

## Interview with Dr. Boyd E. Haley: Biomarkers supporting mercury toxicity as the major exacerbator of neurological illness, recent evidence via the urinary porphyrin tests

Boyd E. Haley<sup>a</sup>, PhD and Teri Small<sup>b</sup>

<sup>a</sup>Professor and Chair  
Department of Chemistry  
University of Kentucky  
Email: behaley@uky.edu

<sup>b</sup>AutismOne Radio  
1816 Houston Ave.  
Fullerton, CA 92833 USA  
Email: tsmall@autismone.org  
Website: www.autismone.org

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### Abstract

In the recent past, several biological finds have supported the hypothesis that early exposure of infants to Thimerosal was the major exacerbation factor in the increase in autism-related disorders since the advent of the mandated vaccine program. These initially included the observations of a genetic susceptibility impairing the excretion of mercury and the increased retention of mercury by autistic children. This was followed by data indicating that autistics have low levels of the natural compound glutathione that is necessary for the biliary excretion of mercury, possibly explaining the genetic susceptibility. Other observations clearly point out that various biochemical processes are inhibited at exceptionally low nanomolar levels of Thimerosal, including the killing of neurons in culture, the inhibition of the enzyme that makes methyl-B<sub>12</sub>, the inhibition of phagocytosis (the first step in the innate and acquired immune system), the inhibition of nerve growth factor function at levels not cytotoxic, and the negative effect on brain dendritic cells. It is also now quite clear from primate studies that Thimerosal, or more correctly, the ethylmercury from Thimerosal delivers mercury to the brain, and causes brain inorganic mercury levels higher than equal levels of methylmercury.

Most recently, one study showed that 53% of autistic children had aberrant porphyrin profiles similar to mercury toxic individuals. Treatment of these children with a mercury chelator brought these porphyrins back towards normal levels indicating mercury toxicity was the cause, not genetic impairment. Porphyrin profiles are one of the most sensitive methods of measuring toxic mercury exposures. Recently, in a major advance it was shown that about 15% of individuals in one population displayed a marked sensitivity to mercury exposure in their porphyrin physiology, again supporting the concept of a genetically susceptible population that is more sensitive to mercury than the general population.

This observation on porphyrin aberrancies brings into consideration other possible effects of mercury toxicity that are secondary to porphyrin depletion. Porphyrins are the precursors to heme synthesis. Heme is the oxygen binding prosthetic group in hemoglobin and depletion of heme would affect oxygen delivery to the mitochondria and decrease energy production. Also, heme is a component of the electron transport system of mitochondria and a prosthetic group in the P450 enzymes which are fundamental in the detox of the body from many organic toxicants including pesticides and PCBs. Just recently, a report was released implying that lack of heme was the major reason why  $\beta$ -amyloid plaques build up in the brains of Alzheimer's diseased subjects. It seems that heme attaches to  $\beta$ -amyloid helping it remain soluble and excretable. Without adequate heme one of the major pathological diagnostic hallmarks of Alzheimer's disease appears. It is well known that mercury rapidly disrupts the normal polymerization of tubulin into microtubulin in brain tissue and aberrant tubulin polymerization is a consistent factor observed in Alzheimer's diseased brain. Therefore, it is the multiple inhibitions of mercury that can cause various neurological and systemic problems and many of these are secondary to the primary site of mercury binding.

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*I'm pleased to be joined by Dr. Boyd Haley. Boyd Haley, PhD, former chairman of the Department of Chemistry at the University of Kentucky from 1996 to 2005, has now chosen to devote additional time to research. An NIH post-doctoral scholar in the Department of Physiology, Yale University Medical School from 1971 to 1974, in the past 17 years, Dr. Haley has emphasized studies on the biochemistry of Alzheimer's disease. His research in the biochemical aberrancies in Alzheimer's disease also led to his identifying mercury toxicity as a major factor. He was one of the first to propose that the organic mercury preservative, Thimerosal, in infant vaccines was the most likely toxic agent involved in Gulf War syndrome and autism-related disorders. Dr. Haley has testified before numerous government agencies on the effects of mercury toxicity from dental amalgams and vaccines. His articles include *Reduced Levels of Mercury in First Baby Haircuts of Autistic Children*, which was published in the *International Journal of Toxicology*. Dr. Haley, thank you very much for joining us.*

You're welcome.

*Dr. Haley, we're going to speak about biomarkers indicating mercury evidenced via the intoxication mercury tests, also known as the urinary porphyrin tests, then we'll talk about Thimerosal. Finally, we'll look to the future of chelation and treatment. Dr. Haley, what is heme and where and how is heme made?*

You know, heme is made from porphyrins – this is the first thing that the audience should understand – and the porphyrins start out in the mitochondria, coming off of products from the citric acid cycle. But it's primarily made in the liver and kidney, although many cells can make porphyrins to some level. The main ones we make are in those two locations. The porphyrins, at the end of the porphyrin synthesis, if they follow through normally, we end up with a product called heme. Now heme is

very, very important, especially to autism practitioners; they need to know about this. If you look at autistic children, many times if not most of the time, you'll see that they have a very, very light complexion, indicating that they have an inadequate amount of heme in their bodies. Because heme, when it binds to iron, makes the red color in blood – or the hemoglobin – when the heme is put into the globulin molecules of hemoglobin, it turns bright red and we can see this. Therefore, children who are short on this would not carry oxygen nearly as well as the children who are very high in hemoglobin.

I would also point out that there's a set of enzymes that help us detox our body. They're called P450 enzymes. These P450 enzymes require heme to be active. In other words, to get rid of other toxins that build up in your body, you have to have heme. So we have a double-whammy there when we don't make enough heme for the blood, we don't make enough heme for the P450. We decrease oxygen-carrying capacity for the children, and we decrease the ability to detox the body from other aspects. It even gets worse if you take another step further. To people who don't have enough heme, heme is used in the electron transport system of the mitochondria. That is the system that makes ATP, allowing us to do a lot of things and one of those things would be to actively detox or to produce glutathione and a huge number of biochemical processes. So when you take heme out of the picture or if you destroy the porphyrin synthetic pathway, you have multiple effects on the body that all of them together could be somewhat disastrous to a person's health.

*Well, Dr. Haley, I think that you have already given us kind of a summary, although I'm sure there's more, of a biochemical train wreck.*

Yes, and the interesting addition to this for those who are concerned about Alzheimer's disease: A recent publication came out stating that why we end up with these  $\beta$ -amyloid plaques – or they're called senile plaques – in the brains of Alzheimer's patients. They said it's due to a lack of heme. In other words, heme binds to the  $\beta$ -amyloid protein making it soluble and allows it to be excreted. If you have a shortage of heme, you can't get rid of those  $\beta$ -amyloid protein particles and it builds up. The  $\beta$ -amyloid aggregates and it makes a  $\beta$ -amyloid plaque in the brain. So the researchers who did this said the  $\beta$ -amyloid is probably due to a shortage of heme and this may be the cause of Alzheimer's disease. I would take a step backward and say, yes, there is a shortage of heme, but the shortage of heme isn't a genetically caused effect as much as it is a mercury toxicity induced event. Again, this ties in with everything I've published and argued about for the last about 15 years or more, stating that mercury causes multiple effects and those multiple effects are observed in Alzheimer's disease patients. This is just the latest addition to my theory that mercury exposures exacerbate—and perhaps cause—Alzheimer's disease.

Now we have added another observation to this, a very critical one that corresponds to mercury causing the problems in Alzheimer's disease, as well as mercury causing the same problem in autistic type of diseases. And that is, mercury goes in and inhibits multiple steps, one of them being in the porphyrin profile and one of them being the terminating of axon develop-

ment at certain stages of development, which we see in both the Alzheimer's and the ASD (Autism Spectrum Disorder) patients. So the data is getting overwhelming, and I don't know how long our government can ignore it.

*You have just said so many important things. You indicated that the improper functioning of the heme biosynthesis pathway, which is the same as the porphyrin synthesis pathway, if this is not functioning properly, it can affect oxygen transport, detoxification. You said that heme was involved with the  $\beta$ -amyloid plaques that you see in Alzheimer's. You mentioned ATP, glutathione, electron transport, the mitochondria and terminating axon development. Is that correct?*

That's correct, and you have to understand—the porphyrin profile. Porphyrins are primarily only used when they are coalesced into the molecule called heme. When you inhibit the porphyrin profile or inhibit porphyrin synthesis, you inhibit the synthesis of heme at the same time because they're one in the same. I think right now we also should point out that there was a paper recently – I reviewed it for publication – but it was also, from what I understand, submitted to *Pediatrics* and rejected, and I think it's because there's politics involved. This paper essentially showed that autistic children in a major clinic in Paris had porphyrin profiles that indicated they were mercury toxic. That is what's been developed Dr. James Woods, a researcher from the University of Washington. He's an expert in this. He has done some beautiful research showing that porphyrin profiles are dramatically affected by mercury exposure, and you can use porphyrin profiles to look at a patient, take their urinary porphyrins – the porphyrins they're excreting in their urine – and look at them and say, "This person is possibly mercury toxic."

