. So you can look at exposure over the last few weeks or month, and relate that to sperm counts. There are now several indications that phthalates and some specific pesticides, including atrazine, alachlor and carbaryl, can have effects to reduce sperm counts in humans. Of course, these are ongoing in study, but they hold a promise that we'll be able to link exposures to specific reproductive dysfunctions.

It was already mentioned -- the really exciting work that Shanna Swan is doing in humans, using anogenital distance, and looking at phthalates. I think this is really significant, because she went back to the people who are doing endpoints and biomarkers in animal studies, and asked what could she use in human studies. She found a really good index, where there's a lot of information in animal studies, and is now using that in the human population.

Finally, what we realized, I think, from this meeting and also from the one in Copenhagen, is that in-utero exposure is really the critical window for exposure to environmental agents, and that the fetus is really more susceptible than the adults. This is a new concept that's called the fetal basis of adult disease. I personally think probably the reason we've not found a role for our environmental exposures in many reproductive diseases -- like infertility and PCOS and endometriosis, fibroids, premature menopause and early puberty -- is because we've been looking at the wrong time.

We believe now that the origins of many of these diseases is going to be in-utero, where exposure to environmental agents at critical windows of exposure during development alters the function of these tissues and organs, by altering gene expression. At birth, everything looks normal -- but the tissues have been altered, due to epigenetic changes in gene expression, such that they're now susceptible to diseases later in life.

There was some data that I presented on breast cancer and in-utero exposure to dioxin that can result in breast cancer later in life. In-utero exposure to estrogenic chemicals can result in increased obesity later in life. Some really exciting data on methoxychlor in-utero in mice, that results in adulthood in 10-20 percent of the males becoming infertile -- and that this effect lasted for at least four generations!

So it was in-utero to the mother. The mother was exposed, and the pups then got the methoxychlor from being in-utero. Four generations later, the effect was still evident -- showing a trans-generational effect through epigenetic mechanisms. I think that's really going to revolutionize what we're doing.

The problem here now is to be able to link those in-utero exposures to these adult diseases. We're going to do that through alterations in gene expression, and using that to develop biomarkers that epidemiologists will be able to use to show that at birth, if you see these biomarkers, you'll be able to predict increased susceptibility to disease later in life.

Then just finally, I want to go back again and mention how impressed I was with all of the integration and collaboration and cordiality amongst all the people that were at the meeting. At the end of the meeting we went around the room and everybody was asked what were they going to do when they went back home, there was a lot of interest and excitement, and a lot of novel and interesting ideas presented. People were really energized by this meeting.

6. Fifth Speaker: Lisa Rosenthal, M.A., Educational Coordinator, The American Fertility Association (AFA)

I want to start by expressing my thanks for the invitation. Not only to attend the conference, but now to present the American Fertility Association's reaction to the conference. It was an extraordinary gathering. I was so impressed and excited by the depth and breadth of research and knowledge presented. The AFA hopes to bring the weight of expertise and credibility of scientific inquiry of the CHE Fertility/Early Pregnancy Working Group to our members and the infertile population at large.

We need hard research, so that we can do the following: bring the medical community we deal with up to speed and into the loop. Over the years in our role as patient advocates, we have found we make much more progress when we educate professionals along with our members. Engaging all those who are interested and supportive in this field is essential for them to become vocal ambassadors, because typically, this is not taken seriously. It's considered a soft science.

It's unrealistic to expect patients alone to have the power to convince their doctors. As a paradigm for change, asking patients to tackle their reproductive endocrinologists just isn't going to work. As we are already overwhelmed by the new language of infertility we have to learn, it's unlikely patients will be able to decipher technical papers and discern what's relevant and useful for them to bring up. The balance of power in the patient reproductive endocrinologist relationship makes it improbable that medical professionals will seriously consider issues such as exposure to endocrine disruptors; impacts of

exogenous estrogens; the significance of contaminants in-utero; when there are subtle effect versus gross effects; when these matters are introduced by patients.

