

## Expert Commentary Series

# Examples of Deficient Science, Hypocrisy, and Bogus Arguments: A Review of Two Articles by *Age of Autism's* Anne Dachel

By Joel A. Harrison, PhD, MPH  
September 30, 2015

Anne Dachel

**“Dachel Media Update: Willingham Wanders Into Waldo”**

*Age of Autism*

August 10, 2015

Anne Dachel

**“Dachel Media Update: Forbes' Emily Willingham Has Made Up Your Mind”**

*Age of Autism*

August 11, 2015

## Executive Summary

Over the past several decades, a number of bloggers and organizations have claimed that vaccines and/or their ingredients cause a number of disorders, foremost among these is autism. The results of their efforts have been a decline in vaccine coverage and a rise in previously rare childhood diseases resulting in unnecessary suffering, hospitalizations, long-term disabilities, and even death.

Anne Dachel is a regular contributor and Media Editor for *Age of Autism*. In two recent articles (Dachel, 2015ab), Dachel criticizes several articles by Emily Willingham, a science writer at *Forbes* (2015ab). As this paper will show, from Dachel's own articles it is clear:

1. Dachel literally doesn't understand epidemiology and causal inference.
2. Dachel displays poor scholarship in claiming that vaccine supporters rely solely on epidemiological studies, missing the numerous references to animal and other research types.
3. Dachel is hypocritical in criticizing epidemiological studies while promoting/advocating for an epidemiological study comparing never vaccinated to vaccinated.
4. Dachel resorts to a typical logical fallacy, *ad hominem* attacks.

5. Dachel is hypocritical to imply, with NO credible evidence, that Emily Willingham is a “pharma shill” by stating “Emily Willingtoworkforpharmaaham's version is below” while she proudly refers to her own for-profit sponsor.
6. Dachel’s approach is great propaganda for the uninformed; but not a valid scholarly approach. In neither of her articles does Dachel actually address what Willingham writes. Dachel could have directly critiqued each of the points Willingham made, including specific information from the writings she mentions; but she didn’t. Instead, Dachel refers to writings that Willingham may or may not have read. Using Dachel’s approach one could critique just about any article by throwing in a reference to another article or book without giving any details.
7. Dachel, like many anti-vaccinationists, takes the approach that people are guilty until proven innocent or, perhaps, guilty with no possibility of proving innocence. However, it is a basic American principle to be considered innocent until proven guilty.

In my articles published by *Vaccinate Your Family* (Available at [www.vaccinateyourfamily.org/expert-commentary](http://www.vaccinateyourfamily.org/expert-commentary)), I have reviewed and critiqued several articles posted on *Age of Autism* and *SafeMinds*, one of *Age of Autism*’s sponsors. Each of my reviews has clearly highlighted the poor scholarship, deficient science, and, often, lack of common sense used by the authors of those articles that render their opinion void of any credibility. This article, which reviews some of Anne Dachel’s articles on Emily Willingham is yet another example that adds hypocrisy to the growing list of anti-vaccinationist flaws.

If people, especially parents are to decide on whether or not to vaccinate themselves and their children such decisions should be based on science and logic (critical thinking) and not belief systems deficient in both.

## Introduction

Over the past several decades, a number of bloggers and organizations have claimed that vaccines and/or their ingredients cause a number of disorders, foremost among these is autism. The results of their efforts have been a decline in vaccine coverage and a rise in previously rare childhood diseases resulting in unnecessary suffering, hospitalizations, long-term disabilities, and even death.

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## **Epidemiological Studies, Population Studies, Causal Inferences:**

### **Do Health Officials Rely Solely on Epidemiological Studies?**

Dachel (2015a) claims "the only science our health officials are interested in are epidemiological studies." This is an excellent example of how her claims don't reflect reality.

The US *Institute of Medicine* has conducted numerous reviews of various aspects of vaccine safety over the past 25 years. (Available for free online reading or via pdf downloads at: <http://iom.nationalacademies.org/Activities/PublicHealth/ImmunizationSafety.aspx> ) It is clear, from their numerous reports, that they conducted a comprehensive review of all relevant research, including animal and laboratory studies. For instance:

"During the course of the 20-month study, the committee examined a wide range of information sources, including case series and individual case reports published in peer-reviewed journals and reported by vaccine manufacturers; unpublished case reports from physicians, parents, and other concerned persons; epidemiologic studies; studies in animals; and other laboratory studies. Whenever possible, the committee examined primary sources of data." (Institute of Medicine, 1991, p.vi)

"The biological mechanism evidence reviewed in this report comes from human, animal, and *in vitro* studies of biological or pathophysiological processes." (Institute of Medicine, 2004, p.3)

“Two streams of evidence support the committee’s causality conclusions: epidemiologic evidence derived from studies of populations (most often based on observational designs but randomized trials when available), and mechanistic evidence derived primarily from biological and clinical studies in animals and individual humans.” (Institute of Medicine, 2012, p.10)

Prior to being tested on humans, vaccines are rigorously evaluated, starting with *in vitro* laboratory studies to animal studies. For instance:

From the FDA: “Vaccine development begins in the laboratory before any tests in animals or humans are done. If laboratory tests show that a vaccine has potential, it is usually tested in animals. If a vaccine is safe in animals, and studies suggest that it will be safe in people, clinical trials with volunteers are next.” (FDA. 2011)

From the CDC Pink Book: “Vaccines, like other pharmaceutical products, undergo extensive safety and efficacy evaluations in the laboratory, in animals, and in sequentially phased human clinical trials prior to licensure.” CDC, p.50)

Although Dachel likes to emphasize the importance of animal studies, which I’ll admit can make important contributions, they cannot be automatically generalized to humans. I love raisins; but if I relied on their toxicities in dogs and other animals, I would not eat them. And, as will be discussed below, Dachel’s likely reaction to this will be that I am basing my case on raisins which, of course, is ludicrous. My use of raisins is simply an illustrative example.

