

# Is vaccine dissent based on science?

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## Abstract

The mere mention of a possible link between vaccines and disorders such as autism will instantly elicit a visceral response from many pediatricians. In most cases the response is to point out that the paper linking the MMR vaccine to autism authored by Dr. Andrew Wakefield and colleagues has been discredited, with Wakefield, vaccine advocates whipping boy losing his license to practice medicine in the UK. The implication being that anti-vaccine groups are relying on flawed or fraudulent data or that this is only study to ever make a connection between vaccines and autism, so the issue has been put to rest.

Medicine has a history of exercising its cultural authority to suppress opposition opinion. These include Dr. William Coley, who observed one of his patients began recovering from cancer after he was infected with *Streptococcus pyogenes*. This led Coley to theorize that post-surgical infections helped defeat cancer by mobilizing the immune system, but almost all his scientific peers rejected the idea, writing it off as “crazy and dangerous”. Coley died in 1936, and with his death his theory and work which were looked down on as “quack medicine” died too. Coley’s theory of immune system stimulation to fight cancer was “surpassed” by “scientific” chemotherapy and radiation.

Francis Peyton Rous was a pathologist who discovered that certain viruses were linked to the development of certain cancers was ostracized by his peers and both he and his findings were largely discredited. However, in 1966, over 50 years after his initial findings, he was awarded the Nobel Prize in Physiology or Medicine.

This paper is not about Wakefield nor is it a defense of him or his research, it is however intended to point out that there has been an organized attempt to silence vaccine opponents, both professionals and parents who, backed with valid research as defined by pro-vaccine’s definition of “real science” have raised legitimate concerns as to the safety and efficacy of certain vaccines. Before latching onto the Wakefield case as the holy grail to prove that vaccine opposition groups rely on fraudulent or weak data to advance their agenda, vaccine advocates need to examine their own science and those who are supplying it.

*“It is dangerous to be right in matters on which the established authorities are wrong.”*

– Voltaire

## Introduction

A 2013 Canadian survey found that almost 70% of parents expressed concerns about potential vaccine side effects [1] and data suggests that an increasing number of US parents are choosing not to vaccinate their children [2]. Thus, it should come as no surprise that most pediatricians will encounter a parent who will express hesitancy about or totally reject one or more vaccines. The most common response is to assure the parent that research has proven vaccine are safe and prevent serious communicable diseases or, if the discussion is Gardasil®, that the vaccine will prevent cancer. But are these responses accurate?

Parents who question vaccine safety and efficacy have been marginalized by physicians who continue to make sweeping generalizations pretending that there is no issue regarding vaccine safety. Statements belittling parents such as “...unable to understand and incorporate concepts of risk and probability into science-grounded decision making...” [3] or that most parents rely on

“... scientifically unfounded fears about childhood vaccines causing autism [that] have proliferated over the past decade...” [4] are commonplace and attempt to portray groups or individual parents who question vaccination safety as ignorant. But are their fears “scientifically unfounded”; or has there been an organized attempt to silence and delegitimize vaccine opposition? [5] Vaccine advocates will point to the extensive published data that confirms the safety of vaccines, their so called “real-science” versus the “junk-science” used by those

who question vaccine safety. Advocates will claim that so extensive is this data that the only people who could look at this information and think that a vaccine safety issue exists are kooks, nuts and conspiracy theorists [6]. The facts contradict this.

## Adjuvants and Other Ingredients

Within the last 12 months there have been numerous published studies that are highly suggestive of vaccine adjuvants and preservatives such as mercury (the major component in Thimerosal) being causative agent in numerous neurological conditions in children. These include emotional disturbances [7], atypical autism [8], autism spectrum disorders [9,10], as well as risk of neurotoxicity to the developing brain [11].