Well, they did that in Paris and they found out that 53% of the autistic children they looked at appeared to be mercury toxic. When they treated these children with the chelator DMSA, which is kind of specific for mercury, their porphyrin profiles went back to normal, indicating that the problem was mercury toxicity, not genetics. So that's the reason why this porphyrin conversation we're having is so important for parents with autistic children. It again puts another nail in that coffin of the use of Thimerosal. It is dramatically important.

*You were referring to the study in press, Porphyrinuria in Childhood Autistic Disorder? I appreciate your bringing that up. We did have the privilege of discussing this with Dr. Robert Nataf of Laboratoire Philippe Auguste on March 28. So are those what you consider to be the most significant findings of that study with regard to the implication of mercury in childhood autistic disorder?*

Yes. Yes, there's no doubt about it. I mean, these kids for some reason – it could be multiple toxicities causing this – but the key thing would be you get them off track with a massive dose of mercury in the vaccine—they may have lead toxicity also that would exacerbate this, they may have cadmium that would exacerbate this—but the major point to be made is that this is a symptom of mercury toxicity and the bulk of these very, very young children that are autistic have this symptom.

How did they get mercury toxic? They're probably not getting it in Paris from eating fish, seafood, or anything like that. These probably aren't the wealthiest of people either. I consider this almost a smoking gun study. Even if you want to say, "Does it absolutely prove it?" You know, it's very difficult to get absolute proof of something causing a disease in a human because we can't do with humans what we do with rats and other animals; we can't sacrifice them and look at their organs, put them in a real tight cage and feed them or not feed them or expose them. So it's very difficult to absolutely prove anything in a human disease. However, the data for mercury toxicity causing problems is paramount. It makes everything else pale to insignificance that may be a suggestion for the cause of autism. The fact that our government refuses to even consider this—it embarrasses me. As an American citizen, it just embarrasses me.

*Let's backtrack a little bit, back from that most recent study from Laboratoire Philippe Auguste. You mentioned the work of Dr. James Woods. So can you tell us, in previously published peer-reviewed scientific literature, has a characteristic signature of mercury exposure as evidenced via the urinary porphyrin profile been documented?*

Yes. Dr. Woods has documented that some time ago, showing that the urinary porphyrin profiles change in individuals that are mercury toxic or individuals that have amalgam fillings. Most recently, he had a very, very important article come out. I can't remember exactly where it was, but I read it. What he found is that about somewhere between 10 and 15% of the population he looked at had a very, very unusual porphyrin profile that corresponded to a genetic susceptibility, more or less, in the population to mercury exposure.

*So would that be an atypical porphyrinogenic response?*

Yes.

*Okay. I believe I have a copy of that study – 15% – and that is, "A cascade analysis of the interaction of mercury and coproporphyrin oxidase (CPOX) polymorphism on the heme biosynthetic pathway and porphyrin production (Heyer NJ, Bittner AC Jr, Echeverria D, Woods JS. Toxicol Lett. 2006 Feb 20;161(2):159-66. Epub 2005 Oct 7)."*

That's the paper. Yes.

*Yes. However, even for years before this, was there published scientific literature showing this distinctive signature of mercury?*

Yes. What he's showing there is somewhat new in that he found an unusual porphyrin profile with a larger study. But his papers, his publications going back probably ten years, show that mercury affected the porphyrin profiles. I think Dr. Woods is an expert in the biochemistry of porphyrin and heme synthesis. I think he's more a heme synthesis expert than he is a mercury toxicity expert. But he's the one who made the original find that mercury toxicity affected porphyrin synthesis. That's been known for a long, long time. Many people that recom-

mended—even before I came into the mercury toxicity field from trying to explain what causes Alzheimer's disease—you should get mercury out of your mouth, dentists, etc., were using Dr. Woods' porphyrin profiles as proof that mercury was causing toxic problems in specific patients.

*Yes, he even tested dentists and dental hygienists, correct?*

Yes.

*So just to reiterate something here, the correct function of the porphyrin synthesis pathway—or the heme biosynthesis pathway—the correct function is important for oxygen transport, energy production and detoxification?*

Yes, absolutely.

*You mentioned children being pale – and this is very interesting – sometimes people might look at children who look pale and wonder if they have an iron deficiency. But you were stating a slightly different take on that. Can you reiterate that?*

Sure. I mean iron binds to heme. The porphyrin synthetic pathway ends in the production of heme. When heme binds iron, then you end up with a product that is used in hemoglobin to carry oxygen. The oxygen molecule binds to the iron that is complexed in the heme molecule. So if you don't have heme, you won't have iron. I mean it just won't be kept in the body. The whole process of making hemoglobin to carry oxygen, you have to have heme and iron, and if you don't have either one, you'll have major problems.

*So for our listeners, is it that toxic metal or mercury inhibits enzymes for heme?*

Yes, that's exactly what happens.

*Alright. You did say that mercury has a characteristic signature, correct?*

Yes, as well as other heavy metals. Mercury will inhibit enzymes that have sulfur groups on them that are essential—that combine mercury—will be more dramatically inhibited by mercury than say by lead or cadmium or other toxic metals. So it has very much a signature profile for mercury toxicity.

*Now what happens if you take a very small baby and inject mercury?*

Well, there are a lot of things that happen, and on top of inhibiting their ability to make hemoglobin, which we just talked about in detail, let's talk about the affect on the immune system. What we know is that Thimerosal, at one nanomolar or lower concentrations—and when we say nanomolar, let's put it in perspective—the vaccine contains 125,000 nanomolar level of mercury if it has Thimerosal as a preservative. That's a huge amount. And one nanomolar levels in the baby will prevent the macrophages from going through phagocytosis. In other words, they will lose their ability to eat viruses and bacteria that are in

the blood that shouldn't be there, and so Thimerosal suppresses the immune system. This is well known and has been well described in the literature for a long time; that mercury is an immune system suppressor and you see that these autistic children have a truckload of immune problems. So you would prevent that from occurring. That is documented research and I don't know how the government can even ignore it, or the agencies of the government can ignore it.

Now the other thing, there was a paper that came out from the University of California at Davis just recently showing that very low levels of Thimerosal inhibited dendritic cell development that's important in brain and the immune system development, and this was at amazingly low concentrations. This again, while you can't do the experiment on the child, it does show that toxicity of Thimerosal is much, much lower than what the "experts" from Rochester and other places like that suggest that it was by looking at the death of certain cells. They did not look at depletion of the immune system. They did not look at depletion of your ability to excrete other toxins such as indicated by the inhibition of porphyrin profiles. They have only looked at death. Death is not a good endpoint for looking at toxicity because these autistic children aren't dying; they're being damaged. You can have damage done at much, much lower concentrations than where death is induced.

So we need to take this methylmercury/ethylmercury argument that they throw out there in context. They're talking about significant damage that you can see with a microscope, and the rest of us are talking about damage you only see in the resulting child who has immune problems, "mental" [cognitive] problems, and numerous other problems. So I think that the biological case against Thimerosal is so dramatically overwhelming anymore that only a very foolish or a very dishonest person with the credentials to understand this research would say that Thimerosal wasn't most likely the cause of autism.

*I appreciate your referencing the U.C. Davis study that recently was released. So, Dr. Haley, let's speak a bit more about mercury and Thimerosal. Are there factors that preclude determining any safe level of mercury exposure?*

Absolutely. Any child that is lead toxic or has a burden of lead will be much more susceptible to mercury toxicity than one who is totally free of lead. Again, that's something that's been known for 30 or more years. And again, the people on the opposing side totally ignore that factor, yet in the paper – the newspaper – day after day we see reports of lead toxicity of children in specifically the eastern cities where the lead paint is still on the old houses and in the ground, and wherever they're getting it. I mean multiple things... Maybe in the pipes that they're drinking water from. If you have a lead toxic child who might survive and might be capable of developing a good I.Q., if you take that lead toxic child and give him an exposure to mercury, you could cause him severe problems—quite different than a child who's not lead toxic. Also, it's not only those children, but those who are on antibiotics are much more susceptible to all types of mercury toxicity, because antibiotics have been shown in experiments with rats to prevent the excretion of mercury. So, it builds up in the bodies of these children.