## **Can One Draw Causal Inferences from Epidemiological Studies?**

Dachel claims:

“This of course refers to population studies of Danish children. When it comes to autism, the only science our health officials are interested in are epidemiological studies, which are the least reliable and can only show associations, not causation.” (Dachel, 2015a)

“She should tell . . . "What kind of study was it?" (P.S. Those oft-used population studies are the least reliable science and the easiest to falsify the findings.)” (Dachel 2015b)

### **A Brief Review of Causal Thinking and Epidemiological Studies**

When Dachel claims that “epidemiological studies . . . are the least reliable and can only show associations, not causation,” what does she base this claim on? Has she taken the time to read articles and books on causal inference and/or taken courses in Philosophy of Science where causal inference is a major topic?

According to Rothman:

Vigorous debate is a characteristic of modern scientific philosophy, no less in epidemiology than in other areas. Perhaps the most important common thread that emerges from

the debated philosophies is Hume's legacy that proof is impossible in empiric science. This simple fact is especially important to epidemiologist, who often fact the criticism that proof is impossible in epidemiology, the implication that it is possible in other scientific disciplines. Such criticism may stem from a view that experiments are the definitive source of scientific knowledge. Such a view is mistaken on at least two counts. First, the non experimental nature of a science does not preclude impressive scientific discoveries; the myriad examples of plate tectonics, the evolution of species, planets orbiting other stars, and the effects of cigarette smoking on human health. Even when they are possible, experiments (including randomized trials) do to provide anything approaching proof and in fact may be controversial, contradictory, or irreproducible. The cold-fusion debacle demonstrates well that neither physical nor experimental science is immune to such problems.

Some experimental scientists hold that epidemiological relations are only suggestive and believe that detailed laboratory study of mechanisms within single individuals can reveal cause-effect relations with certainty. This view overlooks the fact that *all* relations are suggestive . . . Even the most careful and detailed mechanistic dissection of individual events cannot provide more than associations, albeit at a finer level. Laboratory studies often involve a degree of observer control that cannot be approached in epidemiology; it is only this control, not the level of observation, that can strengthen the inferences from laboratory studies. And again such control is not guarantee against error.

All of the fruits of scientific work, in epidemiology or other disciplines, are at best only tentative formulations of a description of nature, even when the work itself is carried out without mistakes. The tentativeness of our knowledge does not prevent practical applications, but it should keep us skeptical and critical, not only of everyone else's work but of our own as well. (Rothman, 1998, p.22; see also Rothman, 1988)

And according to Susser:

Models of alternative pathways have a central role in the disciplined procedures of scientific method. General explanations are inferred by induction from particular facts and associations. The scientific procedure is then to test the consistency of these explanations, hypotheses, and theories in particular situations specially devised. An ideal test will be crucial, that is, the outcome will eliminate one or more of the competing hypotheses. Within this series of steps, analytical models are constructed to represent alternate explanatory hypotheses, which can be subjected to crucial test. (Susser, 1973, p.34; see also Susser, 1987) In this discussion I have sought ways of organizing observations that can lead to sound inferences about causal relationships. (ibid, p.162)

[Copies of Rothman's excellent book are available at many university libraries and inexpensive used copies can be obtained on Amazon marketplace. Susser's book is one of my all time favorites, though long out of print, many university libraries have copies and a few copies are available on Amazon marketplace]

Despite Dachel's claims, causal inferences can be and are often made from epidemiological studies; however, usually not from one study, regardless of how well it is designed and carried out; but from a series of related studies. However, there is a difference between causal inference and proof. In research, based on observations and often previous research one formulates a hypothesis, a prediction that can be tested by some systematic method of collecting data. Sometimes this can be in a highly controlled laboratory setting, sometimes in a double-blinded randomized clinical trial, and often by other designs such as case-control. Some studies, such as tobacco's effects on health cannot be ethically carried out on humans and would not be feasible. We would have to randomly assign children to a smoking and non-smoking group and follow them for, perhaps, 50 or more years. The sample size would have to be large enough to assume that the randomization process equalized other factors that could contribute to health differences, e.g., genetics, diet, environment (air and water pollution, etc.).

The goal of research is not to prove a hypothesis; but to eliminate alternative variables that could have affected the result. For instance, if one is testing some sort of intervention, e.g. a diet to lower cholesterol, or a new teaching methodology for a foreign language, it is important that the group receiving the diet or the new teaching methodology does not differ from the control group by some factor that could influence outcome, e.g. gender, exercise, genetics, etc. The goal of a randomized clinical trial is to distribute all the known and unknown factors that could affect the outcome equally between the two groups. This is the basis of statistical significance.

**Some Basic Statistics:** Imagine a jar with 100 marbles, 90 white, 10 red. If I look at all the marbles, there is no problem in accurately describing the jar that is the entire population as 90% white. What if I blindfolded draw 50 marbles? By chance, I could get all 10 red and my conclusion would be 80% white. What if I only draw 10? Though the probability is quite low, I could get all 10 red marbles and my conclusion would be 100% red. Another example is tossing a balanced coin. One would expect to get half heads and half tails; but toss the coin 100 times and chances are one will get 45 heads and 55 tails or some other outcome close to 50/50 but not exactly so. However, toss the coin 100 times a lot of times and there is a small probability that even though it is a perfectly balanced coin, one could get 90 heads and 10 tails or even an extremely small probability of getting all heads. What about only tossing a coin 10 times? Getting all heads would still be a low probability; but higher than when tossing the coin 100 times. Quite simply, even with large samples there is a probability of the results deviating significantly from the true value of the population it was drawn from and the smaller the sample the higher the probability. However, if one keeps randomly drawing marbles from the jar or tossing the coins, the average results will reflect the true value of the population of interest. Statistical significance uses various formulas to estimate the probability of the sample used differing from the study population. So, a 0.05 level of significance is simply stating that if we were to, for instance, toss a coin over and over and over again in sets of 10, that the outcome we get in one toss would occur only five percent of the time, so we are confident that our result confirms our hypothesis.

The discussion above reflects how well a sample reflects the "true" distribution of variables in the population it is drawn from. When we then compare groups, one with the variable of interest (whether measured or actually introduced), we also use statistical probabilities to determine whether known variables, sometimes actually measured, and unknown variables that could affect the outcome are equally distributed between the groups. As stated above, the larger the sample sizes, the less likely that variables other than those being researched are unequally distributed; but the probability of an unequal distribution, though less, still remains.