Kocourkova has noted that “Vaccine toxicity may originate from a plethora of factors, including the vaccine components (e.g. the antigen itself, the adjuvant, or the excipients), interaction between different vaccine components, vaccine manufacture, overall vaccine composition, route of administration, dose, and number of vaccinations [12] One

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early adjuvant that raised concerns was the mercury containing product Thimerosal. While some will argue that it has been over 14 years since Thimerosal has appeared in a vaccine in the US (except for influenza) [13], the preservative, due to economic reasons (the price of single dose vaccine is cost prohibitive for most poorer countries) is still used in vaccines administered in third world countries, pitting rich against poor, an issue that has stimulated a global debate among physicians and ethicists [14].

While the issue of mercury based preservatives such as Thimerosal in vaccines may appear moot in the US, one needs to keep in mind that Thimerosal is a preservative that has been used in some vaccines since the 1930's when it was first introduced by Eli Lilly Company. Mainly found in diphtheria- tetanus vaccines, as well as hepatitis B vaccine and most flu vaccines Thimerosal was only removed from new manufacturing of vaccines in 1999. This date however is somewhat misleading as this was not a total removal since existing Thimerosal containing inventory could remain in use until the last vial expired in 2003, a full 4 years after the ruling was approved. Even after its removal the FDA's official position remained that the additive was safe and that its removal was not because of overwhelming scientific evidence, (which does exist) but only as a "precautionary measure." [15] Nonetheless we now have an entire generation of children who were exposed to a clearly recognized neuro-toxin with the potential negative effects from this exposer.

Another additive still present in many vaccines and shown to cause neurological pathologies is Aluminum. Inbar and colleagues noted; "...contrary to popular assumptions of inherent safety of Al in vaccines, there is now compelling data from both human and animal studies which implicates this most widely used adjuvant in the pathogenesis of disabling neuroimmuno-inflammatory conditions" [16] Aluminum has been linked to several disorders of the nervous system and GI tract including but not limited to multiple sclerosis, Crohn's disease [17], Gulf War Syndrome, Alzheimer's disease [18], autism and ALS [19].

The effects caused by vaccine additives has been given a name by the scientific community, ASIA- "autoimmune/inflammatory syndrome induced by adjuvants". The syndrome encompasses the wide range of adjuvant-triggered medical conditions "characterized by a mis-regulated immune response." [20] The issue of vaccine additives is just one area that has been shown to be a "scientifically valid" area of concern, with numerous papers linking adjuvants to an auto-immune response [21]. While the issue of vaccine adjuvants is summarily dismissed as a non-issue by vaccine advocates who choose to ignore the published reports, of greater concern and an issue addressed later in this paper are the conflicts of interest and ethical breaches of pharmaceutical manufactures.

With an increasing number of parents questioning the safety of certain vaccines, or refusing the administration of any vaccine many pediatricians have dug in their heels refusing to treat these families, referred to pejoratively as "anti-vaxxers". One survey found that almost 40% of pediatricians said they would "dismiss" families who refused all vaccines [22]. This leaves open the possibility of allowing parents to pick and choose which vaccines will or will not be administered to their child and when, a practice utilized by some physicians when treating their own families.

A survey of pediatricians and pediatric sub-specialists by Michael Martin, MD found a significant proportion of respondents would deviate from CDC guidelines in the administering of vaccines to their own children. Twenty-one percent of sub-specialists indicated they would or have opted out or delayed the administering of a vaccine to a

family member, while 9% of general pediatricians said they had done the same. Among sub-specialists the MMR vaccination was the one most likely to be deferred. Both groups listed safety as the most common reason for altering the recommended immunization schedule [23].

The journal Pediatrics revealed that 50% of the respondents in their survey, all non-pediatricians (internists, family medicine physicians) were more likely not to have immunized their children against measles, mumps, hepatitis B, or Haemophilus influenzae type b. These physician groups were more likely than their pediatrician colleagues to postpone diphtheria-tetanus-pertussis (DTP) and like the sub-specialist in the Martin survey delay the measles-mumps-rubella (MMR) vaccination [24]. The belief that there is homogeneity among pediatricians and family physicians when it comes to acceptance of all scheduled vaccines for their patients or their families does not appear to be factual.

