Facility Automation Management Engineering Systems (*FAME* Systems)
33A Hoffman Avenue, Lake Hiawatha, NJ 07034-1922

Wednesday, 30 January 2013

Introduction

Following this introduction page is this reviewer's science-based analysis of an article titled, "**Poison pill: Not all mercury is toxic**", written by Dr. Heidi Lawson (heidi.larson@lshtm.ac.uk), which was downloaded from the *New Scientist*'s Internet web site at http://www.newscientist.com/article/mg21728990.200-poison-pill-not-all-mercury-is-toxic.html on 15 January 2013.

This analysis, titled "**Draft Review of: 'Poison pill: Not all mercury is toxic'"**, begins on the next page.

Introductory Remarks

First, to simplify this analysis, each portion of the article being reviewed is first quoted in its original fonts.

Further, when some specific sentence, clause, phrase, or word is being addressed within the review, it is quoted in an *italicized* "Times New Roman" font.

Second, this reviewer's assessments are written in a "Verdana" font, follow each quoted portion of the article, and are indented to clearly separate the review remarks from the preceding portion of the document that is being addressed.

Third, when other sources are quoted or referenced, an "Arial Narrow" font is used.

Finally, should anyone find any significant factual error in this review for which they have independent[a], scientifically sound, peer-reviewed published substantiating documents, please submit that information to this reviewer so that he can improve his understanding of factual reality and, where appropriate, revise his views and this analysis.

Respectfully,

<s>

Paul G. King, PhD
CoMeD Science Advisor & Secretary
Founder, ***FAME Systems***
paulgkingphd@gmail.com
Tel. 1-973-997-1321, after 21:00 Eastern Time
[To whom all responses should be directed]

[a] To qualify as an independent document, the study should be published by researchers who have no direct or indirect conflicts of interest from their ties to either those commercial entities who profit from the sale of vaccines or those entities, academic, commercial or governmental, who directly or indirectly, actively promote vaccines, the development of vaccines, and/or inoculation programs using vaccines.

Draft Review of "Poison pill: Not all mercury is toxic"

The author, Heidi Larson, an obvious vaccine apologist begins be making an unqualified assertion, "***Not all mercury is toxic***", that is simply false.

Factually, all forms or mercury, elemental, inorganic, organic and organometallic, are toxic.

However, below some established level of exposure that is specific to each particular mercury entity, its mode of exposure, and other relevant factors, exposure to that mercury entity can be considered to be "safe" or "nontoxic".

For humans, all forms of mercury are toxic unless the level of their exposure is *less than* the levels that have been proven, *in appropriate scientifically sound toxicological studies*, to produce no observed adverse effects in test animals whose results have been proven to provide adverse toxicological effects which can then be translated into the corresponding general toxicity risks for humans.

For studies in rats, the recognized general factors for converting "mercury" toxicity findings in rats to "mercury" toxicity in humans are, *at a minimum*:

1. The recognized minimum inter-species relative toxicity factor of 10 for rats compared to humans,
2. The recognized minimum 10-fold toxicity factor needed to address human population diversity, and
3. The accepted (by research scientists, the US Environmental Protection Agency [EPA] and the US Food and Drug Administration [FDA]) factor of 10 to account for the higher susceptibility to mercury poisoning in the developing child.

Thus, to convert from valid toxicity determinations in rats given various decreasing chronic doses of Thimerosal ("thiomersal") [TM] by injection to the corresponding toxicity level for the toxicity in developing humans, all one need do is divide the toxicity values in rats chronically treated with TM in scientifically sound studies by 1,000 to obtain the corresponding toxicity estimates in developing humans.

Further, without a peer-reviewed, published, scientifically sound and appropriate "no observed adverse effect level" (NOAEL) for the particular mercury compound being discussed, all levels of that mercury compound must be taken to be "***toxic***".

Based on an FDA- accepted, -referenced and -cited chronic toxicity study for injected Thimerosal ("thiomersal") [TM] in rats[1], the

1 Mason MM, Cate CC, Baker J. TOXICOLOGY AND CARCINOGENESIS OF VARIOUS CHEMICALS USED IN

NOAEL for injected TM in developing children is *less than* 0.0086 microgram (µg) of TM per kilogram (kg) of the child's weight (per day [da]), or < 8.6 x 10^{-9} gram [g] of TM/ kg (/da), or < 4.2 x 10^{-9} g of mercury [Hg] from TM/kg(/da)[2].

If the TM-containing biological drug product (vaccine) can be administered to newborns weighing as little as 1.0 kg (2.2 pounds), then the administered vaccine dose must contain *significantly less than* 0.0086 µg of "*thiomersal*".