The same thing with diets: milk diets increase the retention of mercury in the bodies of children. This is a well-published fact. So with all of these things, the diet, the antibiotics and what we call synergistic toxicity of the exposure to other heavy metals, which is rampant in this country—it's all over the place—I mean lead exposures, arsenic exposures, cadmium exposures that we can't even explain where they come from, or even copper—we have to consider that that toxic profile; we're taking on top of that and purposely injecting mercury in these children. We're not giving them much of a chance, and I think we need to get politically active about this and make laws to stop it.

*How about things like PCBs?*

Well, I can't comment directly on any particular PCB, but what you can understand, the chemistry that's involved in increasing retention and especially passage through the blood brain barrier of mercury, is using organic compounds that they have pi-orbitals and they make sandwich complexes with metal ions like mercury. That allows them to penetrate into the cells and across the blood brain barrier much easier, and PCBs would fall into that category. They could fall into the category of a compound that might increase the penetration of mercury into the central nervous system. I haven't seen any data showing that, so I want to separate what I think from what I know. But what I think is a lot of these pesticides and herbicides, and organic compounds that we're exposed to, could dramatically affect mercury retention just like antibiotics do. Also, consider that mercury reduction of heme would cause a reduction of P-450 enzymes which detox the body of compounds like PCBs. This would lead to a build up of PCBs in the presence of mercury toxicity.

*Okay. From what you said earlier, Dr. Haley, it sounds to me as if you think that many exposures to mercury today are preventable, given the right personnel to enact progressive measures.*

Look, over the 90% of the mercury – and this is on an average person with four or five amalgam fillings – over 90% of the mercury in the bodies of mothers who give birth to autistic children, and in the blood of not only the mother but anybody else that has amalgam fillings, it comes from their dental amalgams. And yet our government will absolutely – and when I say 'our government' I mean the dental branch of the Food and Drug Administration and the National Institutes of Dental Research – will do everything they can to protect and defend the use of amalgam fillings and to keep this data from being known to the American public.

For example, there is a children's amalgam study that was done on four children on the East coast and children in Lisbon, Portugal. It was funded by the National Institutes of Dental and Cranial Facial Research, put in the hands and under the control of dentists who said the objective of the thing is to show that amalgams are safe for children. Not to test whether or not they're safe or not, but to show it. So they've done this study, and they're going to report on it in the next few months. And they're going to find out they couldn't find anything wrong. But

the one thing is, all they did was measure urine and hair and blood mercury levels at the most. They didn't look at fecal levels where 90% or plus of the mercury is excreted, so they're going to say they didn't see much mercury in these children, probably. They didn't do the porphyrin profiles. That's what was needed to be done to show if a physiological system in the child was being damaged. They're looking at things where you don't find anything different.

Again, it's symptomatic of that Danish study where you did a Thimerosal causal on a population that doesn't have an autism epidemic, and you find nothing. So this is, again, it's part of the government; look where you won't find anything and when you don't find anything, then sell it to the American public because if, "Well, if we didn't find anything therefore it's safe." And you're going to see that come out and that is done by taxpayer dollars and people ought to be extremely mad about it.

*Are there subsets of the population that do not even excrete mercury as expected?*

That's exactly what we find with the autistic children. We saw that the amount of mercury in the control children's birth hair, went up linearly with the number of increasing dental amalgams the mother had. In the autistic children; it didn't go up, it stayed baseline low all the way through no matter how many amalgams the birth mother had. What that's telling you is that these autistic children represent a subset of the population that are markedly affected by mercury. Same thing Dr. Woods found with his porphyrin study; about 10 to 15% of these people are more susceptible to mercury and it causes them to have problems with their urinary porphyrin levels. So I think that what we can say is that if you don't design a study to look at specific children that are affected, then you can look anywhere else and find nothing. That's what is creating confusion and misrepresentation of what might be going on—not looking at the fact that a toxin can affect a small percentage of the population. By mixing those people that are affected into a huge number of people that aren't affected, you can cover it up. That's exactly what these people are doing.

*So it sounds to me from what you're saying, Dr. Haley, as if you feel that there are mainstream and other researchers using flawed premises that produce flawed study conclusions. For example, the misconception that what is excreted correlates with mercury body burden.*

You know, I'm not suggesting that. I am absolutely accusing them of that, because I've seen it happen. For example, this was done at the University of Kentucky where I'm located, and they did a study and they published it in the *Journal of the American Dental Association*: a study that was earlier rejected by the *Journal of the American Medical Association* and the *New England Journal of Medicine*. So they published it in the *Journal of the American Dental Association*, which isn't a refereed journal... which isn't a journal that would normally address neurology or Alzheimer's disease at all. I mean they're not competent to review research in this area. Dentists don't know neurochemistry. Then they called a press conference and announced the release. What they actually did report in this JADA study

was that they couldn't find increased mercury level in people who had huge numbers of amalgam fillings. It is the only study that's ever said that, that you can have a large number of amalgam fillings and they couldn't find elevated mercury in these subjects, any elevation of mercury even though they were massively exposed to mercury versus those that weren't being exposed at all. So, they found no differences. They didn't find that amalgams weren't correlated. They didn't find amalgams were correlated or not correlated to anything. In my opinion, it was the assumptions made in the dental amalgam indexing that obfuscated the final analysis.

So again, it's the construction of confusion by these people by publishing papers that are poorly done, poorly designed, and give them the answer they want which is, "We didn't find anything wrong, therefore everything is okay." It's that old saying you know, "Absence of proof, isn't proof of absence," and they try to modify that and say, "Well, if we don't find anything, we can still say it's safe." That's exactly what they do. The study that was negative, they couldn't find anything. The only people in the world who ever did a study to show that there was no correlation between mercury, blood or body burden and amalgams, and then announced it saying, "Therefore amalgams have nothing to do with Alzheimer's disease." They didn't prove anything. What they proved is that they couldn't measure things right. I should point out that in this study they presented data showing that about 15% of the nuns had brain mercury levels in the micromolar range, which is an extremely toxic level. Some were normal and some were Alzheimer's diseased. I would suggest an explanation of how someone could have such high mercury brain levels and be normal is in order. Also, how did this 15% get such high mercury levels when their sister nuns did not, and they essentially lived under identical conditions. Is this a reflection of a genetic based inability to excrete mercury in this group?

*I think that there was even a study that showed that mercury could actually help – and let me say this was a flawed study – help cognitively. And earlier, also when you said mental effects, I think you meant cognitive because –*

Yes.

*– autism is a constellation of real physiological disorders, not a mental diagnosis, or it shouldn't be, anyway. In the Seychelle Islands study—did this not actually lend credence to the fact that the boys who excreted more mercury in their hair, hence having lower body burden, were able to do better cognitively, and then wasn't that result twisted?*

Well, I don't know if you'd say the result was twisted. It was interpreted in a very unusual way. The net effect was the boys with the highest hair levels of mercury—they interpreted that as being the boys that were the most exposed to mercury when in effect, it was the boys that were excreting the mercury that they were exposed to better. But they didn't do that last interpretation, so this was a conundrum for people to look at. Why would the boys that were exposed to more mercury be smarter than those that weren't? But then what you come back to—and I think our paper on the mercury in the hair of these autistic chil-

dren was the one that explained it—these are the kids that are excreting mercury. We had a study group. We could look at the children's hair and the cognitive effects that they might have, and we compared those and said, "Well look, the kids with the lowest hair mercury are doing worse," and that's because they're not excreting it. Then we could check the children, which Jeff Bradstreet did, as well as Dr. Jim Adams at Arizona State University, as well as several other people, and you find out these are the kids that are not excreting mercury. They're probably the ones with the porphyrin profiles that are aberrant, and this all makes good sense. Except modern medicine, or the people who control medicine and control the vaccine program, etc., don't want this being presented to the American public because it creates a real problem for them. There are literally hundreds of millions of Americans walking around with huge amounts of mercury in their mouths, and they should be concerned. But it will cause an economic hardship on certain people if this is reported.