### **Big Pharma Lacks a Moral Compass**

Attacks on anti-vaccine groups and individuals have included accusations of falsifying data or at least, the cherry picking of data to bolster their cause [25], a rather hypocritical accusation considering these are the exact practices frequently employed by the pharmaceutical industry when seeking approval of their products. Pharmaceutical firms have repeatedly violated rules designed to protect human subjects in drug testing. They have concealed health risks of their products that appeared in clinical trials findings and failed to report adverse drug reactions in a timely manner. Some have even failed to meet safe manufacturing standard [26]. Reports of one large pharmaceutical company training its sales force how to lie to insurance companies by insinuating a patient was suffering from cancer when in fact they were not to have their product approved have only recently come to light [27].

Vaccine advocates rely heavily on published data to make their argument, implying that only their science is "real science" and the anti-vaccine groups rely on "junk science". [22] A statement not unlike politicians dismissing information contrary to their own as "fake news". The fact is that a great deal of the data from this "real science" is funded by the pharmaceutical industry, a fact that is frequently omitted [28]. While industry funding of trials does not automatically negate the findings, it certainly should raise a caution flag of potential bias. To further stress this point one only need to read a paper from the British Medical Journal that examined randomized vaccine trials and found that; "non-industry sponsored trials were 4.42-fold ( $P=0.008$ ) more likely to report negative or mixed findings" [29].

David Freedman of The Atlantic writes that one of the world's foremost experts on the credibility of medical research, Dr. John Ioannidis has expressed concern over the role that pharmaceutical manufactures play in the design and interpretation of research outcome Data [30]. In a scathing attack on the industry Ioannidis and his coauthors said; "To serve its interests, the industry masterfully influences evidence base production, evidence synthesis, understanding of harms issues, cost-effectiveness evaluations, clinical practice guidelines and healthcare professional education and also exerts direct influences on professional decisions and health consumers." [31] Ioannidis believes that as much as 90 percent of the published medical information that doctors rely on is flawed. He believes that much of the conclusions reached by biomedical researchers, conclusions that physicians rely on when prescribing medications or performing procedures is misleading, exaggerated, and often flat-out wrong [32]. When it comes to the usefulness of published research he is just as critical, saying; "Overall, not only are most research findings false, but, furthermore, most of the

*true findings are not useful. Medical interventions should and can result in huge human benefit. It makes no sense to perform clinical research without ensuring clinical utility.” [33].*

Vaccine activist continue to claim something close to a monopoly on truth and knowledge, while labeling anti vaccine groups as “unscientific” kooks, or worse [34,35]. They have no reservation creating aura of skepticism around the published research that raises questions as to safety and/or efficacy of certain vaccines, even when these critiques are authored by well credentialed researchers.

Examples of pharmaceutical industry fraud (remember this is often the information physicians are relying on when making clinical decisions) is not hard to find. Even the risk of substantial monetary penalties haven’t slowed their practices. Penalties’ are now nothing more than the cost of doing business. One study found; “... that over a 21.5-year period two of the largest manufacturers GlaxoSmithKline and Pfizer together paid \$10.52 billion in 20 settlements” [23]. While this amount may sound staggering it was a drop in the bucket in comparison to the firms’ \$17.7 billion in net profits in 2014 alone [36].

In the 2012 GalaxoSmithKline and the United States Government reached a \$3 billion settlement agreement. The settlement, the largest ever paid in a healthcare fraud settlement was the result of numerous fraudulent and criminal actions by the drug maker. Among these was the fact that “...GSK participated in preparing, publishing and distributing a misleading medical journal article that misreported that a clinical trial of Paxil demonstrated efficacy in the treatment of depression in patients under age 18, when the study failed to demonstrate efficacy.” Additionally; “... the United States alleges, GSK did not make available data from two other studies in which Paxil also failed to demonstrate efficacy in treating depression in patients under 18.” [37,38] In the matter of its anti-depressant Wellbutrin, GSK admitted that it paid millions of dollars to doctors to speak at and attend meetings, “sometimes at lavish resorts, at which the off-label uses of Wellbutrin were routinely promoted. It then used sales representatives, sham advisory boards, and supposedly independent Continuing Medical Education (CME) programs to promote Wellbutrin for these unapproved uses.” [39].