Since the amount of "*thiomersal*" in the vaccines given to such newborns is nominally 25 µg of "*thiomersal*", it is obvious that the level of "*thiomersal*" in vaccines is toxic to developing children unless the child weighs *significantly more than* (">>") 2900 kg (>> 6400 pounds).

"A global treaty on mercury pollution will do more harm than good if it bans the vaccine preservative thiomersal"

The writer's 'lead in' makes an unsupported assertion about an event that, *if it were included in any global treaty*, would have a delay period of more than long enough for the manufacturers of the current TM-preserved vaccines to switch to an alternative cost-effective compound for use as the preservative in such vaccines.

Factually, 2-phenoxyethanol (2-PE) is an alternative chemical compound that has been used as a safe, effective and cost-effective preservative in vaccines for more than two (2) decades[3].

Moreover, in a recent attempt to make a multiple-dose vaccine for Pfizer's Prev(e)nar 13™ pneumococcal vaccine[4], "*thiomersal*" (TM) "did not meet EP antimicrobial effectiveness acceptance criteria".

On the other hand, 2-PE "at a concentration of 5.0 mg/dose was stable and met EP recommended criteria for antimicrobial effectiveness tests when the formulation was kept over a 30 month period".

Thus, because "*thiomersal*" is a bioaccumulative mercury toxicant that is much more toxic than 2-PE, which is not a bioaccumulative toxicant, and has been, can be, and is being, used as an effective and cost-effective preservative in vaccine formulations, the writer's unqualified lead-in statement appears to be at odds with the facts.

THE PREPARATION OF VACCINES. ***Clin Toxicol***, 1971; **4**(2): 185-204.

2 See: http://dr-king.com/docs/090812_fnldrft_TheTruthAboutTheToxicityOfThimerosalr5b.pdf.

3 See: http://mercury-freedrugs.org/docs/20110105_CoMeD_onepager_Preservatives_rb.pdf.

4 Khandke L, Yang C, Krylova K, Jansen KU, Rashidbaig A. Preservative of choice for Prev(e)nar 13™ in a multidose formulation. ***Vaccine*** 2011 Sep 22; **29**(41) 7144-7153.

"NEXT week, governments from around the world will gather in Geneva to finalise a long-overdue treaty on mercury. The aim of the negotiations is laudable: to ban those mercury-laden products and pollutants that are a danger to human health and the environment.

Among the targets are some of the most toxic products of the industrial age, including methyl mercury. This notorious compound killed and injured thousands in the Japanese city of Minamata in the 1950s and 1960s and still poses a significant global health risk."

This reviewer agrees with the first two statements made by the writer about the treaty on mercury.

However, the writer's failure to understand that the "methyl mercury" is a reference to a group of compounds and not to any one particular compound leads the writer to state, "*This notorious compound killed and injured thousands in the Japanese city of Minamata in the 1950s and 1960s*".

Factually, the methylmercury compounds found in the fish that the people of Minimata consumed "*killed and injured thousands in the Japanese city of Minamata in the 1950s and 1960s and still*" pose "*a significant global health risk*".

"Another compound facing a possible ban, however, is a benign medicinal preservative called thiomersal (thimerosal in the US). Although it contains mercury, there is no evidence that it is harmful. In fact, it helps save the lives of well over a million children every year. Banning it would be a grave mistake."

Without any toxicological evidence to support her assertions, the writer miscasts "*thiomersal*", a trade name for sodium ethylmercury thiosalicylate, which is a human carcinogen, mutagen, teratogen, and reproductive toxicant at levels below 1 part per million, as if it were "*a benign medicinal preservative*".

This reviewer knows of no toxicological study where doses of 25 micrograms or more of TM are administered to developing human children that have shown that that such doses of TM were "safe" (nontoxic) or "*benign*".

Deftly changing the focus away from the known toxicity of "*thiomersal*", the writer next states, "*there is no evidence that it is harmful*" without providing any evidence to support her assertion.

Factually, there are more than 150 case and toxicity studies which collectively have established that "*thiomersal*" is a bioaccumulative toxicant with long-term adverse effects in animals and humans.

Further, the rest of the writer's comments should be ignored since they have no bearing on the future when: **a)** the use of TM finally is

banned and **b)** other alternatives are used in place of the TM in all of the then-current preserved vaccines still being recommended for universal use.

"Thiomersal aside, the world clearly needs to deal with mercury pollution. Mercury is a powerful neurotoxin that is especially dangerous to unborn children. Estimating its global impact is difficult but in some populations almost 2 per cent of children are born with mental retardation caused by mercury poisoning.

Much of this mercury comes from industry, which consumes about 3400 tonnes of the element a year. About a third of this is used in batteries, 800 tonnes in a process called chlor-alkali manufacturing and 650 tonnes in so-called artisanal mining.