So, you can have this disagreement, I guess: Should we tell American people, "Hey, you've got a toxic metal in your mouth that's probably going to cause you problems as you age." They're going to want to get it out. They're going to want the insurance companies to pay for it. Or do we keep it quiet and wait until those people die off, and then write a book about it in the history and say, "We shouldn't have done this, and we shouldn't do this anymore." I'm just a person that believes you have to be totally honest to all people at all times. There are other people who say, "No, we've got to cover this up or we'll create a panic." Well, yes, we'll create a panic. A panic generated by the American Dental Association and other people that have suggested that mercury is just fine to be exposed to.

*It is actually a panic, isn't it? It should be –*

I get a lot of phone calls—people asking me what can they do? You know, we should do what they do in Sweden. The government pays to have the amalgams replaced, and replaced carefully and I sometimes dream of the day that we can sit down with a group of well-meaning and well-educated dentists and physicians, and talk about this problem and say, "Here's the situation and here's the best we can do for the American people to get this taken care of." And save money in the long run, because then the cost of keeping a person in a nursing home for a month would more than pay for the replacement of most people's amalgams.

*Good point. Getting back to your study, Dr. Haley, "Reduced Levels of Mercury in First Baby Haircuts of Autistic Children." So there was a correlation between less birth hair mercury and the severity of autism?*

Yes. The less mercury that was in the hair, the more severe the autism, in general, appeared to be. I think what you have are different levels of ability to excrete. The less capable they were of excreting the mercury, the more severe the affect was.

*With regard to Alzheimer's disease, are there any papers indicating that poor excretion correlates with increased dementia?*

Yes, there is. This was before JADA Sach's study. This also was done by two people that I really respect at the University of Kentucky for their ability to do research: Dr. Bill Ehmann and Dr. William Markesbery—one is a chemist and the other one is a neuropathologist, he's head of the aging center. They showed that mercury in the fingernails or the nail tissue of Alzheimer's patients was much lower than that of controls, again, just like that birth hair in the autistic children, and that this was quite different from the levels of mercury they found in the brain. They found it elevated in the brains of AD and lower in control brains at that time. So if you go back to their original data and look at it, this is strong proof of Alzheimer's diseased individuals being unable to excrete mercury as well as normal individuals.

I would also point out that if you go to that publication in the *Journal of the American Dental Association* where they say there's no correlation between mercury exposure and Alzheimer's disease—if you look at the data – and the data, I do believe, is the data that was done in the chemistry department where they measured the mercury levels in the brain – and again, there were about 10 to 15%, depending upon the level of the nuns in that study, to have mercury levels in their brains that were in the micromolar level. That's a huge amount. In other words, these appear to me to be people that were either AD or going to become AD because they had very toxic levels of mercury in their brain, in contrast to the 85% that didn't have those high levels. And this indicates that there were about 15% of those people that were very, very susceptible to retention of mercury in their brain tissue compared to the other nuns. You know, one of the major strengths of this study, the JADA study, when they did it, was that all of the subjects were nuns living in the same convent, eating the same food, going to the same dentist and their dental records were fairly well kept. So if you look at their data, you can say just comparing mercury levels and contrasting doesn't mean much, but if you consider where in the world did these 15% get such high mercury levels if they're eating the same food as these other people that didn't get such high mercury levels in their brain. These are the people, I think, that are similar to what Dr. Woods is talking about in his porphyrin profile. These are people that are affected at low levels of mercury and it's based primarily on their inability to excrete it which is likely a genetically-based phenomenon.

*Good point. So just a bit of a summary here. We're talking about people at different ages who have had mercury exposure having different affects; AD (Alzheimer's disease) or autistic disorder. So what is the relevance of what kind of neurological deficits follow these vaccinations with Thimerosal-containing vaccines such as the Hep B or DTaP, or tetanus or influenza? How does the mercury damage manifest itself at various stages of life in various people?*

Yes, you know you hit on a key question. If you understand that on the day of birth neuron development is quite different than when you are older... If you look at the data and the figures that I've seen in numerous conferences where people show the amount of neurons that have developed in the brain of someone on the day of birth and contrasted that to the first six months of life and to the first year of life, you'll see most of the

neuron growth in an infant occurs in its first six months of life. So if you take that baby out when his neurons are growing and you're having massive development of the brain at that time and that's when you give him an exposure to mercury, you will have a different effect than you would if you wait until a child is six to nine years old and then start placing amalgams in his mouth and see what effect it has after this normal development has already occurred—where they have their maximum number of neurons. Because there's a time that neurons increase and then there's a time when they start slowly decreasing as we age. I think that if I can use an analogy, in the one case you're preventing a bridge from being built; that's when you put mercury into an infant on the day of birth or in his first six months of life. Then the second case, you're taking a bridge that's built and you're increasing the rate that you break down those bridges. That is what I think happens with dental amalgam exposure to someone as they age.

*What happens to a child who receives a Thimerosal-containing influenza vaccine when they're a little bit older, say maybe six years old? I know a child who regressed into an autism spectrum disorder at that point.*

You know, I had not done any studies or read any studies about what percentage, but I think the possibility is that at any time, especially if a child is on the borderline of being autistic and having very poor capability of excreting mercury, I think getting a bolus dose of Thimerosal at this time, with all we know about Thimerosal, with all we know about its extremely potent biochemical toxicity, certain children would have a very negative effect. I think it's criminal to expose a child to Thimerosal when other options are available.

To take another step further and say right now knowing how toxic it is, it's criminal to suggest that people in their 80's get a Thimerosal-containing vaccine to prevent them from getting the flu when you know just how toxic that Thimerosal is. For example, in autistic children, Dr. Jill James' study showed they had low glutathione levels explains maybe the reason why they can't excrete the mercury, as mercury must be chelated by glutathione before it is excreted by the biliary transport system of the liver. Therefore, it fits into this hypothesis: what we know is that in the elderly, especially when you pass about 60 years of age, the level of glutathione that your body produces in the average American drops dramatically. So you're suggesting giving an ethyl mercury shot to older people who cannot effectively excrete mercury – even if they're totally normal – because the glutathione levels in their bodies are just dramatically lower than they are in young, healthy people.

*So it's still not a good idea for a seven-month-old. It's still not a good idea for a seven-year-old, or a seventy-year-old?*

You know, Teri, we're sitting here having a discussion that one of these days when we're old people and we're sitting on a bench someplace, we're going to say, "Man, wasn't that a stupid discussion? We were sitting there discussing whether or not it's a good idea to inject one of the most toxic materials that we know of into babies and old people." I mean, we have to convince the American population of that. That should be very easy

and very straightforward to do, and why are we having this discussion? Because we have bureaucrats sitting in key positions who want to cover up this problem because they are the ones who made it. This is not rocket science. This is common, farm-boy logic. You just do not put really toxic compounds that have absolutely no value, that you can replace with something safer, into the bodies of human beings. You don't put Thimerosal in vaccines, and you do not put amalgam fillings in the mouths of people. Not in this modern day and age when you have things that can substitute for that.

It just shows you how stupid human beings can really be—when we don't stop to think and we just start listening to what "the authorities" say. The authorities here would say everything I said today is wrong, and yet the science and the observation, and the occurrences – we have an epidemic of autism. We're going to have a bigger epidemic of Alzheimer's disease as all these baby boomers start reaching 60, 70 and 80 years of age with a mouth full of dental amalgams that were put in back in the 1950's. And everyone agrees with what I just said about the coming increase in Alzheimer's disease. And yet, when you say well this is what is causing it, you're exposing these people to toxic amounts and this could cause a problem, and they say, "No it can't." And yet they'll tell you, "Don't eat fish. Don't eat the fish from your local lake because the mercury coming from the coal fire power plants has made it a bit toxic," or "the mercury coming out of your dental amalgams is being flushed down the toilet through the water supply system and put back in the lake is causing this problem." So you can't eat the fish because they contain mercury that came from your body. I mean, this is a – it's an absurd situation and an absurd argument.

Like I've stated many times – it was some time ago I made a comment in a conference when I told somebody I felt like I had been in an eight-year argument with the town drunk regarding mercury exposures and mercury toxicity. Now we can expand that out. It's been another six years on top of that, so 14 years of arguing with people that don't understand chemistry and use absurd arguments in court. I mean I'm testifying trying to get mercury out of certain states, and you'll hear these people make comments comparing a dental amalgam to table salt. Then you look at it and you say, this is what I mean by arguing with the town drunk. That is completely absurd logic and it shows that they don't know an iota of chemistry or they're desperately trying to find something to deceive the American people to make them think they're right.