Between 2001 and 2007, GSK failed to include certain safety data about Avandia, a diabetes drug, in reports to the FDA that are meant to allow the FDA to determine if a drug continues to be safe for its approved indications and to spot drug safety trends. The missing information included data regarding certain post-marketing studies, as well as data regarding two studies undertaken in response to European regulators’ concerns about the cardiovascular safety of Avandia [40]. Again, it needs to be stressed that this is the information that prescribing physicians relied on when making clinical decisions, believing the data had been vetted and undergone both company and government oversight.

A November 2014 Newsweek magazine report entitled; *Big Pharma Plays Hide-The-Ball With Data* outlines the history of a young girl who suffered severe hallucinations following taking the influenza medication, Tamiflu® [41]. The significance of the article is not so much the drug itself, but what was known about it and by whom. Following an investigation by the London based Cochrane Collaboration, it was revealed that a significant amount of negative data from the drug’s clinical trials were hidden from the public. What many practitioners may find surprising is that The Food and Drug Administration (FDA) knew of the existence of this negative data, but the medical community did not [42]; In an additional piece of irony it was disclosed that the

U.S. Centers for Disease Control and Prevention (CDC), doesn’t have the same access to unpublished data as regulators, and thus had recommended the drug without being able to see the full picture. When results from those unpublished trials finally did emerge, they cast doubt over whether Tamiflu® is as effective as the manufacturer says [41]. As Cochrane found out first hand it has been estimated that as many as half of all clinical trials are never published [43].

What Cochrane uncovered was that Roche had paid for dozens of clinical trials to prove the efficacy of Tamiflu®. Roche researchers then produced “clinical study reports” and turned them over to the FDA, which approved the drug in 1999. Many of these reports were then condensed into short articles and subsequently published in medical journals, which is usually the only source that the practitioner has when evaluating a study. When Cochrane representatives sought to obtain the full clinical study reports from “all” trials, a number that was estimated at about 36 they were rebuffed by Roche. A Freedom of Information request (FOIA) was filed with the FDA and its European equivalent the European Medicines Agency (EMA) [44,45].

During this period Roche and Cochrane continued to negotiate with Roche offering to give Cochrane 10 reports, but only if it signed a confidentiality agreement keeping everything secret—including the existence of the agreement. Cochrane refused to sign. After a 5-year battle Roche and the EMA opened their files (the FDA still has not). What Cochrane uncovered was more than 70 Tamiflu® trials and over 100,000 pages of unpublished reports including many trials where the results were negative or inconclusive. Now, with this more complete picture Cochrane concluded the trials don’t prove that Tamiflu® prevents hospitalizations, contagiousness or complications. The only thing it does do, Cochrane said, is shorten the duration of symptoms, by about a day [46]. Despite these findings the CDC, did not change their position on the drug saying; “the agency says it still believes Tamiflu® is “an important adjunct to influenza vaccine.” One posable reason for this position could be that the U.S. government spent \$1.3 billion to develop and stockpile antiviral medication, including Tamiflu® [47].

In a 2017 investigation of pharmaceutical company Insys Therapeutics, U.S. Senator Claire McCaskill found that the company utilized a technique of “... Systemic Manipulation of Prior Authorization” in order to have Medicare and other insurance companies approve its pain medication Subsys®. McCaskill said that her investigation found; “*There is extensive evidence that Insys aggressively pressured its employees and the entire medical system to increase the use of a fentanyl product during a national epidemic that was taking the lives of tens of thousands of Americans a year in order to make more money – it’s hard to imagine anything more despicable,*” [48] CNN reported the investigation found that to boost sales, the company took patients who didn’t have cancer and made it look like they did. It said the drug maker used “a combination of tactics, such as falsifying medical records, misleading insurance companies and providing kickbacks to doctors in league with the company.” [49].