Most eventually finds its way into the environment, along with mercury released from burning coal, smelting metal, making cement and incinerating waste. Large quantities of mercury are also released by natural processes such as volcanic eruptions, forest fires and erosion. The United Nations Environment Program estimates that the total global emissions of mercury are between 4400 and 7500 tonnes a year.

Mercury released into the environment eventually finds its way into oceans, lakes and rivers, where it is converted into methyl mercury by microorganisms. This toxic compound accumulates up the aquatic food chain and is often concentrated at high levels in fish, shellfish and marine mammals - and ultimately in the people who eat them. Methyl mercury in food is the biggest cause of mercury poisoning."

Interestingly, in her discourse, the writer fails to mention the third source of mercury poisoning in humans – the mercury emitted by the dental amalgams (about 50% mercury by weight) used to fill cavities in most of the nations in the world – a mercury poisoning source that, delivers significant mercury exposures directly into the body in a mode that bypasses some of the human body's mercury-poisoning defenses.

Finally, the writer again miscasts "*methyl mercury*" as if it were some specific mercury compound found in "*food*" and also makes the unqualified generalization that this "*methyl mercury*" is "*the biggest cause of mercury poisoning*".

"In comparison to industrial and natural mercury emissions, thiomersal is negligible. The European Union's vaccine industry uses less than 0.25 tonnes of thiomersal a year, corresponding to just 100 kilograms of mercury. The American Academy of Pediatrics has described this as "infinitesimally small".

First, the EU's usage is not critical since most of the "*thiomersal*" is

used in the developing countries.

Second, if the amount of "*thiomersal*" is correct, "*0.25 tonnes of thiomersal*" corresponds to 112.4 kg of mercury which is significantly more than the writer's "*just 100 kilograms of mercury*".

When a writer, who does not appear to be qualified by training (the writer is an "*anthropologist*") or experience (she is someone who deals with public-trust issues for vaccines), does not accurately state the amount of mercury in a given amount of "*thiomersal*", then, how can one trust the validity of any statement that this writer makes in support of the status of the toxicity of TM in vaccines?

Third, since the neurotoxicity of "*thiomersal*" is *more than* 100 times that of elemental mercury, "*0.25 tonnes of thiomersal per year*" is the toxicological equivalent of *more than* 25 "*tonnes*" of elemental mercury per year.

If the author of this article were trying to present the facts, they would have reported the world-wide usage of "*thiomersal*" (also known by other trade names [e.g., Thimerosal, timerosal, tiomersal, and Merthiolate]) and would have reported that TM was much more toxic than elemental mercury.

Contrary to the writer's claims, after accounting for the significantly higher toxicity of TM than "elemental mercury" and the fact that TM's injection into the human body bypasses the body's gastrointestional defense mechanisms that reduce the amount of mercury compounds absorbed from the foods eaten and the liquids consumed[5], the effective amount of TM exposure to developing humans given TM-preserved serums and vaccines is significant.

In addition, in studies in nursing mothers who were eating a fish-containing diet where the babies received TM-preserved vaccines, the TM accounted for half of the infants' exposure to mercury in the first year of life.

Further, because the Thimerosal doses are boluses of nominally 25 or 50 micrograms (µg) of TM ("*thiomersal*") delivered at several intervals in a manner that completely bypasses the gastrointestinal defense mechanisms, the probable bioaccumulative amounts of the tissue-retained inorganic mercury into which TM is converted in the tissues is several times the amounts of tissue-retained inorganic mercury into which the ingested (swallowed) methylmercury compounds from breastfeeding are converted.

5 Ouédraogo O, Amyot M. Effects of various cooking methods and food components on bioaccessibility of mercury from fish. ***Environ Res*** 2011 Nov; **111**(8): 1064-1069.

Thus, the unsupported claims of "*American Academy of Pediatrics*" (AAP), which has an obvious conflict of interest here, should be ignored.

"Thiomersal also serves an irreplaceable function. It has been added to medical products since the 1930s as a preservative, including in vaccines packaged in multi-dose vials. These are especially vulnerable to bacterial and fungal contamination because many doses are drawn from each vial. Single-dose vials, in contrast, are used once and then thrown away."

Since: **a)** compounds other than TM ("*thiomersal*") have been used as preservatives in vaccines for decades and **b)**, in a recent vaccine study cited by this reviewer earlier in this review (see footnote "5"), TM failed to "meet EP antimicrobial effectiveness acceptance criteria" at levels up to 4 times the 0.01% level in most TM-preserved vaccines, compounds other than TM can and should be used as a preservative in vaccines.