*Well let's talk about a few of those arguments. I agree with you that it's frustrating to try to convince people that the second most toxic substance on earth – that a documented poison – to try to convince them that that's not a good idea to inject into people. We hear a lot about fish. You mentioned fish. But hasn't the mercury in the fish already reacted with things in the fish? Is the mercury from amalgams or vaccines more toxic to humans than that from fish?*

Absolutely. The mercury coming off of dental amalgams has not reacted with anything yet. It has its full toxic potential. The mercury coming from Thimerosal injected directly in the body, that's pure ethyl mercury that's released. It has its full toxic potential. The methylmercury in fish is mostly bound up. I

mean if it weren't, the fish would die. The fish protects itself because it's slowly exposed to this methylmercury as it eats smaller fish, etc., and the fish's body makes compounds to protect it. If it's an ocean fish, it's bringing in lots of selenium. There's much more selenium in the ocean than there is mercury, and selenium is the big neutralizer of mercury toxicity in the environment. So when you eat fish, you are not eating methylmercury. You're eating methylmercury attached to a protein in the fish because it's too reactive to be in a biological system where there's proteins and sulfur compounds or compounds that bind mercury, and just be floating around free. When they measure mercury in fish, they put that piece of fish in an oven and they heat it up to over 800 degrees centigrade to boil off the methylmercury, and then they measure methylmercury. But that methylmercury stays on the fish proteins to a large extent when you eat the fish. That's the reason when you eat a can of tuna with so many micrograms of mercury – most of it is excreted from your body within that day. Whereas, if you take ten micrograms of mercury vapor, 80% of it's going to be in your body for a long, long time.

So again, this is part of the deception, in my opinion, to rant and rave about mercury in tuna so we don't think so much about the mercury in our mouth or the mercury in our vaccines. The medical doctors I talk to who don't know the difference between exposures – I mean exposing yourself to mercury that's already bound up with selenium, bound up with other protective compounds that you find in the fish – is totally different than mercury coming off of a dental amalgam. The one is excreted rapidly and the other one is not. A study done by the National Institutes of Health by a researcher named Kingman back in 1998, published in the *Journal of Dental Research*, showed that the major amount of mercury in our bodies came from dental amalgams. Not from the fish diet. And this was done on 1,127 American military men in the Washington, D.C. area. But even in this paper all they did was measure urine mercury and blood mercury; they didn't measure the amount that's being retained in these individuals—that would have been even more interesting. But notwithstanding that, it absolutely showed that eating fish – because there's a lot of fish eaten in the Washington, D.C. area – is not a major contributor to total mercury body burden in Americans. It might be if you live in an island and all you eat is fish, but it's not in the United States. It's a minor level.

*Here's another thing that we hear. Is ethyl mercury safer than methylmercury? What happened to Thimerosal-derived ethyl mercury in the brains of primates?*

You know, that's what's turning out to be totally wrong, and it's a matter of oink and oink-oink, really. They're both extremely toxic compounds, but they do have different toxicities. I would like to use an analogy so people can understand. If you drink methyl alcohol, or wood alcohol, the one thing you can be assured of is you probably will go blind and you very likely will die. I mean, it's that toxic. It's lethal. If you drink ethyl alcohol, you'll get drunk. But if you drink ethyl alcohol a lot, you'll end up with cirrhosis of the liver. You can even get an alcohol-induced dementia by drinking ethyl alcohol. So the question here isn't, "Which one's the most toxic?" It is, "Is ethyl mer-

cury toxic? Does it cause other problems?" Ethyl mercury releases more inorganic mercury into the brain than does methylmercury. That's what the Burbacher study showed (Burbacher TM, Shen DD, Liberato N, Grant KS, Cernichiari E, Clarkson T. Comparison of blood and brain mercury levels in infant monkeys exposed to methylmercury or vaccines containing Thimerosal. *Environ Health Perspect* 2005; 113:1015-1021).

So therefore, you can make the statement that in certain parts of the brain ethylmercury is more toxic than methylmercury with regard to giving a mercury toxicity in that region. If you look at the immune system, it would be hard to find anything more toxic than ethylmercury with regard to the dendritic cells from the California study, and the inhibition of phagocytosis at one nanomolar. So they're both extremely toxic. They have different types of toxicity, but that doesn't mean that ethylmercury injected into a child is a good idea. That's like telling your children, "Well, we don't want you drinking any hard liquor but if you go out, drink all the wine you want. I mean, the wine is not as toxic as whiskey, so the one won't bother you at all." I mean, it makes me angry that people try to use, or force that type of logic on well-meaning and well-thinking people. You just have to look up and say, "Don't be such a dummy." I mean, Thimerosal is plenty toxic to cause a problem. We weren't injecting methylmercury with the vaccines. We would have seen a toxic effect and it probably would have been slightly different.

*So is the methylmercury compound more toxic than ethylmercury, or is it in general an exceptionally toxic form of mercury?*

Yes. When you say that – methylmercury will kill you faster than ethylmercury. I mean, if you talk about lethality. But that doesn't mean that at low levels the ethylmercury can't be more damaging to your neuronal system than methylmercury. The bottom line is they're both exceptionally toxic compounds. I mean, why do we even let them get us into this argument of which one's the most toxic, when both of them would be considered as extremely toxic organic mercury compounds? I mean I think it's an argument that we say, "Hey, only a fool goes and argues which one's the most toxic." It's just like, "Is wine more toxic than whiskey?" or vice versa. I mean, they're both toxic so they both have their effect and one may take, say, twice as much. Twice as much isn't a big deal when you're injecting it directly into the body. And is the amount you're getting exposed to enough to cause the problems you see in autistic children? The answer is absolutely. If you're putting in a half a mil of 125,000 nanomolar of mercury from a vaccine into a baby, and one nanomolar causes severe problems – or one nanomolar or less – and you can do the calculation on the blood volume, the liquid volume of a six-pound baby and dilute that out. I did those calculations. You've probably seen it on some of the talks I've given. What you're seeing is that you have nanomolar levels in the body, in the blood, that definitely reach levels that could cause severe toxicity.

*All right. In the non-human primate study – and I understand that they're both poison – but did the Thimerosal-derived*

*ethylmercury persist in the brain longer, a greater amount of that?*

Yes. The Burbacher study showed that there was more inorganic mercury in the brain of the monkeys, and numerous studies have shown that inorganic mercury stays in the brain with exceptionally long half-lives, varying from many, many months up to 27 years in certain cases.

*And in the Burbacher study, it was inorganic mercury from the Thimerosal-derived ethylmercury?*

Yes, it was.

*Now also it can be argued that the exposure of neurons in culture is different than other routes of administration. Do we have respected medical history backing that low-level exposure to mercury can cause severe neurological disease in infants?*

Well, I've never argued that exposures to neurons in culture represented a mimic of the natural state. But let's put it this way. What we're seeing—and not only us—people in Europe have done the same studies where they've taken neurons in culture and found that they see significant biochemical effects, including death, at low nanomolar levels—I mean very low nanomolar levels. Now, if you look at that and then you go to the brain studies from the Alzheimer's study – what was published in JADA – these people had micromolar levels. So a nanomole is  $10^{-9}$  molar. A micromole is  $10^{-6}$ . So the difference is  $10^3$ , you know, a 1,000 or more. So certain brains had 1,000 times the amount of mercury that's required to kill a neuron in culture. And you say well all of a sudden you should get worried. There is no doubt that the brain has a massive ability to protect itself from mercury toxicity, but 1,000-fold over the lethal concentration and it comes in every day? It keeps coming in and coming in. You have to say, "Let's look at reality." There are going to be 10 to 15%, from what I understand, of American people that are going to become demented before they die of Alzheimer's type disease. So at some point in their life, they are incapable of protecting their neurons from some form of toxicity that is causing them to die. You're telling me that adding mercury on top of that isn't going to exacerbate that problem? You know, I would find that hard to believe.

Plus, if I had done that study on neurons in culture and I didn't see any killing until micromolar levels, then I would have to admit, you know, you're not going to get too many micromolar levels of mercury in the brain, therefore, my hypothesis isn't solid. It's not something you should be concerned with because you don't reach those levels in the brain. But when you see neurons killing in culture at nanomolar levels, and you get much, much higher levels on injection – or when you look at brains, the level that's in there – then you have to say, "Hey, this could be a problem." So it's a common sense issue, and common sense says if you have something that kills neurons at a nanomolar level, you ought not be injecting hundreds of thousands of nanomolar molar levels into your body.