This is one of the main reasons that one seldom relies on one randomized clinical trial no matter how well it was conducted and how large the sample size. There is always a probability that the sample(s) deviated in some way from the population of interest and/or the two groups differed. For instance, if one got more males than females in one group or more older people, etc.

Replication is essential because if replications find the same or similar results, the probability that the “cumulative” set of studies would suffer from the same “uneven” distribution of variables/traits/factors that could influence the results between groups becomes lower for every replication that finds the same or similar results. The same basic principles apply to case-control and other epidemiological studies. While they cannot assume that unknown factors, if unequally distributed could have affected the outcome, they can measure/control the known important factors and again, one usually doesn’t draw causal inferences from one or two epidemiological studies but from several, often buttressed by animal and other types of studies.

Replication doesn’t mean an exact duplication of every aspect of a study. As Susser writes:

“The empiricists argue first that perfect demonstration of a cause demands replicability and predictability. Change occurs as time passes, and therefore no event can ever be repeated exactly. To some degree any replication is an approximation.” (Susser, 1973, p.69)

“In epidemiology, variation in the conditions of study is for all practical purposes a constant. An alternative exact replication is consistency of a finding on repeated tests. The criterion of consistency depends on the replications of results in many studies or analyses.” (Susser, 1973, p.148)

Thus, when epidemiological studies using various designs, on different populations, in different countries, by different researchers arrive at very similar results, one can be confident in the conclusions; but confidence doesn’t mean certainty. The numerous studies allow one to eliminate alternative potential causal factors; but there remains always the possibility of unknown factors.

This is when antivaccinationists often demonstrate deficient science. They search for the one or two studies that confirm their rigid ideology, ignoring the fact that these could be the equivalent of the rare outcome of a balanced coin toss.

## **Are Population Studies the Least Reliable and the Easiest to Falsify?**

Dachel writes: “(P.S. Those oft-used population studies are the least reliable science and the easiest to falsify the findings.)”

**The Danish Studies:** As explained above, population studies do not reflect the risk that a sample would have of not being representative since everyone is included. Population studies such as the Danish Psychiatric Central Research Register can include a number of the other factors that may affect a studies results, e.g., child’s gender, age, co-morbidities through linkages with other national registries. The Danish Psychiatric Central Research Register is linked to The Danish National Prescription Registry, The National Patient Register, and The Danish National Health Service Register. (Munk-Jørgensen, 2011, p.172)

“Reliability refers to the degree to which the results obtained by a measurement procedure can be replicated.” (Last, 1995, p.145) Reliability checks are essential to any study. In the case of an electronic registry, a random sampling of actual medical charts to check that data was entered accurately is a must.

According to Mors:

From 1969 an intensive validation of the data from the psychiatric departments took place. Although the register itself was computerized, the method of reports on paper from the departments continued and the data from paper transferred to electronic media at the Department of Psychiatric Demography. The data was validated by comparison of the copies of the written case summaries which were forwarded to the register together with the data sheets.

Systematic studies validating the clinical diagnoses in the case register against research diagnoses do not exist. However, in several studies, validation of some diagnoses (e.g. schizophrenia, single episode depression, dementia, autism), has been carried out with good results. (Mors, 2011, p.56)

Lauritsen *et al.* conducted a study:

To assess the validity of the diagnosis of childhood autism in the Danish Psychiatric Central Register (DPCR) by reviewing medical records from 499 of 504 total children with childhood autism born 1990–1999. Based on review of abstracted behaviors recorded in case records from child psychiatric hospitals, case status determination was performed using a standardized coding scheme. In 499 children diagnosed with childhood autism in the DPCR, the diagnosis could be confirmed in 469 children (94%). Of the 30 non-confirmed cases, five were classified by the reviewers as non-autistic cases and the remaining 25 cases were either classified with another ASD diagnosis or the specific diagnosis was not possible to determine. (Lauritsen, 2009, p.139)

Madsen writes: “We performed an extensive record review for 40 children with autistic disorder (13 percent of all the children with autistic disorder) to validate the diagnosis of autism.” (Madsen, 2002, p. 1478)

According to Dachel, such studies are “the easiest to falsify the findings.” One of the major sponsors of *Age of Autism* is *SafeMinds*, an anti-vaccination organization who among other things has testified before Congress and at Institute of Medicine hearings. In October 2003, *SafeMinds* posted “Analysis of the Danish Autism Registry Data Base in Response to the Hviid et al Paper on Thimerosal in JAMA (October, 2003). They write: “Safe Minds obtained a copy of a data set of the Danish Registry for autism cases, referred to here as the Registry Data Set.” (Bernard, 2003, p.1) In other words, the Danish database(s) are publicly available. Anyone can obtain them, check the data, and re-analyze them. The *SafeMinds* analysis is flawed. An exchange of LETTERS between supporters of the *SafeMinds* paper



and the Hviid *et al.* paper can be found in the January 14, 2014 issue of *JAMA* under the title “Association Between Thimerosal-Containing Vaccine and Autism. However, my point is the exact opposite of Dachel’s claim. The public verifiability of the data makes falsifying the findings difficult, NOT easy.

One final point: if the data was false, then the results of the *SafeMinds*’ analysis would also be invalid. So, population studies do not suffer from sampling errors, and are therefore the most valid studies as long as random sampling of medical charts validates the accuracy of the electronic data entries. And studies based on registries such as the Danish, being publicly available, would be the most difficult to falsify findings. Dachel is wrong on all counts!

## Hypocrisy Rears Its Ugly Head

*L'hypocrisie est un hommage que le vice rend à la vertu.*  
[Hypocrisy is the homage which vice renders to virtue.]  
François de La Rochefoucauld, Maximes (1665–1678)

Over 50 years ago in my college Freshman English course one part of the final exam had us write a 250 word essay, grammatically correct, and having a premise, discussion, and conclusion. The topic of the essay was the above phrase written on the blackboard. I’ve never forgotten it, finding it quite insightful.