Acting in concert, patient and provider makes for a strong grassroots movement -- the only way we're going to protect our reproductive health. But we need to be a screening tool, because the volume of material flowing in and out of CHE is enormous. To do that effectively, patient advocates must be able to understand all the impressive research. We have to be able to winnow it down to the manageable and comprehensible, before we can pass it along to our members.

There's a distinction between information you as geneticists, reproductive endocrinologists, epidemiologists, anthropologists will find germain and that which patients will find relevant. Patients won't find complex clinical data useful, because we don't know how to interpret it. Generally speaking, we're not going to find this research compelling unless it speaks directly to our difficulties of trying to conceive and carry to term.

The hierarchy of certainty is an essential tool here. We have to be able to distinguish what definitely will have an impact on our procreative abilities from those things we suspect might. The AFA needs to be able to relate in a clear factual manner what we need to be vigilant about. Whether it's time-to-conception, fetal development as it predicts adult-onset disease, or trans-generational genetic change.

But what do I do when I come across material that isn't CHE-generated? Can I bring it here for evaluation? How do we responsibly mobilize patients on the policy front? We must move swiftly against those contaminants we know with certainty have an averse effect on us or our progeny. But we all must take prophylactic action against those things that are likely, if not absolutely, going to cause trouble for the reproducing generation or its descendants.

The AFA will work with CHE to articulate and promote public policy driven by scientific consensus among the working group participants. We will disseminate a list of things that CHE considers standards -- things that have little doubt that we should and should not do to preserve fertility, and the health of potential offspring.

Apparent that at this moment in the investigation of environmental contaminants and fertility, there are more questions than answers. Questions beget more questions. We need CHE's help to raise the questions as well as provide answers.

As indicated in the name CHE, this is a collaborative effort. The AFA is offering its support. We want it to be meaningful and productive. We have a big voice and a big base. We're determined, highly visible and politically effective. I'd like to offer the AFA website <http://www.theafa.org/> as home for well-researched and well-documented information about the interrelation of environment and infertility.

Second, I'd like to establish a directed public education initiative. The AFA will publish articles, hold seminar sessions and conduct moderated online educational discussions. The audience stretches beyond our membership. Remember -- the infertile population is profoundly concerned with the effects of personal and global conditions on our children when they're in-utero and newborn, when they're adults having children of their own. We want to know that we've done right by our great-grandchildren. We struggle hard to

reproduce, and we're invested. What we need is the information -- the hard facts -- to work with. Just as we're actively committed to reducing the incidents of A.R.T. induced multiple births because of low birth weight, we are actively committed to creating a safe pre-conception, prenatal environment from the bottom up.

Today we learned that the EPA will not create a uniform cap on mercury emissions, but rather will allow the buying and trading of mercury emission rights. These things are an opportunity for CHE and the AFA to work together. We will look in our cabinets, pantries, backyards and workplaces. We will lobby our elected and appointed officials. What I'm asking for are clear guidelines so that we, the AFA, can take a responsible position. Thank you.

7. Open Discussion

Michael Lerner:
Thank you all very much. The impresario of this whole extraordinary event, as Linda mentioned, was Alison Carlson. Alison, would you like to add anything to what's been said?

Alison Carlson, Fellow, Commonweal Health & Environment Program, CHE's Fertility/Early Pregnancy Compromise Working Group, CHE Project Coordinator, Women's Health @ Stanford:
Thanks Michael. It was great fun to be able to have a review of the meeting from everybody, because in organizing it, there were times that I wished I could have paid more attention at the time. It was really an extraordinary experience. The only thing I want to add is that for me, it was a success just to get those particular people in the room. I think in the US anyway, it was the first time that we had key scientists in the room with the infertility and repro advocacy NGO world. That alone was one of my first goals.
I wanted to just point to something that Linda brought up -- which was that one of the hardest parts of doing the workshop was our small budget and the specific strategy to keep the meeting a retreat-like meeting -- to accomplish specific goals. There were about 200 more people that we wanted to be able to include. That's why we were happy that the workshop was successful as a preliminary step also to a much larger summit, which people will be hearing more about.
Lastly, we will make sure that the CHE network is alerted when the lay synopsis document is ready, as well as the Vallombrosa consensus statement. I'm actually going to be looking for suggestions and help in disseminating it as widely as possible. I look forward to feedback from the CHE network about how we can do that dissemination.