Further, *based on the cited study and previous studies on vial contamination and contamination suppression*, in several of the TM-preserved vaccine formulations, TM has not been shown to be an effective preservative for preventing the transfer of viable organisms from in-use vial contamination to others in subsequent withdrawals from a contaminated multi-dose vial.

"Vaccinating from multi-dose vials is cheaper than from single-dose ones. Multi-dose vials also take up less space, reducing the amount of refrigerated storage required to get them to where they are needed. They are thus particularly important for poorer countries, which do not have the money or facilities to use single-dose vials for large-scale immunisation programmes."

Here, the writer begins by making unsupported generalizations about the relative costs and requirements for using single-dose vials versus multi-dose vials which totally ignores the reality that, at about the same cost per dose, multi-dose vaccine formulations using alternative compounds, such as 2-PE, could be developed and used for the few types of vaccines that currently are preserved with TM.

Thus, the writer's remarks here should simply be ignored because they do not address the use of alternative compounds as vaccine preservatives for the current multi-dose vaccine formulations.

"Currently 120 countries, accounting for 64 per cent of global births, depend on thiomersal-containing vaccines. These prevent an estimated 1.4 million child deaths a year, according to the World Health Organization. At present there is no substitute."

Since any global treaty would have final dates for the banning of any use of TM that are years or decades in the future and, at least for a diphtheria, tetanus and pertussis vaccine, an inactivated polio vaccine, and the Prev(e)nar 13 vaccine, 2-PE has been shown to be an effective substitute for TM, any treaty could provide more than adequate time for a change in preservative.

Therefore, the unsubstantiated remarks made by the writer here should also be ignored.

"Thiomersal is also added to influenza vaccines, which can be important in developed countries. The consequences of banning the compound are therefore wide-reaching and dramatic."

Because: **a)** several no-TM flu vaccine formulations are readily available in the developed countries, **b)** there is no significant cost or cold-space issues in these nations (or the writer, a vaccine apologist, would surely have mentioned these issues), and **c)** any ban would provide the time need to convert all flu vaccines to no-TM vaccine formulations, there are no real adverse "*consequences*" to banning the use of TM in the manufacture of influenza vaccines in the developed countries.

Moreover, removing the TM would lead, *as it has in Denmark*, to the elimination of those pregnant women and developing children who would be: **a)** vaccinated with these TM-preserved inactivated-influenza vaccines and **b)** consequently mercury-poisoned to some degree by the ethylmercury species into which TM initially degrades.

"A number of developing countries have expressed concern over thiomersal's proposed ban. Public health experts around the world, including the WHO, have no doubt about the importance of allowing it to remain in vaccines.

So why has thiomersal been dragged into the negotiations? The debate is partly fuelled by a historic confusion between risks ascribed to methyl mercury and the ethyl mercury in thiomersal. In 1999, the American Academy of Pediatrics and the US Public Health Service issued a joint statement recommending the removal of thiomersal from vaccines as a precautionary measure, following a US Food and Drug Administration review.

At the time there was abundant evidence that methyl mercury was toxic, but little evidence on ethyl mercury. Additional pressure came from rumours of a link between thiomersal and autism. Since

then, however, numerous studies have shown that thiomersal is harmless."

Here, the writer begins by speaking of the concern over, and the importance of, allowing TM to remain in vaccines as expressed by

unidentified "*(p)ublic health experts around the world*" when these self-same experts have been, and/or are still, responsible for allowing TM's use without the required toxicological proof that it was nontoxic (safe) to give to pregnant women, developing children and, for that matter, adults.

These "*(p)ublic health experts*" know that the incidence and the prevalence of "autism" will significantly decline, as it did in Denmark, after all of the TM-containing vaccines are removed from all of the vaccination programs for pregnant women and developing children, as the real findings (as reported, *for example*, in the internal e-mails between some of the authors and the project liaison person from the US Centers for Disease Control and Prevention [CDC][6], which funded, oversaw, and pushed the publication of an 2003 article[7] that misrepresented the truth that, after the TM-preserved vaccines were withdrawn from the Danish market in 1992, the incidence and prevalence of "autism" declined in Danish children).

Moreover, from the data reported in a follow-up population study in Denmark published in 2010[8], the "autism" incidence in children born between 1994 and 2004 in Denmark was about 1 in 1,272 children after TM-preserved vaccines were removed from Denmark's vaccines proved.