## The Miracle Drug Fraud

In one of the most egregious frauds perpetrated on consumers and physicians alike one just need to examine the ethical history of Merck Pharmaceuticals, the manufacturer of Gardasil®, M-M-R® II, Pedvax HIB, Pneumovax® 23, ProQuad, Recombivax HB® and a host of other vaccines. Between 1999 and 2001 patents on 5 of Merck’s bestselling drugs were set to expire, with an additional 2 more scheduled to expire in 2007 [50]. In need of a new best seller, (in the pharmaceutical industry a best seller is classified as any drug that grosses over \$1 billion

in annual sales [51].) executives at Merck as well as their shareholders would look to the company's new arthritis drug Vioxx to fulfill this goal. They would not be disappointed. Vioxx was approved in 1999, and in 60 months' over 107 million prescriptions were dispensed [52] to over 20 million Americans [53] with annual sales approaching \$2.5 billion [54]. But in 2004 it was concluded that there was significant evidence that the drug caused cardiovascular harm, and in an appearance of a large pharmaceutical company being prudent and acting responsibly, Merck "voluntarily" withdrew the drug from the market [53].

Court documents would later reveal that Merck researchers raised concerns about Vioxx and its potential for cardiovascular harm in 1996, well before its "voluntary" withdrawal of the product. During the very early trial period, when Merck submitted its data to the FDA any mention of cardiovascular events was excluded. In a clear case of data manipulation, the submitted trials involved small patient populations with low risk of cardiovascular issues with treatment periods that extended less than 12 months during which time researchers did not collect relevant outcomes to measure cardiovascular problems. While early results raised "concerns" by 1999 the company knew for "certain" there was a problem [55].

When FDA scientist David Graham examined the data from a study designed to show that when compared to its competitor, naproxen Vioxx caused fewer gastrointestinal side effects he found that "27,000 heart attacks and sudden cardiac deaths could have been avoided" if the patients had used Celebrex (Merck's competition) instead of Vioxx. But these results were not made public and Graham and other researchers were "pressured to keep quiet." This pressure to silence dissent came not only from Merck, where senior management warned Graham that he would face "serious consequences" if he continued to publicly express concerns over Vioxx [56]. The FDA's Office of New Drugs, who, because they were not considering a warning against the use of Vioxx "suggested" that Graham should change his conclusions about the drug.<sup>5</sup> When other researchers found similar issues as Graham and raised a red flag about Vioxx's safety, Merck responded by saying their data was flawed [55,57].

The FDA and Merck were not alone in their glossing over Vioxx's negative data. Co-conspirators included many journals, including the "New England Journal of Medicine", "Circulation", and the "Annals of Internal Medicine" all of which published articles favorable to Vioxx [53,58]. Ross et al. found that many of these were ghostwritten by Merck staff or outside hired writers, while lead or sole authorship was attributed to an academic researcher [59]. **In only half of the ghostwritten papers was Merck's financial sponsorship disclosed.** Even more astounding was that in many cases it wasn't until the Vioxx lawsuits began that many of the "authors" of these papers became aware that they had in fact been listed as lead authors [60,61]. Many Wall Street analyst believed that this could be the demise of Merck, but a financial miracle appeared in the name of a new vaccine named Gardasil®.