According to Dachel, “When it comes to autism, the only science our health officials are interested in are epidemiological studies, which are the least reliable and can only show associations, not causation.” (Dachel, 2015a)

“(P.S. Those oft-used population studies are the least reliable science and the easiest to falsify the findings.)” (Dachel 2015b)

As discussed above, Dachel does not understand the basics of causal inference, epidemiology, and science in general; yet, she advocates for what is clearly an epidemiological study, comparing never vaccinated with vaccinated children:

Dachel writes in one of her articles:

Why isn't Mnookin, in all his media interviews, demanding an independent comparison of fully-vaccinated and never-vaccinated kids. Forget the Amish question. Show us a one percent rate of autism among these children. Show us thousands of never-vaccinated kids with the undeniable signs of classic autism. More and more parents in the general population are exempting their children, so the study group is out there. There is no excuse for not seizing the opportunity.

Not only has no one ever done this research, officials have done everything to avoid doing it. ***It is however, the only way this issue will ever be finally settled.*** [My emphasis] (Dachel, 2011)

In another of her articles, Dachel writes:

Dr. Wharton:

"It seems like it ought to be possible to compare the health of vaccinated and unvaccinated children and address some of these questions. It's got a kind of intuitive appeal. ...

"I don't know of any way we can do it, and it's for a couple of different reasons.

"In the first place, it would be pretty hard to find those 50,000 unvaccinated children to do the study comparing the health outcomes..."

Leslie pointed out, "The CDC's own data says there are over a million unvaccinated children in the United States."

Wharton had more to say about why UNVACCINATED CHILDREN would be hard to study:

"They're almost certainly very different than other children because their parents have made this decision not to vaccinate--and they probably made other decisions that are different than the decisions other parents have made....

"Let's just pretend for a moment that autism is actually caused by pesticides residues on broccoli. ...And we think about this group of 50,000 vaccinated children and this group of 50,000 unvaccinated children. What's their exposure to pesticide residues on broccoli? Is it the same? And it's probably not, because probably those people who made the choice not to vaccinate their children have other things they're concerned about as well. And maybe they're not that concerned about pesticide residues on vegetables and they buy their fruits and vegetables at different stores than these other people do."

Leslie ended the video by telling us how ridiculous it is that Wharton blames different diets for the failure of officials to conduct this needed research.

This wasn't the first time Dr. Wharton has made excuses for not studying vaccinated and unvaccinated children. Seven years ago, I wrote about her explanation during an interview. (Back then the autism rate was one in every 150 children.)

"Dr. Wharton said that because of the high vaccination rate in the U.S., it wouldn't be possible to do a comparison study of vaccinated and unvaccinated children for autism rates. She didn't say anyone at the CDC had even looked for kids who haven't been vaccinated."

In 2007, Wharton said that it was impossible to do the study because there weren't enough unvaccinated kids. Today, it's because unvaccinated children probably aren't eating vegetables laced with pesticides.

I really have no response to what Wharton said in the video. How do these people imagine they're credible to the public? (Dachel, 2014)

As typical for anti-vaccinationists, Dachel focuses on two issues, the number of unvaccinated children and “eating vegetables laced with pesticides.” Dr. Wharton was using pesticide residues on broccoli as an example of just one of the many variables, alternative hypotheses that would render the findings of such a study invalid. Keep in mind that unvaccinated children are not randomly distributed in the population; but on the whole are found in clusters of mainly white, middle to upper middle class, educated, suburbanites. Among the possible variables besides vaccines that could contribute to cases of autism spectrum disorders are:

1. Geographical location, e.g. air-pollution, water-pollution, lead and other toxins used in paints in older homes (as opposed to newer construction often found in suburbs) as well as distance from industrial areas
2. Genetics
3. Pre-natal and post-natal care
4. Low and very low birthweights (modern medical science saves these children)
5. Parental age at birth of child (noting that a higher educated population tend to have children later in life)
6. Co-morbidities, childhood illnesses
7. Change in diagnostic categories
8. Awareness

In order to even attempt such a study, one would have to find enough unvaccinated kids to do some sort of matching or measurement on all of the above. And, as with any epidemiological study, some of the measures would have to be based on self-reports and, as Dachel points out, these would risk being unreliable. As I discussed above, epidemiologists do not rely on one study, regardless of how well done and this one would have just too many problems. If such a study were attempted and found a positive association, it would have to be replicated to rule out random chance that some unmeasured factor contributed to the outcome. If the study resulted in a negative finding, I have no doubt antivaccinationists would cry foul. If it found a positive association with autism, they would ignore all the caveats of unmeasured unequally distributed variables, the animal and lab studies, the brain autopsies, and claim that this one study was definitive. And I have no doubt that Dachel would be leading the charge, ignoring her strong criticisms of the reliability and validity of epidemiological studies.

So, if I read Dachel correctly, it really isn't the type of study that is being questioned, it is the findings. If epidemiological studies, even numerous carried out in different countries, on different populations, by different researchers, with different designs, find results that Dachel disagrees with, then epidemiological studies are unreliable and invalid; but if they result in findings she agrees with, then they are valid and even one study would be definitive. If this isn't hypocrisy, I don't know what is. It certainly isn't science.

However, if Dachel doesn't like epidemiological studies, what would she suggest? Should we start with mothers who have not received any vaccines during pregnancy? Then we could find newborn identical twins, randomly assigning half to get the routine vaccinations and half no vaccinations. We would also have to monitor their diets and environment to rule out other potential confounders such as

heavy metals, pesticides, sugar, etc. To some extent this would depend on self-reports. Maybe Dachel would suggest we could take the newborns from their mothers and move them to a lab for the first 4-5 years of their lives to ensure the only difference would be half would be vaccinated? Maybe we could find some parents willing to allow their children to be placed in a lab for five years? And, even if we could convince some parents to participate, could we get a large enough sample to reduce the risk that their children differ in some important way from children in general, e.g. a rare genetic mutation?.

Clearly I abhor the notion of such unethical controlled scientific studies, which would never be approved. And any study keeping kids in the home, even identical twins could be compromised, e.g. one of the twins could still be exposed to something different from the other. So, as with tobacco studies and many others, epidemiological studies are the only approach ethically acceptable and feasible. Studies on animals can buttress epidemiological findings; but due to genetic and physiological differences cannot give definitive results. And *in vitro* cell studies have problems in that cells in our body are part of a complex interacting system.