Further, contrary to the writer's assertions that, in 1999, "*there was abundant evidence that methyl mercury was toxic, but little evidence on ethyl mercury*", there was sufficient toxicological evidence about the toxicity of TM by the 1980s that,

a. In 1982, FDA officials recommended banning its use in over-the-counter (O-T-C) topical antiseptics and spermicides;

b. In 1983, the former Union of the Soviet Socialist Republics banned its use in vaccines and other drugs;

c. In the 1990s, the Scandinavian countries had removed all TM-preserved vaccines from their vaccination programs; and

---

6 http://dr-king.com/docs/20120331_FalsusInUnoFalsusInOmnibusAThimerosalpreservedVaccineConundrum_b.pdf, "'Wed 13-11-2002', some, if not all, of the authors in the key Danish study cited in this discussion and the CDC's liaison person knew that 'the incidence and prevalence' [of 'autism'] 'are still decreasing in 2001'".

7 Madsen KM, Lauritsen MB, Pedersen CB, Thorsen P, Plesner A-M, Andersen PH, Mortensen PB. Thimerosal and the Occurrence of Autism: Negative Ecological Evidence From Danish Population-Based Data. ***Pediatrics*** 2003 Sep 1; **112** (3): 604 -606.

8 Maimburg RD, Bech BH, Væth M, Møller-Madsen B, Olsen J. Neonatal Jaundice, Autism, and Other Disorders of Psychological Development. ***Pediatrics*** 2010 Nov 1; **126**(5): 872 -878.

d. In 1998, the FDA banned the use of TM in the manufacture of O-T-C topical antiseptics and spermicides because the allowed 0.1% TM liquids were too toxic and not effective.

Moreover, all of the case and toxicological studies in animals and humans involving exposures to TM or to some other ethylmercury compound at vaccine levels or levels that produce *chronic* toxicity have found evidence of persistent neurological harm from exposures to all of these ethylmercury compounds.

In addition, all of the comparative *chronic* toxicity studies in which the toxicities of an ethylmercury compound and a methylmercury compound were compared have found that the toxicities of the two compounds studied were generally comparable and, *if anything*, the ethylmercury compound was the more neurotoxic compound.

Further, in a recent rat study in which the mercury compounds were speciated[9], rats that were injected with vaccine-level solutions of TM were found to convert a significant percent of their ethyl-mercury species into some methylmercury compounds in the evaluated rats' tissues (brain, heart, liver, and kidneys).

Since the metabolism of "*thiomersal*" (TM) clearly converts its ethylmercury metabolites into methylmercury metabolites in the animal's tissues (see footnote "9") and this writer admits that the methylmercury compounds are toxic, clearly the results of the comparative toxicity studies and the mercury speciation study prove that TM is toxic at vaccine and lower levels.

Thus, the writer's claim that "*numerous studies have shown that thiomersal is harmless*" is not supported by any toxicological or scientifically sound case study of which this reviewer is aware.

Moreover, how can TM at the 0.1% level be too toxic (unsafe) to be allowed in O-T-C antiseptics, where only a drop or two (0.05 to 0.1 milliliter (mL) [applying 50 to 100 µg of TM to the skin] is used for the minor superficial wounds for which the products are meant to be used but injecting 0.5 mL of a 0.01% TM-containing vaccine [introducing 50 µg of TM directly into the body] can be claimed to be safe (nontoxic)?

Finally, how can injecting even 0.25 mL of a vaccine containing 0.01% TM used as a preservative [introducing 25 µg of TM directly into the body] meet the higher safety standard imposed by law for

9 Rodriques JL, Serpeloni JM, Batista BL, Souza S, Barbarosa Jr F. Identification and distribution of mercury species in rat tissues following administration of Thimerosal or methyl mercury {chloride}. ***Arch Toxicol*** 2010; **84**: 891-896.

compounds used as a preservative in vaccines and other biological drug products ("… preservative shall be sufficiently nontoxic so that the amount present in the recommended dose of the product will not be toxic to the recipient, …"[10] [emphasis added])?

Based on the existing applicable toxicological data for injected TM, these amounts of injected TM are clearly neither "nontoxic" nor "sufficiently nontoxic …".

"In 2006, an expert panel convened by the WHO issued a statement on thiomersal in vaccines, concluding that there was 'no evidence of toxicity'. It highlighted the fact that while methyl mercury builds up in the body, ethyl mercury is excreted rapidly. The American Academy of Pediatrics has since endorsed the WHO's position."

Since the expert panel's 2006 report clearly ignored the toxicological and case evidence on the toxicity of ethylmercury compounds and TM and, while there have been studies that show rapid clearance of ethylmercury species from the blood[11], there have been no studies showing that all of the organic mercury species and the tissue-retained inorganic mercury from the metabolism of the ethylmercury species generated when TM is injected[12] rapidly clear the treated monkeys' body much less the human body.