*I would think that at some point the mercury might actually disable the body's defense mechanisms against mercury even more.*

In the study done in Italy, they show that the very first thing that happens when you expose neurons to sub-lethal doses—this is doses of mercury that are like  $10^{-10}$  molar that don't kill the neurons very quickly—what they found was that the glutathione levels dropped dramatically. In other words, mercury prevents the synthesis of the compound that is used to excrete it.

*Yes. So the very thing that would help combat it is disabled by it?*

Yes.

*Okay. Now I had a friend who was concerned about her son having mercury toxicity and the doctor simply – this is a long time after the fact of exposure from vaccinations – prescribed a blood test. Is a blood test or a blood clearance always a good way to measure potential adverse effects of mercury administration?*

There's no way you can do a blood test on a child that's been exposed to ethylmercury in the past and look at the mercury level in that blood and make any knowledgeable statement about his toxic retention. There's just no way you can do it. That happens all the time. If you take people that are exposed to mercury, they'll have a high blood level. The blood levels of mercury will drop down dramatically. But they're not excreting it. It's being collected in the cells in the central nervous system. That's the retention toxicity possibility. In fact, if they found mercury in the blood, the child would probably be better off because it would indicate he's getting rid of it.

*And what about the babies who had Pink disease? What did that tell us?*

Well, it told us that exposure to mercury to an infant – you know, this mercury exposure came from teething powder so you know the age of the babies. They were at the time where they have a very sore mouth because teeth are breaking through, and people were rubbing a mercurous chloride-containing material called Calomel ( $Hg_2Cl_2$ ) on their gums. Again, you say, "well why would they do that?" Well, mercury destroys the ability of a nerve to function properly and so it kills the pain. That's the way it worked. It's a neuron-damaging agent that prevents the pain of teeth coming through on that skin from being perceived. Those babies, a small fraction of them – again, just like the autistic – I think it's 1 in 500 is the number I've read published, developed Pink disease, which was also called acrodynia, and they had symptoms that were quite similar to autistic children except they were very, very young. They were less than two years, so no one ever diagnosed them as autistic. But they would turn bright pink. They would have sore joints. They would have red cheeks, some types of irritation.

When they took the teething powders off the market, that disease disappeared. There's some very nice articles that are

written by people who were Pink disease children, who have survived, and who talk about the problems they had the rest of their lives because of that exposure. But basically what the Pink disease epidemic, which occurred up to about 1940, tells us and what it absolutely shows us, is that a very low level of mercury—and this was a very non-toxic type of mercury by the way. Calomel, or mercurous chloride, isn't nearly as toxic as Thimerosal—but a very low exposure to that on an infant when their nerves are developing can cause severe problems. It's a perfect poster child for saying how can anybody sit there and say that exposure to Thimerosal couldn't be toxic when we have the Pink disease example to look at?

*Right, and the babies who were exposed to Thimerosal in the rigorous infant immunization schedule, they weren't even able to produce bile at the time that they received it, were they?*

No, they weren't, and that was one of the reasons I kept telling people, "You've got to understand—infants cannot detox mercury very well because they don't make enough bile." I'm sure that the production of bile – and I know it's a major problem with certain children that are born – is something that's genetically inherited also. There are probably good bile producers and there probably are not good bile producers. But without a doubt, most infants—and most physicians or pediatricians would tell you—you don't feed certain foods to an infant until he gets to be six months or so old, because he's not making enough bile to detox it. Production of bile is one of our detox mechanisms.

*Wow. I wonder if I'm on the right track here, but did that have anything to do with children who became jaundiced when they were a few days old after receiving the Hep B? Might it have?*

I would say that's a possibility, but I don't have any data to have any –

*Yeah, it's just a thought. It would have been nice for someone to have maybe said, "Hey, this might be a caution here for getting anymore Thimerosal-containing vaccines." Not that it's good for anybody. Might babies of immunocompromised mothers be more susceptible to even lower doses of Thimerosal-derived ethylmercury?*

You know, since the immune system appears to be affected in autistic children, and since we know that Thimerosal is one of the most potent known immune system suppressors, I would say "yes", this would be doubling the risk, at least.

*Okay. Well just a couple more questions before we move forward to some talk about treatment and the future. Dr. Haley, why are males more prone to mercury toxicity than females?*

Well, in my opinion, and the research we did set a lot of this off, we knew that there were four boys to every girl, so Dr. Mark Lovell and I, sitting down talking about our studies on looking at the toxic effects of Thimerosal on neurons in culture, decided we would pre-treat the neurons with estradiol or testos-

terone to see what would happen – would this enhance the toxicity – and the results were dramatic. The estradiol actually protected against the Thimerosal toxicity. I mean at the lower levels of Thimerosal that we used that would kill the neurons, or over half of them in 24 hours, we could almost totally prevent that by adding estradiol. When we put in the testosterone, at levels where testosterone had no affect on the normal life span of these cells the neurons were all dead within three hours at levels of Thimerosal alone that took over 24 hours to kill about 80% of the neurons.

So the presence of testosterone dramatically enhanced the killing power of Thimerosal to neurons in culture; whereas, the female hormone had the opposite effect. Then when we followed up on that, we ran into a report by a Dr. Baron-Cohen from England that implicated testosterone increases in children who have a lot of autistic-like problems. I wouldn't say he called it autism. But you know, language development and other problems, the problems that you correlate with autism, were primarily found in children born of mothers who had high levels of testosterone in their amniotic fluid. That's the only difference they could find. That led him to propose that this was a major male brain disease or problem; "excessive maleness" in the brain is how I think he described it. I would suggest that people read this because he's a psychiatrist or psychologist and I'm not expert in that area. But anyway, the observations indicate that testosterone plus Thimerosal is the major problem.

Now, Mark and David Geier are looking into this and they're finding that autistic children definitely have high testosterone levels on the average. I've heard them give a talk, and I've talked to them about their data indicating that it's a major susceptibility factor: if you're from a family that produces a lot of testosterone, if you have higher levels than the average of testosterone, then you may be more susceptible to the toxicity of a Thimerosal-containing vaccination. It fits into the whole mold of everything that we're seeing. So I think that's the reason why you have a massive amount of boys getting this problem versus girls. To expand on that, it's well known that 10-15 years ago we were having concerns about girls not being trained as well in math and science because boys did better on the math and science tests of the scholastic aptitude – or SAT tests – than did girls.

Today, that's flipped around to where the massive concern is: "Why are our boys going in the toilet academically? Why can't they pass the math and science portion of the SAT tests?" These are kids that are not called autistic; these are kids that are planning on going to college. I mean they are not dramatically damaged, but I think what we've seen is a damage to two generations of American children by the vaccine program – caused mainly on the boys – and we're looking at that and saying, "Is something wrong with computers?" Or we blame, we beat on the education community, the community that's responsible for education. I think they have been given an impossible job—trying to teach to children who have had their cognitive skills somewhat damaged by a vaccine program. And these are the bright ones.

*Absolutely. So while the American public may not understand why this issue touches them, children who could have*

*done better in school may not be doing as well in school, or be doing well in school, as they could have.*

Well, I think that's exactly right. You have to explain this conundrum. We had to add 100 points to the SAT scores to get them back up to their normal average. So that's about how much damage we've done. We now practice affirmative action to get boys into law school, dental school and medical school because the girls have just outstripped them academically in the last ten years.

*This is a really sad commentary. To reiterate, mercury and testosterone have a negative synergistic effect?*

We would not say it that way. Testosterone at the levels we are talking about are not toxic alone, and may even be beneficial to the growth of a male child. We would say that testosterone enhances the susceptibility to the toxicity of Thimerosal dramatically.

*Okay, and boys are now doing worse in math and science?*

Look at the newspaper reports. I've read time after time how the scores of the males have dropped dramatically relative to the girls. It's not that the girls have gone up, it's that the boys have gone down.