## **Dachel Lacks the Basic Understanding of Science Necessary to Evaluate It**

According to Dachel:

“I’ve read the findings that they use, I’ve looked for the science that should be there, and I found no one has done it. I’ve read the books put out by people like Paul Offit. We’ve all heard their endless arguments in defense of vaccines, and we remain unconvinced.” (Dachel 2015b)

“(P.S. One thing I know about Robert Kennedy, Jr. is that he has read the science and looked at what’s out there on both sides. What he found and couldn’t find convinced him that the vaccine safety claims were not supported by the science.)” (Dachel 2015b)

As discussed above, Dachel gives absolutely NO indication she understands the basics of science, epidemiology, and any other related disciplines such as microbiology and immunology. Without these, the criteria she uses to evaluate books such as Paul Offit’s, CDC research, Robert Kennedy’s claims, seems to be based on her beliefs, confirmed by a cherry picking of books, papers, and articles. Without any of the skills necessary to “objectively” evaluate research, her litmus tests seems to be if the findings support her beliefs then they are based on good science and if the findings go against her beliefs then the science is flawed, either methodologically or by intentional fraud.

## **Logical Fallacies and More Hypocrisy: The *Ad Hominem* Attack**

Dachel writes: “Emily Willingtoworkforpharmaaham's version.” (Dachel, 2015a)

From Fearnside & Halter:

Damning an opponent is a common and odious method of damning the source. Personal attacks are effective because it is difficult to credit a man who has been tarred and feathered with obloquy. There is no argument easier to construct or harder to combat than

character assassination, and this may be the reason personal attacks are so commonly on the lips of ignorance and demagoguery.

How, then, can one take account of the character and motives of parties to an argument without falling into fallacy? Personal considerations are certainly relevant for judging the reliability of a man, his willingness to tell the truth. If judgment of a man holds him unreliable, then his statements are rightly suspect. But there is a ***DIFFERENCE BETWEEN “SUSPECT” AND “FALSE.”*** [my emphasis] (Fearnside, 1959, p.99)

And Carroll writes:

*Don't reject an argument just because you don't like the arguer or you question his motives.*

The *ad hominem fallacy* occurs when one mentions things *about a person* in an attempt to show that the person's *argument is* flawed. An argument stands or falls on whether its premises adequately support its conclusion. . . Personal characteristics, associations, past history, motives, and the like of the one making the argument are *irrelevant* to whether premises support a conclusion.

No argument is refuted by showing that the *arguer* is flawed or biased. Good people with good intentions can argue fallaciously and bad people with evil motives can argue cogently. (Carroll, 2013, p. 17)

In other words, labeling and attacking someone is a way of avoiding actually addressing/critiquing/analyzing what they write. It either reflects an inability to think logically and/or a dishonest attempt to get readers biased so that they either do not even bother to read what the person said or read it with a pre-determined closed mind.

Suggesting that Dr. Willingham's work should be rejected because of alleged pharma connections is also hypocritical in that Anne Dachel is sponsored by Lee Silsby Compounding Pharmacy. Dachel includes in each of her articles: "The Dachel Media Update is sponsored by Lee Silsby Compounding Pharmacy and Our Kids ASD. Lee Silsby is one of the most respected compounding pharmacies in the country and is committed to serving the needs of the Autism community."

Unless Lee Silsby Compounding Pharmacy is a charity giving away their products for free, they are a for-profit business selling health care products that allegedly are beneficial. From their website (Medications We Carry, Available at: [www.leesilsby.com/medications-we-carry/](http://www.leesilsby.com/medications-we-carry/)) they list a number of items that have not been subject to systematic scientific research and certainly not to clinical trials and FDA approval, either for effectiveness or safety and some, such as chelation therapy, that have been found to be neither effective in treating autism and dangerous:

"No clinical trial evidence was found to suggest that pharmaceutical chelation is an effective intervention for ASD. Given prior reports of serious adverse events, such as hypocalcaemia, renal impairment and reported death, the risks of using chelation for ASD currently outweigh proven benefits." (James, 2015)

Whether Dachel personally thinks their products work or not is beside the point. However, it begs the question of whether she will use products manufactured by a for-profit pharmaceutical company. Next time she or a friend ends up with a serious infection, will they reject antibiotics, or if she or a friend has a kid with Type 1 diabetes, will they reject using insulin because they are manufactured by a for-profit pharmaceutical company?

So, Dachel uses the logical fallacy, an *ad hominem* attack, to direct attention away from her inability to directly address, critique and refute Willingham's articles. What's more, while Dachel proudly supports a for-profit company (which is similar to her accusation of Willingham being a pharma shill, which is a term used by many antivaccinationists to define anyone who supports vaccines), she doesn't provide any evidence that Willingham has any significant association with the pharmaceutical industry, let alone any evidence that would pass public credibility. Meanwhile, Willingham's webpage includes the following: "Conflict of interest statement: 'I have no fiscally related conflict of interest to declare relative to vaccines, GMOs, global climate change, autism, parenting, or feminism. One of my family members is autistic, so I have a personal as well as scientific interest in the subject.'" (Willingham, 2015e)

However, as I wrote above, even if Willingham directly worked in the pharmaceutical industry, it would not automatically discredit what she writes. So, Dachel resorts to the logical fallacy of *ad hominem* attacks and displays her blatant hypocrisy at the same time.