Further, in 1978, an unchallenged Japanese study[13] estimated the half-life of this "tissue-retained inorganic mercury" was from 18 to 20 years in the human brain and ^{203}Hg radiolabelled studies in spider monkeys have shown bioaccumulation of the mercury in the monkey's brain[14] even when the blood levels were less than the method's limit of quantitation.

Thus, the 2006 position of the World Health Organization (WHO), which seeks to defend the healthcare establishment's decision to allow the use of Thimerosal without the required toxicological proof of safety, is clearly at odds with factual reality.

---

10 **21 CFR § 610.15(a).**

11 Pichichero ME, Gentile A, Giglio N, Umido V, Clarkson T, Cernichiari E, Zareba G, Gotelli C, Gotelli M, Yan L, and Treanor J. Mercury Levels in Newborns and Infants After Receipt of Thimerosal-Containing Vaccines. ***Pediatrics*** 2008; **121**(2): e208-e214.

12 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 Persp*** 2005; **113**(8): 1015-1021.

13 Sugita M. The biological half-time of heavy metals. The existence of a third, "slowest" component. ***Int Arch Occup Environ Health*** 1978; **41**(1): 25-40.

14 Takahashi T, Kimura T, Sato Y, Shiraki H, Ukita T. Time-dependent Distribution of $^{[203]}$Hg-Mercury Compounds in Rat and Monkey as Studied by Whole Body Autoradiography. ***J Hygenic Chem*** (Japan) 1971; **17**(2): 93-107.

Therefore, the recent endorsement of the 2006 position of the WHO, which has obvious conflicts of interest concerning "*thiomersal*"-preserved vaccines, by the AAP, an organization with similar proven conflicts of interest, is obviously an endorsement of a lie.

"Nonetheless, a handful of well-meaning campaigners still believe that thiomersal is harmful. Led by two groups - the Coalition for Mercury-free Drugs and SafeMinds - they have brought the thiomersal "debate" into negotiations designed to address environmental problems."

Because the positions of both "*the Coalition for Mercury-free Drugs and SafeMinds*" are supported by all of the applicable, independent, peer-reviewed, published, toxicological evidence, both of these groups know that TM at vaccine levels is bioaccumulatively mercury toxic to all developing humans to varying degrees.

Since, in speaking of the mercury treaty negotiations, this writer began by correctly stating,

"*The aim of the negotiations is laudable: to ban those mercury-laden products and pollutants that are a danger to human health and the environment*",

this reviewer find it inexplicable that the writer would now state,

"*they have brought the thiomersal 'debate' into negotiations designed to address environmental problems*",

because the treaty negotiations were also supposed to address "*those mercury-laden products and pollutants that are a danger to human health*".

"What happens next depends on the negotiators. The latest draft treaty does not specifically name thiomersal, but there is a clause that leaves the door open for additional items to be added.

There is no question that mercury is dangerous. But thiomersal is not a threat, and banning it would create far more human misery than failing to negotiate a treaty at all."

Since the toxicological evidence has clearly established that TM ("*thiomersal*") is toxic to the fetus and developing children at levels well below those in a single dose of the typical vaccine preserved with TM at a nominal level of 0.005% or higher, the on-going use of TM as a preservative in vaccines is a varying-degree threat to the health of all those children injected with even one dose.

At present, the estimated "safe" (nontoxic) level for TM exposure for fetuses and developing children is 0.004 µg of TM per kg of body weight (per day) or 4 nanograms of TM/kg/(day) [or, in terms of mercury from TM, 0.002 µg of mercury (Hg) (or 2 nanograms of Hg)

per kg of the developing child's body weight (per day)[15]] and the "sufficiently nontoxic" level for TM is < 0.0004 micrograms of TM per kg of body weight (per day) or <0.4 nanogram of TM/kg/(day).

Therefore, banning the use of TM in medicine at some point in the future would create less human mercury-poisoning-related misery (morbidity; chronic childhood disease) than continuing to use TM in vaccines and other drugs.

Based on the the body of toxicological evidence, all use of TM should be banned in any global treaty, which, as with all treaties, would provide the vaccine makers years or decades to replace the TM with another safe, effective and cost-effective compound.

The gorilla in the room that this writer, other vaccine apologists and global public health officials are desperately trying to hide is what the 2003 Danish study actually found: **the incidence and prevalence of "autism" in Denmark significantly declined after TM was removed from all of the Danish vaccines that used it as a preservative**.

Subsequently, *as found from the internal documents recently obtained by a Congressional representative from the CDC for another study*[16], it appears the CDC knew that stopping the administration of TM-preserved biological products (vaccines and serums) to pregnant women also significantly reduced the risk that developing fetuses who survived into childhood would be diagnosed with a regressive autism spectrum disorder (ASD).