Ana M. Soto, M.D., Professor, Department of Anatomy and Cell Biology, Tufts University School of Medicine:
I would like to know if you know what is the dose that Shanna found from the correlation between the decreased anogenital distance and phthalates. I'm interested because as you know from myself and others who have done low-dose exposure in-utero, in animal models. As you know, one of the things that are observed are decrease of this distance with some chemicals. So I wonder whether it would be a good idea to put all these things together, to see as Jerry Heindel has mentioned the correlation that exists between DES exposure in animals and in humans, maybe we can start constructing a database about what it is we are observing in humans and what we are observing in

animal models. So that we can provide this data to the interested agencies, so that the regulation of these chemicals can start here. In France, I think it's going to start -- since the precautionary principle went into their constitution. So maybe we can help by trying to put all this data together and establish those correlations.

Pete Myers:
First, in respect to Anna's second comment -- Paul Foster presented an excellent summary of the animal data and the variety. I know he's headed toward creating a database of the sort that you're talking about. With respect to the dose level, I don't remember the precise levels, either. But one calculation that Shanna made stood out to me. That was that when she looked at the level of phthalates associated with significantly detectable effects on feminisation of the baby's reproductive tract and compares that level to the NHANES (National Health and Nutrition Survey out of CDC) survey, she finds that 25 percent of women in the US today have phthalate levels that are within the range that in her sample produced observable effects.

Ana Soto:
This is interesting, because BPA (bisphenol A), as you know, hasn't been yet measured by the CDC in their survey. But there is some scant data in humans. The levels that they found in blood and in mother's blood is within the levels at which we observe effects.

Pete Myers:
The CDC has an electronic version of a new publication on the web, on the *Environmental Health Perspectives*. It shows 95 percent of American urine samples measured have detectable metabolites of bisphenol A. You can get access to that via the website <http://www.environmentalhealthnews.org/>. It's one of the top stories in the central column. There's a link from there to the publication at *Environmental Health Perspectives*.

Theo Colborn:
I can remember back in the early 90s, there was a child study that was going to start. One of the things they wanted to do was anogenital distance on these babies. The hospital wouldn't allow it. For puritanical reasons, I'll say nothing more other than it may be a difficult endpoint to begin to measure, unless we can do something about breaking this mindset of dealing with the children's external genitalia. Just to let you know. We would've had data like this probably by now, if we could have got past that hurdle.

Lisa Rosenthal:
I have a comment: We were lucky enough to get funding for an entire magazine of *infocus on fertility and the environment*. I would like to invite anybody on this call who would like to be able to give me some input on what breadth and scope of this magazine should contain, to e-mail me directly at: lisa@theafa.org. I really am looking forward to having the guidance from this group on what to present to a general lay public.

Marian Weber, Founder, The Arts and Healing Network:
As we discover the chemicals that cause infertility, my hope is that the CHE network will focus on ways to clean the body of these chemicals and that there will be a whole effort in that department. Is this happening now, and is this possible?

Michael Lerner:

It's not happening yet, Marian. The issue of detoxification research is still considered too frontier for mainstream acceptance. However, a number of us are interested in detoxification. Your recommendation will help us continue to move that forward, so that we can bring it into mainstream exploration. I agree with you that it's a fundamentally important question. It is an issue that is widely discussed in integrative and complementary medicine. But there's very little data to support it. It's badly in need of rigorous research, and it's certainly a subject we can continue to explore.

Sherry G. Selevan, Ph.D., Reproductive Epidemiologist, US Environmental Protection Agency:
When I used to do occupational health, there were lots of discussions about chelation, for example, lead exposure. The problem with focusing too much on removing the chemicals from the body is that there can be other sequelae that aren't very beneficial. Personally, I think we should try to prevent them from getting there in the first place, and have that be our major focus.