## **Bait and Switch: Avoiding Actually Addressing Points**

Willingham's article "Hey, Interpol. I Found Your Autism Researcher Fugitive" discusses the anti-vaccinationists' obsession with Poul Thorsen, a Danish researcher who co-authored studies on vaccines and autism and while a guest researcher at the CDC was accused of embezzling research funds for his personal use. Thorsen is currently in Denmark with antivaccinationists hoping he will be extradited back to the US. In Willingham's article she points out the following:

1. Despite antivaccinationist claims, Thorsen was not the principle investigator on the Danish vaccine-autism studies (Madsen, 2002; 2003). He is listed as the sixth of eight authors in one article and fourth of six in another article.
2. Despite antivaccinationist claims, Thorsen is not on the Interpol most wanted list.
3. Despite antivaccinationist claims, Thorsen is not in hiding. He is currently working as a researcher, his home address is listed, and he has been interviewed there.
4. Despite antivaccinationist beliefs, there is absolutely NO reason to assume that someone who embezzles money would also falsify research. I would add that antivaccinationists either have to accuse all of the authors (8 in one paper, 6 in the other) of participating in producing a fraudulent paper or explain how Thorsen, not the principle investigator, could have carried out such a fraud without them catching it.
5. Willingham points out that the data is available in the Danish registry for re-analysis. In fact, *SafeMinds* accessed the data for their own analysis, one that, though lacking credibility, is an example of how difficult it would be to falsify research when the original data is easily available.

6. Willingham makes it clear that if Thorsen is guilty he should receive punishment for both betraying the public by embezzling funds intended to contribute to public health and giving ammunition, albeit wrongly used, to antivaccinationists which, in turn, further hurts public health. I strongly concur.

Rather than discuss any or all of the above points, Dachel changes the subject stating: “I’d like to ask Willingham if she’s looked into the views of the other side in the vaccine controversy. Has she read *Evidence of Harm* by David Kirby, *Age of Autism* by Dan Olmsted and Mark Blaxill, *Callous Disregard* by Andrew Wakefield, or *Thimerosal, Let the Science Speak* by Robert Kennedy, Jr.? If not, why not? I’d love to read her critique of these books.” Dachel goes on to write: “(P.S. One thing I know about Robert Kennedy, Jr. is that he has read the science and looked at what’s out there on both sides. What he found and couldn’t find convinced him that the vaccine safety claims were not supported by the science.)”

In essence, Dachel is pulling a bait and switch. One of Willingham’s article is on Poul Thorsen, what she has or has not read, and what she has written in the past are all totally irrelevant. Dachel simply fails to address Willingham’s points regarding Poul Thorsen. Willingham’s other articles focus on several claims made by Robert Kennedy, including his original article on thimerosal. Dachel doesn’t even attempt to actually address what Willingham writes. Instead, she throws out references to other documents. A legitimate/valid critique would involve directly addressing what Willingham writes, including specific “information” from any source Dachel chooses. By simply questioning whether Willingham had read other articles by those Dachel puts faith is a bogus approach; but excellent propaganda for those lacking basic critical thinking skills.

By the way, I have read *Evidence of Harm*, *Callous Disregard*, and *Thimerosal: Let the Science Speak*. I intend to write a review of *Thimerosal: Let the Science Speak* and wrote an extensive detailed review of Andrew Wakefield’s *Callous Disregard* which took me almost a year tracking down relevant articles and documents. After reading carefully as many as 300 articles and documents, I finally honed in on 150 references for my article:

Harrison, J.A. (2013). Wrong About Vaccine Safety: A Review of Andrew Wakefield’s “Callous Disregard”. *The Open Vaccine Journal*, 6, 9-25. Available at: <http://benthamopen.com/contents/pdf/TO-VACJ/TOVACJ-6-9.pdf>

While I don’t think Dachel will like my article, if she actually read it, I doubt she would be able to validly address any of the points I made.

## **Guilty Until Proven Innocent, Or Perhaps, Never Allowed to Prove Innocence**

I would add one additional point. The tenor of many of the antivaccinationist articles implies the belief that Thorsen is guilty. I was raised to believe that someone is innocent until proven guilty; but that would not fit into the antivaccinationist agenda. What would happen if Thorsen were to return to the US, face trial, and be found innocent? I doubt many of the antivaccinationists will write any sort of ar-

ticle admitting they had been wrong. More than likely, at least some of them will attribute his exoneration by the court as being part of their imagined Pharmaceutical Industry-CDC-NIH-Academy of Science conspiracy.

As an example, besides not addressing any of the points Willingham makes in her article on Poul Thorsen, Dachel hyperlinks to an article entitled “WANTED BY THE FEDS: Poul Thorsen, Who Helped Pull Off CDC Vaccine Autism Heist” (Age of Autism, 2012) Not only does *Age of Autism* try to convict Thorsen prematurely by using a title that assumes something that hasn’t been proven; but they also make an assumption that has been refuted by numerous studies. Only in the rigid unscientific minds of antivaccinationists is it an assumed fact.

Even if Thorsen were to be found guilty it would NOT automatically discredit any research he has been involved in. He was not the principle investigator and only one of six or seven co-authors. In addition, people are not unidimensional, though this is, apparently, how antivaccinationists see the world, that is, when attacking those doing research on vaccines.

## Discussion

Anne Dachel is a regular contributor to *Age of Autism*. As this article shows, she lacks the basics of science. She indicates NO understanding of epidemiology or causal inference. She avoids directly addressing/critiquing what Emily Willingham writes. Instead, she simply throws out the titles of other writings without giving any specifics. These examples display Dachel’s blatant hypocrisy, twice: she both critiques epidemiology while simultaneously promoting an epidemiology study of never vaccinated vs vaccinated, and she implies that Willingham’s writings are to support the pharmaceutical industry while openly admitting her sponsorship by a for-profit company that sells numerous products, some which have been found to be harmful, are not scientifically validated, and have never been approved by the FDA. Given her lack of basic scientific knowledge, it is easy to disregard her complaints that she is not convinced by the science. It would be similar to me listening to a speech in some foreign language I don’t understand and stating I wasn’t convinced by the speaker.

However, what would happen if I did have a primitive knowledge of a foreign language, perhaps a vocabulary of 500 words and some basic grammar? Would I then be in a better position to decide if a speech given in that language convinced me or not? Not if I had any common sense.

Science represents a prestigious and powerful institution in our culture. As Christopher Toumies writes:

“My argument is that, regardless of the metaphysical status of science, its value in American life is contingent on the cultural values and meanings that frame science. . . I ask how the American people attribute the plenary authority of science to those values and meanings by disconnecting the popular symbols of science from its intellectual substance and attaching those symbols to other matters instead. In other words, I ask how we conjure a semblance.” (Toumies, 1996, p.10)



From the Back Cover:

“Toumey argues that instead of comprehending scientific knowledge, methods, or standards, most American know science only in terms of symbols that stand for science that stand between people and scientific understanding.” (Toumey, 1996)

Toumey's book goes on to discuss, among other things, the poor scientific education that many American receive. His short fascinating book is well-worth reading.