However, as with the 2003 article, the CDC hid the findings of the increased risks of harm (reflected in an increased risk of a regressive-ASD diagnosis) for those children whose mothers had received TM-preserved biological drug products during pregnancy and oversaw the publication of an article that *misleadingly* asserted,

> "**WHAT THIS STUDY ADDS:** This study revealed no increased risk of ASD associated with receipt of thimerosal-containing vaccines. No increased risk was found for subtypes of ASD, including ASD with regression, and prenatal exposure was not associated with a risk of ASD",

and

15 http://mercury-freedrugs.org/docs/20120928_CoMeD_WHO_GACVS_UNEPINC5Submission_ReviewOfGACVSJune2012ReportOnSafety_ThimerosalInVaccines_rev1b.pdf, page "**10**".

16 Price CS, Thompson WW, Goodson B, Weintraub ES, Croen LA, Hinrichsen VL, Marcy M, Robertson A, Eriksen E, Lewis E, Bernal P, Shay D, Davis RL, DeStefano F. Prenatal and Infant Exposure to Thimerosal From Vaccines and Immunoglobulins and Risk of Autism. ***Pediatrics*** 2010 Oct; 126(4); 656-664 published online September 13, 2010; DOI: 10.1542/peds.2010-0309.

> "**CONCLUSIONS:** In our study of MCO members, prenatal and early-life exposure to ethylmercury from thimerosal-containing vaccines and immunoglobulin preparations was not related to increased risk of ASDs".

Further, until the results of all retrospective statistical population studies involving vaccines and outcomes can be confirmed by qualified independent scientists, the results of all such studies should be discounted as unconfirmed results.

In addition, all published statistical population studies where the original data sets have been "lost" and/or valid requests for independent access to the original data sets and all study design information has been denied should be withdrawn by the journals that published said articles.

Finally, given the repeated instances of apparently intentional misrepresentation of the study findings in such studies, all statistical population studies dealing with vaccines should not be published until and unless, after initial peer-review and tentative acceptance: **a)** the authors have provided appropriately coded certified copies of all of the original data sets and initial study design criteria and modeling along with valid justifications for any changes to the initial designs and **b)** a confirmatory evaluation of all of the data sets and supporting information by qualified reviewers affirms the assertions made by the authors or, *if any*, the major discrepancies found by the independent reviewers can be resolved.

Reviewer's Closing Remarks

In conclusion, at a minimum, this reviewer anticipates that this in-depth review of Heidi Larson's article titled, "***Poison pill: Not all mercury is toxic***", will cause all who read this review to understand that Larson's statements are clearly at odds with the applicable toxicological science, and represent her take on the unsubstantiated views of the typical vaccine apologists who irrationally defend the use of "*thiomersal*" as a preservative in vaccines.

Such defenses are clearly irrational because the ever-growing body of published toxicological evidence clearly has established that injected "*thiomersal*" is:

a. An organic mercury-based compound that is highly toxic to developing humans at exposure doses more than 1000 times lower than the least exposures in developing children given "thiomersal"-preserved vaccines or indirectly exposed in utero

when their mothers are given such vaccines during pregnancy;

b. To varying degrees, converted in the developing children's tissues into bioaccumulative, toxic, inorganic mercury species having half-lives in the human brain of 18 to 20 years; and

c. Unsafe to use as a preservative in vaccines given to pregnant women and developing children.

That the adopted treaty on mercury excludes "*thiomersal*" used in vaccines does not alter the realities that: **a)** "thiomersal"-preserved vaccines are mercury toxic to developing children and **b)** those organizations who are engaged in any aspect of supporting the continuing use of such vaccines are knowingly engaged in knowingly supporting the mercury-poisoning of the world's developing children for reasons other than protecting the health of those children.

About the Article's Writer, Heidi Larson

"Heidi Larson is an anthropologist at the London School of Hygiene and Tropical Medicine who studies public trust in vaccines"

and from http://www.lshtm.ac.uk/aboutus/people/larson.heidi

"**Dr Heidi Larson** MA PhD

Senior Lecturer

Dr. Heidi Larson is an anthropologist who currently leads a team studying issues around public trust in vaccines and the implications for immunization programmes and policies.

Dr. Larson previously headed Global Communication for Immunization at UNICEF and Chaired the Advocacy Task Force for the Global Alliance for Vaccines and Immunization (GAVI). Her research specializes in the analysis and evaluation of health and development programmes with particular attention to social and political factors which can affect policies and programmes. Her particular focus is on risk and rumour management in health programmes and technologies, especially vaccines - from clinical trials to delivery - and building public trust.

Dr. Larson is also a Fellow at the Chatham House Centre on Global Health Security.