Michael Lerner:
Absolutely, Sherry. Let me also point out that as Jerry Heindel just mentioned, the more we understand that these are in-utero exposures that are responsible for a great deal of what's going on, the more clearly true that is. But the issue of detoxification won't go away. It's going to be on that interface between science and integrative medicine, until it gets studied. I think we would all completely agree with you that we want to get the chemicals out of the environment.

Stephanie Dahl, M.D., Clinical Fellow, Reproductive Endocrinology and Infertility, The University of Cincinnati College of Medicine:
The Society for Gynecologic Investigation and the Society for the Study of Reproduction, are both meetings that are coming up. SGI is next week and SSR is this summer. Is CHE Fertility going to have any type of presence?

Linda Giudice:
At the SGI (Society for Gynecologic Investigation) meeting, there is nothing that I have seen on the agenda that specifically addresses the environment. However, at the council meeting, we have discussed partnering with the SSR (Society for the Study of Reproduction) and the ASRM (American Society for Reproductive Medicine), and so with the other hat that I wore at the workshop as the incoming president of SGI in the year 2006, it's definitely going to be on the radar screen, and we are going to be promoting this area of investigation, because it's so important.
Last year, for the ASRM, Alison and I put together a special interest group for environmental contaminant effects and fertility. We had an overwhelming response of nearly 60 people that came to that. We were expecting about 10.
I'm on the board of ASRM. I've been asked to be a "cousin" to the SSR. They have a committee on reproduction and the environment -- the CoRE committee. I have just talked to Dr. Stan Glasser so that we can continue interactions among all these organizations. There is going to be a symposium at the ASRM, in its October meeting, 2005 -- specifically on the environment and reproduction. There will be three speakers. We do not have the formal okay yet of the third speaker. But it will be a forum for three individuals to present what is there in regard to effects on fertility. It's a pretty high-profile program, and the meeting is attended by nearly 3,000-4,000 reproductive health professionals and researchers and patient advocacy workers.

I think that summarizes where we are, in terms of trying to get more exposure of the issues, which then of course will hopefully lead to more demand for research and getting people together, so that we are all speaking the same language.

Anne Adams Lang, Wylde Child Productions, Inc/onPoint Strategic Communications, Consultant, American Fertility Association:
I believe it was Theo who mentioned the problems in overcoming the puritanical attitudes that inhibit research. I think that having a strong relationship with the patient population and beginning to educate them really aggressively is going to help broaden the pool of participants, and maybe change attitudes. This is something that has to be pursued aggressively, I think.

Theo Colborn:
It was in many instances the parents who absolutely refused. They wouldn't let their child stay in the study if this was going to take place. So it is going to take a lot of parental education.

Michael Lerner:
One point I want to make about this meeting. It was really also a major turning point in the history of the Collaborative on Health and the Environment. We've been experimenting with different formats over the last three years. We've done mostly regional meetings, where what we did was to present on a whole set of different disease outcomes, as well as an overview of the science.
What we really realized when this meeting took place, was how extraordinarily powerful it is if the whole meeting has a central focus, like infertility, pregnancy compromise and reproductive health more broadly. How, when we bring the constituencies into a retreat setting of this kind with five key things involved, such extraordinary outcomes can take place. We're going to be looking at generalizing this strategically throughout the Collaborative on Health and the Environment.
The five elements are first of all -- you need to find somebody who is absolutely focused on this -- like Alison Carlson. Somebody with extraordinary organizing skills, who is committed to the issue, and just won't take no for an answer. Secondly, you need absolutely impeccable scientific leadership at the highest levels, like Linda Giudice and Shanna Swan. Third, the science needs to be ready. It needs to be at a point where people can be brought together to look at it in that way. Fourth, you need to bring the scientific leadership, the health professionals and the patient-advocacy community together. Fifth, you need a little bit of funding. Not a lot, but just enough to pull the whole thing together.
Finally, at the center of this sort of pentagon of five factors, is a really deep commitment to civility and to a science focus and to mutual respect, so that there's a deep sense of openness in the room, and that we are letting the science speak, and then letting everybody draw their own conclusions from that.
In any case, I just thought it might be of interest to the group to understand that in addition to the power of the meeting for the community of scientists, health professionals and patient advocates interested in these issues, it was also a turning point for the Collaborative. We're going to move more toward these meetings focused primarily on specific nexuses of health issues, as opposed to presenting an array of 10 or 15 different disease outcomes and doing very brief presentations on each one.