According to Wikipedia:

“Willingham has a bachelor's degree in English (1989) and a PhD in biological sciences (2001), both from the University of Texas at Austin. She completed her fellowship in pediatric urology at the University of California, San Francisco, from 2004 to 2006, where she studied under Laurence S. Baskin. . Willingham has published 44 scientific papers.” (Wikipedia, Emily Willingham)

So, we have a PhD in biological sciences with numerous published scientific papers being criticized by someone with a blatant deficient understanding of science. I am not claiming that one should automatically defer to Willingham or any other accomplished scientist; but anyone criticizing her should have the basic skills and knowledge necessary to do so. As far as I can tell, science is to Dachel as critiquing a speech in Chinese would be for me or even a speech in German based on the high school German I learned from over 50 years ago.

## Conclusion

In my articles published by *Vaccinate Your Family* (Available at [www.vaccinateyourfamily.org/expert-commentary](http://www.vaccinateyourfamily.org/expert-commentary)), I have reviewed and critiqued several articles posted on *Age of Autism* and *SafeMinds*, one of *Age of Autism's* sponsors. Each of my reviews has clearly highlighted the poor scholarship, deficient science, and, often, lack of common sense by the authors of those articles. This article which reviews some of Anne Dachel's articles on Emily Willingham is yet another example that adds hypocrisy to the growing list of antivaccinationist flaws.

Deficient knowledge and scientific skills render their opinions void of any credibility. If people, especially parents, are to decide whether or not to vaccinate themselves and their children such decisions should be based on science and logic (critical thinking) and not belief systems deficient in both.

Personally and to the best of my knowledge, all of my former colleagues try our best to NEVER claim that we have anything approaching perfect knowledge or absolute certainty. As discussed above, science does not prove anything; but advances by eliminating alternative hypotheses. The more studies that find the same or similar results, the more confident we become; but NEVER certain. Antivaccinationists, lacking understanding and basic science skills, cherry pick what confirms their rigid pre-existing beliefs and reject anything that disconfirms them. I'll end with a quote about the Dunning-Kruger Effect that fits with antivaccinationists quite well (note that the Rational Wiki article gives references to the original studies)

“From RationalWiki“

The Dunning-Kruger effect, named after David Dunning and Justin Kruger of Cornell University, occurs where people fail to adequately assess their level of competence — or specifically, their incompetence — at a task and thus consider themselves much more competent than everyone else. This lack of awareness is attributed to their lower level of competence robbing them of the ability to critically analyze their performance, leading to a significant overestimate of themselves. Put more crudely, they're **too stupid to realize they're stupid**.

The inverse also applies: competent people tend to underestimate their ability.” (Rational Wiki. I, for one, am almost always second guessing myself and devote considerable time to reading papers that disagree with me, sometimes changing my mind, sometimes finding some compromise, and often, based on my training and extensive reading, refuting them.

## References

Age of Autism (2012 Nov 1). WANTED BY THE FEDS: Poul Thorsen, Who Helped Pull Off CDC Vaccine Autism Heist. *Age of Autism*. Available at: [www.ageofautism.com/2012/11/wanted-by-the-feds-poul-thorsen-who-helped-pull-off-cdc-vaccine-autism-heist.html](http://www.ageofautism.com/2012/11/wanted-by-the-feds-poul-thorsen-who-helped-pull-off-cdc-vaccine-autism-heist.html)

Bernard, S (2003 Oct). Analysis of the Danish Autism Registry Data Base in Response to the Hviid *et al* Paper on Thimerosal in *JAMA* (October, 2003). *SafeMinds*. Available at: [www.safeminds.org/wp-content/uploads/2013/04/Hviid\\_et\\_alJAMA-SafeMindsAnalysis.pdf](http://www.safeminds.org/wp-content/uploads/2013/04/Hviid_et_alJAMA-SafeMindsAnalysis.pdf)

Carroll, Robert Todd (2013). *The Critical Thinker's Dictionary: Biases, Fallacies, and Illusions and what you can do about them*. Lulu. [Also available as e-book]

CDC (2015). Chapter 4: Vaccine Safety in *Epidemiology and Prevention of Vaccine-Preventable Diseases: The Pink Book* 13th Edition. Washington, DC: Public Health Foundation

Dachel, Anne (2011 Jul 11). Amish & Autism. *Age of Autism*. Available at: [www.ageofautism.com/2011/07/amish-autism.html](http://www.ageofautism.com/2011/07/amish-autism.html)

Dachel, Anne (2014 Sep 26). Leslie Manookian & The Greater Good Movie on Dr. Melinda Wharton. *Age of Autism*. Available at: [www.ageofautism.com/2014/09/leslie-manookian-the-greater-good-movie-on-dr-melinda-wharton.html](http://www.ageofautism.com/2014/09/leslie-manookian-the-greater-good-movie-on-dr-melinda-wharton.html)

Dachel, Anne (2015a, Aug 10). Dachel Media Update: Willingham Wanders Into Waldo. *Age of Autism*. Available at: [www.ageofautism.com/2015/08/dachel-media-update-willingham-wanders-into-waldo.html](http://www.ageofautism.com/2015/08/dachel-media-update-willingham-wanders-into-waldo.html)

Dachel, Anne (2015b, Aug 11). Dachel Media Update: Forbes' Emily Willingham Has Made Up Your Mind. *Age of Autism*. Available at: [www.ageofautism.com/2015/08/dachel-media-update-forbes-emily-willingham-has-made-up-your-mind.html](http://www.ageofautism.com/2015/08/dachel-media-update-forbes-emily-willingham-has-made-up-your-mind.html)

FDA (2011 Jul). *Ensuring the Safety of Vaccines in the United States*. Available at: [www.fda.gov/downloads/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/UCM298181.pdf](http://www.fda.gov/downloads/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/UCM298181.pdf)

Fearnside, W. Ward & Holther, William (1959). *Fallacy: The Counterfeit of Argument*. Englewood Cliffs, NJ: A Spectrum Book.