Affiliation

√Department of Infectious Disease Epidemiology

√Faculty of Epidemiology and Population Health

Research

More details about my research can be found here.

Research areas

√Adolescent health
√Behaviour change
√Decision analysis
√Ethnography
√Global Health
√Health policy
√Public health
√Research : policy relationship
√Risk
√Social and structural determinants of health
√Vaccines

Disciplines

√Anthropology
√Policy analysis

Disease and Health Conditions

√HIV/AIDS

Other interests

√Advocacy
√Communications
√Ethics And Human Rights
√HIV
√Immunization,Vaccine
√Pandemic
√Pandemic Influenza
√Participation
√Participatory Approaches To Health
√Social Epidemiology
√communications strategy
√international partnerships
√public engagement in science
√social determinants of health
√social justice
√young people

Selected publications

√1 **Lessons from polio eradication.**
Larson, H.J. ; Ghinai, I. ;
Nature, 2011; 473(7348):446-7

√**Addressing the vaccine confidence gap.**
Larson, H.J. ; Cooper, L.Z. ; Eskola, J. ; Katz, S.L. ; Ratzan, S. ;
Lancet, 2011;

√**Redesigning the AIDS response for long-term impact**
Larson, H.J.; Bertozzi, S.; Piot, P.
Bulletin of the World Health Organization, 2011; 89(11):846-852

√**Eradicating polio: persisting challenges beyond endemic countries.**
Larson, H.J. ; Paterson, P. ;
Expert Rev Vaccines, 2011; 10(12):1635-6

√**Public Health Response to Influenza A(H1N1) as an Opportunity to Build Public Trust**
Larson, H.J.; Heymann, D.L.
JAMA-Journal of the American Medical Association, 2010; 303(3):271-272

√**The India HPV-vaccine suspension.**
Larson, H.J.; Brocard, P.; Garnett, G.;
Lancet, 2010; 376(9741):572-3

√**Protecting public trust in immunization.**
Cooper, L.Z. ; Larson, H.J. ; Katz, S.L. ;
Pediatrics, 2008; 122(1):149-53

√**Coming to terms with complexity: a call to action for HIV prevention**
Piot, P.; Bartos, M.; Larson, H.; Zewdie, D.; Mane, P.
Lancet, 2008; 372(9641):845-59"

About the Reviewer, Paul G. King

Beyond the general information that is available on his Internet web site, http://www.dr-king.com/ (The Know Zone), Paul G. King, PhD Analytical Chemist, is the Science Advisor to, and current Secretary for, the Coalition for Mercury-Free Drugs (CoMeD, Inc., which is a 501(3)(c) not-for-profit corporation) that maintains an Internet web site at http://www.mercury-freedrugs.org/.

As a scientist and student of the federal regulations and statutes that govern drugs, including vaccines, Dr. King has led CoMeD, on two (2) separate occasions, in the drafting and submission of a "Citizen Petition" seeking to have the federal government comply with the law, and, based on the improper denial of the Citizen Petition submitted, a federal lawsuit seeking to have the Federal District Court for the District of Columbia compel the Secretary of the Department of Health and Human Services (DHHS) and the

Commissioner of the FDA to comply with the statutes, laws (regulations) and policies that regulate the lawful conduct of the Secretary of the DHHS, the FDA commissioner and CDC and FDA official's. The second civil suit, 1:2009-cv-00015, is still being litigated.

In addition, Dr. King has, on several occasions, drafted legislation for submission to the Congress of the USA as well as to the legislatures of various States, submitted cogent comments in opposition to proposed changes to federal and state regulations that are not in the public interest or appear to be at odds with the law, reviewed numerous documents, and written articles on a variety of vaccine-related and other issues.

Further, Dr. King has provided diverse groups with his analysis of various Congressional bills, resolutions and treaty documents as well as federal and state judicial proceedings.

Moreover, he has been an author of several papers bearing on issues related to the toxicities of Thimerosal and other compounds and their connection to a range of chronic neurodevelopmental, other developmental and behavioral abnormalities that appear to be:

- well-above (> 1 in 10 children; asthma),
- above (> 1 in 100 children; the autism spectrum disorders),
- at (> 1 in 1000 children; non-genetic childhood type 1 diabetes),
- or approaching (> 1 in 5000; life-threatening peanut allergy)

epidemic childhood levels.

Most recently, Dr. King was the co-author of a paper in the journal ***Vaccine*** with Dr. Gary S. Goldman[17].

17 Goldman GS, King PG. Review of the United States universal varicella vaccination program: Herpes zoster incidence rates, costeffectiveness, and vaccine efficacy based primarily on the Antelope Valley Varicella Active Surveillance Project data. ***Vaccine*** 2012 May 31 online.