Philip R. Lee, M.D., Professor Emeritus of Social Medicine, UCSF and the Institute for Health Policy Studies, Stanford University, Program in Human Biology:

There was one other thing I think that was very important. That was the link to the media and the fact that there were people present from the media. And then you had a summary prepared for a general audience, not just for scientists. It seems to me, that linkage is critical, because so much of this information is really not known or understood or appreciated by the general public. I think it's imperative, in view of the magnitude of, for example, the issues we discussed at the meeting for this to be another element in our overall strategy.

Michael Lerner:
I think that's absolutely true, Phil. Phil Lee is the chairman of the Collaborative.

Mark Smith, Massachusetts Department of Environmental Protection:
I'm just sort of wondering what kind of participation you've had at this meeting or other workshops you guys have had, from regulators and folks from the Department of Public Health and Environmental Protection Agencies at the State level. We are, I think, increasingly in the forefront of getting regulations out on some of the chemicals you all are concerned about. It seems to me that we as a group might be able to provide some insight as to the types of information we need to facilitate our decision-making and also perhaps could learn a lot from these types of things.

Michael Lerner:
Well, I'm glad you mention that. We did have quite a representation at this meeting from EPA and other agencies. But more broadly, the Collaborative has a very significant membership from State and National regulatory agencies. So it is a place where the regulatory agencies are joining in the dialogue. I really should've mentioned that in this summary. Thank you for pointing that out.

Pete Myers:
I'd like to return to the comment made earlier about the aggressive patient advocacy. Perhaps Lisa Rosenthal would be willing to comment on the upcoming meeting that they're holding in New York? The fact that Alison and I will be making a presentation there.

Lisa Rosenthal:
One of the things that I tried last year was introducing a new workshop at our conference in New York City. We typically get about 1,000 patients attending this conference. The first year we do a workshop, typically, we get anywhere from 0-5 participants. We were astounded when we were lucky enough to have Pete Myers do a presentation. We had between 17 and 22 people in the room. So naturally, we are doing the workshop again this year. Again, we were hoping to expand what we do with the environment and with CHE. Again, I ask that we are doing this incredibly important magazine and appreciate all of your participation and guidance, in that

Michael Lerner:
Linda, can I call on you again just to give us a summary of how you see the movement toward the Stanford summit on this issue? Some sense of timeline and what your goals for the summit will be?

Linda Giudice:
In the summit, there will probably be some overlap with what has gone on in the workshop. We really want to have a good representation of what the state of the science

is. We also want to have reproductive-advocacy, patient-advocacy groups represented and participating -- and also, a variety of funding agencies. Again, I think the workshop really spoke volumes with regard to how this works well or can work well. The question is, of course, will it work well in a bigger scheme?
Also, we want to include issues such as education -- patient education and also professional education. Right now, there is nothing in most medical schools, for instance, for anything about environment and effects on human health. Let alone reproductive health. So we have been discussing inviting representatives of some of the major medical schools. The AAMC (American Association of Medical Colleges), for instance -- to have their input, and to perhaps even educate them, with regard to these issues.
We don't have a formal agenda, yet. We are just putting together now the organizing committee, and if anyone would like to be part of this, we would certainly welcome your participation. The timeline will be sometime in 2006.

Eleni Sotos, M.A., National Coordinator, Collaborative on Health and the Environment: The next CHE Partnership Call will be on Environmental Cardiology. This call is scheduled for Wednesday, April 13th at 9a.m. Pacific/ 12noon Eastern time. We will be sending out more details as the date draws closer.

Michael Lerner:
Environmental Health Perspectives had a cover article on the fact that the American Heart Association had issued a statement on Environmental Cardiology. This is a very big development in the cardiology field. Ted Schettler is just finishing a paper, now under peer review, for the Collaborative, on environmental health and cardiology. It should be a very interesting call, and I welcome all of your participation.
Thanks to all of you for being on, and we look forward to being with you in the future.