Hviid, A, Stellfeld, M, Wohlfahrt, J & Melbye, M (2003). Association Between Thimerosal-Containing Vaccine and Autism. *JAMA*; 290: 1763-1766.

Institute of Medicine (1991). *Adverse Effects of Pertussis and Rubella Vaccines*. Washington, DC: National Academy Press. Available at: [www.nap.edu/catalog/1815/adverse-effects-of-pertussis-and-rubella-vaccines](http://www.nap.edu/catalog/1815/adverse-effects-of-pertussis-and-rubella-vaccines)

Institute of Medicine (2004). *Immunization Safety Review: Vaccines and Autism*. Washington, DC: National Academy Press. Available at: [www.nap.edu/catalog/10997/immunization-safety-review-vaccines-and-autism](http://www.nap.edu/catalog/10997/immunization-safety-review-vaccines-and-autism)

Institute of Medicine (2012). *Adverse Effects of Vaccines: Evidence and Causality*. Washington, DC: National Academy Press. Available at: [www.nap.edu/catalog/13164/adverse-effects-of-vaccines-evidence-and-causality](http://www.nap.edu/catalog/13164/adverse-effects-of-vaccines-evidence-and-causality)

JAMA Letters (2004 Jan 14). Association Between Thimerosal-Containing Vaccine and Autism. *JAMA*; 291:180-181.

James, S, Stevenson, SW, Silove, N, Williams, K (2015 May 11). Chelation for Autism Spectrum Disorder (ASD), *The Cochrane Database of Systematic Reviews*, Issue 5. ABSTRACT Available at: [www.ncbi.nlm.nih.gov/pubmed/26114777](http://www.ncbi.nlm.nih.gov/pubmed/26114777)

Lauritsen, MB, Jørgensen, M, Madsen, KM *et al.* (2010). Validity of Childhood Autism in the Danish Psychiatric Central Register: Findings from a Cohort Sample Born 1990-1999. *Journal of Autism and Developmental Disorders*; 40: 139-148.

Madsen, KM, Hviid, A, Vestergaard, M, Schendel, D, Wohlfahrt, J, Thorsen, P, Olsen, J, & Melbye, M (2002). A Population-Based Study of Measles, Mumps, and Rubella Vaccination and Autism. *New England Journal of Medicine*; 347: 1477-82.

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

Mors, O, Perto, GP & Mortensen, PB (2011). The Danish Psychiatric Central Research Register. *Scandinavian Journal of Public Health*; 39(Suppl 7): 54-57.

Munk-Jørgensen, P & Østergaard, SD (2011). *Scandinavian Journal of Public Health*; 39 (Suppl 7): 170-174.

RationalWiki (last modified on 2014 Aug 16) Dunning-Kruger Effect. Available at: [http://rational-wiki.org/w/index.php?title=Dunning-Kruger\\_effect&printable=yes](http://rational-wiki.org/w/index.php?title=Dunning-Kruger_effect&printable=yes)

Rothman, Kenneth J. (1988) *Causal Inference*. Chestnut Hill, MA: Epidemiology Resources Inc.

Rothman, Kenneth J. & Greenland, Sander (1998). Chapter 2: Causation and Causal Inference and Chapter 8: Precision and Validity in Epidemiologic Studies in *Modern Epidemiology*, Second Edition. Philadelphia, PA: Lippincott Williams & Wilkins.

Susser, Mervyn (1973). *Causal Thinking in the Health Sciences: Concepts and Strategies in Epidemiology*, New York: Oxford University Press.

Susser, Mervyn (1987) *Epidemiology, Health, & Society: Selected Paper*, New York: Oxford University Press.

Toumies, Christopher P. (1996). *Conjuring Science: Scientific Symbols and Cultural Meanings in American Life*. New Brunswick, NJ: Rutgers University Press.

Wikipedia. "Emily Willingham" Available at: [https://en.wikipedia.org/wiki/Emily\\_Willingham](https://en.wikipedia.org/wiki/Emily_Willingham)

Willingham, Emily. Emily Willingham: About. Available at: [www.emilywillinghamphd.com/p/about.html](http://www.emilywillinghamphd.com/p/about.html) (Accessed Aug 13, 2015)

Willingham, Emily (2015a, July 21) Why Does Robert F. Kennedy Jr. Get Brain Science So Wrong? *Forbes*. Available at: [www.forbes.com/sites/emilywillingham/2015/07/21/why-does-robert-f-kennedy-jr-get-brain-science-so-wrong/print/](http://www.forbes.com/sites/emilywillingham/2015/07/21/why-does-robert-f-kennedy-jr-get-brain-science-so-wrong/print/)

Willingham, Emily (2015b, Jul 22). Robert F. Kennedy Jr. Gets It Wrong About African-American Boys and Autism. *Forbes*, Available at: [www.forbes.com/sites/emilywillingham/2015/07/22/robert-f-kennedy-jr-gets-it-wrong-about-african-american-boys-and-autism/print/](http://www.forbes.com/sites/emilywillingham/2015/07/22/robert-f-kennedy-jr-gets-it-wrong-about-african-american-boys-and-autism/print/)

Willingham, Emily (2015c, Aug 10). Hey, Interpol. I Found Your Autism Researcher Fugitive, *Forbes*. Available at: [www.forbes.com/sites/emilywillingham/2015/08/10/hey-interpol-i-found-your-autism-researcher-fugitive/](http://www.forbes.com/sites/emilywillingham/2015/08/10/hey-interpol-i-found-your-autism-researcher-fugitive/)

Willingham, Emily (2015d, Aug 11). I Reject The Evidence, And So Do You. *Forbes*. Available at: [www.forbes.com/sites/emilywillingham/2015/08/11/i-reject-the-evidence-and-so-do-you/print/](http://www.forbes.com/sites/emilywillingham/2015/08/11/i-reject-the-evidence-and-so-do-you/print/)

Willingham, Emily (2015e). About. Available at: [www.emilywillinghamphd.com/p/about.html](http://www.emilywillinghamphd.com/p/about.html) (Accessed Aug 13, 2015)