*Right, and it's kind of frustrating to look at these mainstream magazine articles and wonder "why aren't they getting this?" You know, you mentioned a psychological expert, but this isn't really a psychological thing in my humble opinion. You know? It may be a cognitive thing, but it was caused by some physiological damage.*

Yes, but people will argue. You know that old saying, "If the only tool you own is a hammer, every problem looks like a nail." If the people who are addressing this problem aren't biochemists – they aren't physiologists. They're not people trained in the medical toxicology. So the comments that come back, that you look at time and time again from these people are – they're mainly sociologists. They're education people. I'm not running down that field. They say, "What's doing this?" Well it must be something global because our government tells us the vaccine thing is a joke so it's probably the fact that they're playing too much with computers, or they're more interested in buying clothes. You know kids are kids. They're the same now as they ever used to be. I know when I was chairman of the Department of Chemistry, I pushed our department into having website servers where a young college kid could go to 24 hours a day, seven days a week and look at all the lecture notes, take practice exams, look at test questions, take a test, have it graded and tell him how well he was doing on the type of questions we would ask. And you can't tell me that that wouldn't help those young people do a lot better on tests, because they did do a lot better. But at the same time, some of these students are coming in, and they're so damaged even this access to our web servers cannot significantly help them. So, computers aren't the cause of our problems. I think the fact that we've generated a large

number of young students that have somewhat been damaged by exposure to mercury when they were infants.

*Dr. Haley, what do you think is going to happen to the American workforce, college graduates and families, with a widespread neurologically or cognitively damaged male population?*

Well, I'm not a doom predictor because I think we'll survive that. But if you study our graduate programs—and I do that—I mean, it was my job for eight years, trying to ensure that we could get enough graduate students into the chemistry program so we could teach general chemistry, because you need graduate students to run the laboratories. What you see in not only at the University of Kentucky, but at every university in the United States probably, is a huge preponderance of foreign students coming into graduate school because we can't find enough qualified American students in chemistry and math and other science areas to help us with those laboratories. So the occupations requiring a math/science education is going to be taken by people who come from countries where they didn't damage their children. This is not a wild speculation. I think out of 78 nations, if we look at our longevity and our health, the United States ranks 72. We're not ranking in the top ten.

So, there's something wrong with our medicine and it may not be the medicine as much as it is the vaccination policy that's causing us to have a lot of children that have speech problems or cognitive problems, health problems. I mean if you're not making heme and you're not carrying oxygen very well, you're talking about chronic fatigue-type problems. If you can breathe well, but you don't have the heme or the red cells to carry the oxygen to the appropriate spots in your brain or in your body, you are not going to be a healthy person. I mean just look at any animal population that's been made toxic. You have the same effect. What we're doing is we're trying to find somebody to beat on who can't fight back, and that's mainly the fish. We go blame the fish.

*Excellent points, Dr. Haley, and thank you for bringing that back around to the heme. There is a statement in a James Woods and colleagues study drawing upon Schwartz and Weis, he says, "There is considerable need for further development of analytical approaches in toxicologic and epidemiologic research for estimating public health impacts associated with environmental toxicant exposures and, especially, for identifying metabolic processes and genetic variants associated with altered susceptibility (risk) to toxicant injury." How do you feel about this?*

I think he's right on because it's what we more or less said in our autism paper. If you've heard me talk, I've been saying that now for about ten years. The frustrating part of this is, this is not rocket science. Again, I can understand how a layperson wouldn't understand the damage done by mercury from dental amalgams. I can't understand how a physician – and you have this very, very quiet response from the American Medical Association – they never mention amalgams except to say, "Well, the dentists tell us that it's safe." I don't know of a physician that wouldn't understand what training that a dentist has and

that they are totally unqualified to make a statement on the toxic effects of the amalgams they're putting in our mouths. That's like asking house painters to talk about the toxic effects of the lead and mercury that was in the paints that we used to put on the walls. This is a level of absurdity that I just cringe when I think about it, and I'm very disappointed in my own inability to convince the Food and Drug Administration and certain Congressman and other people that we have a major problem and if we're to be a healthy, strong country, we can't be exposing our population to mercury.

And having half the government, like the National Academy of Sciences and the Environmental Protection Agency have both put out reports saying somewhere between 8 and 10% of American women have such high mercury body burdens as to render susceptible to neurodevelopmental disorders any child they would give birth to. They made that statement. I didn't make that statement. Yet when you go to all the research papers that are coming out and saying, "that human mercury body burden you're talking about, 80 to 90-plus percent of it is coming from dental amalgam" this needs to be addressed. Plus, you add the bolus doses – the huge amounts you gave to a baby on the day of birth via vaccines to this child born from a mercury toxic mother – is an absurdity on top of that. Our government does not do anything about it. That's because they can't hear the data, they can't hear the comments about this over the rustling sound of the lobbyists' checks that are being written for them to tell them 'support us.' The American Dental Association actively goes and supports and fights any mercury restriction bills based on eliminating amalgams that we take up in front of Congress or any state. Medical organizations write in support of keeping Thimerosal in vaccines given to infants and the elderly. I fail to see any logic in retaining injection of ethylmercury into anyone if you are indeed concerned with their health and follow the "first do no damage" criteria. I think the bureaucrats at the medical organizations are going to be embarrassed in the end and they will have done much damage to the credibility of the medical profession in this country by their actions.

Any time I go to a state that is trying to eliminate or restrict the use of mercury in medicine and dentistry, it will be me there with a couple of parents that are intelligent and well read that started the bill. A few legislators are trying to help them, and I will be opposing six or seven people dressed up in expensive looking business suits who are there as lobbyists or as dentists or physicians saying, "Oh, this isn't true. This isn't true. Don't listen to this guy," and they don't present any published data. I've mentioned that several times to the legislative committees that are listening to us. I'll say, "Ask them where their data is." If I make a claim that mercury is 22,000 times higher in the heart of a child that died of idiopathic dilated cardiomyopathy, I want to show you where it was published. They're going to say mercury exposure doesn't have anything to do with the health in this country, yet we have children die of this all the time. Where's their data showing that it doesn't?

*I'm glad you brought that up, Dr. Haley. So, one more agency-type question. Please tell us about idiopathic dilated cardiomyopathy and mercury. Are agencies such as the National Institutes of Health and FDA looking into this relationship?*

If they are looking into the relationship, they've kept it a secret from me. I mean, this was published in 1999. That was about seven years ago. What the study showed is that people who died with – they call it IDCM – idiopathic means we don't know what causes it; it's a mystery disease. Idiopathic dilated cardiomyopathy is a disease that kills mostly the young people who are too young to die of a heart ailment at that time. You know, usually high school athletes that die during basketball games or football games, or even older athletes. It is also one of the major reasons that we have to pay for heart transplants in older people, because they have that cardiomyopathy. The thing we do know is that cardiomyopathy can be caused by a low selenium level in many countries. Selenium is taken out of your body by binding to mercury. Even if it's in your body, it won't be useful because the mercury will make it biologically unavailable for the body to use. So we have all these tie-ins with mercury causing cardiomyopathy, and when they measured the amount of mercury in the heart tissues of these people, it was 178,000 nanograms plus per gram of heart tissue. That's 22,000-fold excess of what they found in the muscle tissues of those same patients, or in the heart tissue of people who died of other forms of illnesses or diseases.

So there's no doubt IDCM, a major disease in this country, is caused and is somewhat related to huge, huge increases of mercury in that tissue. Our government, our NIH, has not put out one nickel or one call for a research proposal to look at the involvement of mercury in this disease. This is consistent with the NIH not looking at mercury toxicity causing any neurological or any type of systemic illness in Americans. You look at what they've published. I mean they will spend money on 1,000 ridiculous research articles or projects, and they will not look at this very, very important question. If you go to Medline or Sci-Finder and check on the publications studying the relationship of mercury to neurological diseases you will find that the vast majority of this research was not done in the USA. We have to ask "why?" and it is my opinion that research into the involvement of mercury being a causal or exacerbating factor in any major illness is being suppressed by the dental and medical aspects of our country that cause the major exposures of humans to mercury.

*It's like we have 1,000 elephants sitting in the living room.*

It's somewhat similar to that. Again, it goes back to my now-14-year-argument with the town drunk. There is a strong component in our government agencies and I would say one of them is the dental branch of the Food and Drug Administration. It's run by the American Dental Association in my opinion. They put a halt on any projects or any look at the amount of mercury that comes off dental amalgams. The Food and Drug Administration has absolutely and steadfastly refused to measure the amount of mercury that comes off of dental amalgam because they would not like the answer. The proof of that lies in the fact they would shut me up in a heartbeat, a long time ago, if they would just publish an article saying, "We made 100 amalgam fillings outside the mouth. We sent them to Yale, Harvard, Cal-Tech, University of Washington, other places where people are expert at measuring mercury, and they showed that no, or insignificant amounts of mercury came off."

That would cost them \$10,000, and yet they've refused to do that.

The reason they refused is they know that they would lose, that it would come back saying, "Look, these are toxic levels of mercury." Because people like me and others have measured this and we know they're wrong. Yet, what you get them to do is they say, "No, we're going to stick our heads in the sand and ignore this." Also, if they do address this issue – they use a very clever trick. When you ask the Food and Drug Administration to look at the safety of dental amalgams, they do not fund any new basic research to be done by unbiased, high quality research groups. What they do is they read and review the existing papers. They make a committee to read these papers that are made of people that they can manage. The committee will come up and say, "We didn't see anything saying like an epidemiological study that stated that dental amalgams were toxic and caused an illness," because there's nothing published because nobody funds such studies, including the American Dental Association. The committee will conclude, "What's needed is more research," and they've been saying that since about 1960. "We need more research to see if amalgams are toxic." Yet that research never gets done because the NIH doesn't fund it because most of the funding for such research goes through the National Institutes of Dental and Cranial Facial Research. This is operated by dentists and they are not interested in finding that amalgams caused a lot of problems because it would embarrass their profession, and in my opinion that's the reason they don't do it. I believe this because one can't explain why you can go to the NIH CRISP (Computer Retrieval of Information on Scientific Projects) data base and pick any metal like cadmium, lead, arsenic and you will find hundreds of grants that have been funded to look at the toxicity and the fact that these might correlate to some disease. But if you put in mercury, excluding methylmercury from fish, and try to find any grant that's been funded, you will find very few and the very few that you will find will have been awarded to a dental school somewhere in the United States for the project, and the project usually will not have published anything on the issue.

*Now we mentioned cardiac disease and I spoke with a doctor from the United Kingdom who found that his cardiac patients did better with chelation.*

Yes, I think anything that would get cadmium, lead and mercury out of your body would make you do better.

*So let's move forward. On behalf of autistic children, are there any promising developments with regard to more effective and safe chelation methodologies?*

I think the sad thing is – if it's being addressed at the NIH level, I haven't heard about it. I mean, that would be the place to go because it may sound like I'm against NIH and I'm not. NIH is loaded with hundreds, if not thousands, of outstanding scientists who just may not be aware of what this problem is, scientists that could develop excellent chelators. We need this because the chelators we're using, primarily DMSA and DMPS, were invented by the Russians and Germans back in 1940. So these things are now 66 years old. They weren't developed

knowing anything about crossing the blood brain barrier problems, etc. So we need NIH and a major proposal going out to all the good chemists in the world that can make new types of mercury chelation compounds. Again, the biologists and the biochemists who can test them to come up with something that can detox this 8 to 10% of American women, which amounts to millions, and get their mercury body burdens down. I mean it's absolutely needed.

Now the thing is, I have made – with one of my graduate students – some compounds that we think will be much better at chelating and removing mercury from the body, but we're doing it on a minimum budget and we have a hard time getting the toxicity testing done because of all of the restrictions and the costs. But that's exactly where it is right now. I think that it probably will be done. I talk a lot in Europe; I think it will be done in Europe. I don't think it will be done in the United States because we have this problem that our government won't recognize this as a problem so they're not going to put money in it.

For example, when Congressman Dan Burton had a hearing on amalgam fillings, he had the head of the Food and Drug Administration there, and he had the spokespersons from the American Dental Association there, and me. I and others encouraged Congressman Burton to ask the FDA this question: Have they ever tested amalgams for mercury release and corresponding toxicity? The Food and Drug Administration representative said, "No, they have never ever tested amalgam fillings." Dan Burton asked them why and they said, "Well, because we listen to the experts in the field," and the experts in the field in this case was the American Dental Association, and they tell us mercury doesn't come out and that they're totally safe. Yet if you go at the same time to the handout that the American Dental Association presented at the meeting and what was on their Web page, they stated one of the reasons that they can tell American people that amalgams are safe is because the Food and Drug Administration says they are; they've approved them.

So you have this ring of circularity in their reasoning. The ADA telling the FDA that amalgams are safe, and then the ADA telling the public that we know amalgams are safe because the FDA has approved them. This is the absurdity that we face. So we can't get a push to make it worthwhile to make anything that would help remove mercury from the body if the major government agency controlling this, the Food and Drug Administration, is saying it's not a problem.

*But theoretically, there is a possibility of making better chelators given the right attitude and sufficient funding?*

No, it's not theoretical; it's a fact. Much better chelators can be made and they can be much safer to use.

*Okay.*

Trust me. Anyone sitting there looking at DMSA and DMPS could say, "Hey, we could make an improvement on this," because they in fact are not chelators. They do not have room between the two adjacent thiol groups to bind mercury as a chelator. We've made compounds that bind mercury – orders of magnitude tighter than DMSA and DMPS, and in the test tube

they work tremendously better than those two. However, we've got to show that they're not toxic. That costs a lot of money and it's very difficult to do, you have to have the right facilities. That's where we're hung up right now, the question is, "How do we get somebody to do these studies?" because I face another problem. I am very outspoken as obvious from the comments I've made in this interview. Other scientists, while they agree with me, they like me, they also would like not to work with me because they don't want to pull any attention on themselves for what I've been saying for the last 15 years. They've seen the luck I've had with funding, etc., from being very outspoken and they don't want to join me. I don't blame them a bit. I mean, they have careers, they have families. So it's very difficult to decide to stick your neck out. Well, we can say you can be honest and straightforward in this country, but you better go into it with the idea you're going to pay a price.

*Dr. Haley, how are gold salts looking?*

I don't know. Again, I don't treat patients. I mean, I'm not allowed to; I'm a Ph.D. research scientist. I have given as much information as I can to people who might be testing this, and I think that they are doing the right thing and they're keeping very quiet about it until they come up with an answer.

I do think there are people that are checking these out on older autistics, that aren't young infants, because gold salts can be very dangerous. I mean it can be a double-edge sword where it could cause you as much problems as it could cause you health. Again, that is something that should have been done by government clinical research groups to really say that it was done right. They could have done it in a heartbeat. Again, it's just not an issue for them at this time. But I do think that there is a strong possibility the chemistry is there that the gold salts could be helpful to treat mercury toxic people. You can have a lot of good ideas, and most good ideas turn out not to work in science because there's just usually one way things go. But this is one that has the potential of being very helpful, but it requires a clinical study. Like I say, there aren't too many places that would openly approve of such a study as the argument is that mercury toxicity is not a major problem. If I tried to get an IRB approval at the University of Kentucky to inject gold salts into autistic children, it would not, in my opinion, be approved. Now if somebody who was a medical doctor in a medical clinic that treated a lot of autistic children were to make that suggestion based on what they've seen, and wrote it up right, they would get it approved.

*So, Dr. Haley, what is the priority for the future moving forward?*

Well for me, right now, I mean I think the fact of autism causation being Thimerosal is over. I mean, you're going to hear a lot of screaming, a lot of denial; that just goes with the territory when you fight with individuals with their backs to the wall. But if you take into account that autism didn't exist before 1941-43 in the literature, and we put Thimerosal in our biologicals in 1933 or '34, it fits into the fact that the disease appeared with the advent and the appearance of Thimerosal in biological compounds. Everything you've seen with the epidemic going up when you increased the amount of Thimerosal exposure to children through the vaccines and now it is dropping with the removal of Thimerosal from infant vaccines reflects this, along with all of the biological data on retention toxicity, genetic susceptibility, aberrant porphyrin profiles returning near normal on mercury chelation in autistic children, the case against Thimerosal is exceptionally strong. I think it's a conclusion that no one's going to be able to refute, and we're going to have to learn to live with it. However, the medical establishment that was deeply involved in exposing children to Thimerosal will likely go to their graves denying this theory.

Therefore, I'm not trying to prove that Thimerosal causes anything anymore. I'm trying to develop better heavy metal chelators to help detox the American population. I'm going as hard and as fast as I can in that direction with my limited resources. The limited resources, by the way, aren't necessarily money. It's the fact that you can't get people to collaborate with you because they know it's an unpopular issue. The Institute of Medicine made it quite clear, "Don't do anymore research on Thimerosal being causal," because they wanted to subvert the possibility that somebody would prove that the CDC vaccine policy makers had made a big mistake with the mandated vaccine program. So people know about that, and they know if you write grants suggesting Thimerosal as a study factor, you will not get funded. You may get on somebody's list that's not a good list to be on. So there's a shortage of good collaborations in this area, and that's the reason I think it will be done in Europe. I think it won't be done in the United States because there's just too much political pressure against it.

*Well, Dr. Haley, thank you for your continued and courageous work on behalf of America's and all of the world's children and citizens, and thank you for sharing this information with us today.*

You're welcome.