### Making Billions from a Disease that will probably never appear

There is no shortage of peer reviewed literature that links Gardasil® to potential life threatening events such as postural orthostatic tachycardia syndrome (POTS) [62], as well as findings of CNS demyelination [63]. The literature documents several reports of development of autoimmune disease after human papilloma virus vaccination [64-67]. As noted above more recent case reports warn of the potential of premature ovarian failure (POF) in young girls, with its significant

consequences for future health and prospects of motherhood [68]. And while most pediatricians continue to push this vaccine based on the safety data supplied by Merck it should be noted that in the U.S., there have been 59,092 adverse reactions reported VAERS since Gardasil and Cervarix® were available in the United States. Of these adverse events, there have been 1,727 reports of disability, 6,388 listed as serious events, 9,177 events where the individual has not recovered, and as of February 2017, 315 deaths reported [69]. While acknowledging that VAERS data interpreted alone or out of context can lead to erroneous conclusions about cause and effect as well as the risk of adverse events occurring following vaccination it certainly, at the minimum should raise a red flag in the mind of any healthcare provider. Underreporting of vaccine reactions in the U.S. is a widely acknowledged weakness of VAERS. It is estimated that only between 1 and 10 percent of all adverse health outcomes which occur following vaccination are reported to VAERS [70-72].

As of June 30, 2015, the producers of Cervarix®, and Gardasil® are estimated to have sold 57 million and 190 million doses, respectively [73] for approximately \$25 billion USD in total [74]. The most successful method of selling vaccines that yield such high profits is for pharmaceutical companies to take an active role in state vaccination policymaking. In one of the most publicized cases of the pharmaceutical industry's efforts to form public policy and to formulate mandatory vaccine laws an examination of the relationship of Merck and former presidential candidate and Governor of Texas, Rick Perry is in order.

In February 2007 Perry issued an executive order mandating a school entry HPV vaccination program for the states female students. The law raised a number of red flags including the fact that Merck had contributed \$5000 to the governor's campaign fund and that the governor's chief of staff had, previous to his employment by the state, worked as a paid lobbyist for Merck. In addition, there was the larger ethical question of the appropriateness of the vaccine manufacturer being so heavily involved in vaccine policy making.

Public outcry would cause Merck to announce it was suspending lobbying efforts for state mandates, this however was not entirely true. While decreasing its very visible lobbying efforts a subtler form of lobbying was taking place, the implementation of legislator "education" programs and the funding of vaccines.

The vehicle that Merck would use to target legislators in Texas as well as in other states was through Women in Government (WIG), a national, nonprofit group of female state legislators. WIG had identified cervical cancer as a priority issue for the organization and Merck responded to this effort by contributing unrestricted educational grants to the group. Because there were no restrictions placed on the funds among other things they were used to cover the expenses of dozens of legislators to attend conferences on cervical cancer at appealing destinations all of which were attended by Merck representatives.

In addition to hosting meetings the group convened a task force that would issue recommendations to legislators as well preparing a "legislative toolkit" that among its contents was as a model of school-entry mandate legislation. Students of lobbying and politics have recognized how well Merck prepared the political environment for the introduction of school entry mandates and other legislation. Most of the mandate bills introduced in various states across the country were drafted by Merck and presented through its proxy WIG [75].

### Killing the Messenger

Since 2016 various media outlets have mistakenly reported that The American Academy of Pediatrics (AAP) had issued a bulletin to

its members with the following headline; "New Concerns about the Human Papillomavirus Vaccine" [76] The warning was in fact issued by the American College of Pediatricians, a splinter group who split with the more established AAP in response to political disagreements that mainly centered around same sex parenting. Pro-vaccine groups were quick to jump on this, making every effort to clarify that this was a small splinter group and not affiliated with the mainstream organization, and because of their religious slant was biased in their reporting. But this was not the American College of Pediatricians, it was a professional group informing its members of a report published in the well-respected *British Medical Journal*.

The group's warning was based on a published case linking Gardasil® and premature ovarian failure POF, also known as premature menopause. Originally published in 2012 [77], with an additional report shortly the authors raised significant issues regarding the clinical trials of Gardasil. Among the issues raised was Merck's failure to realize that masking of ovarian dysfunction including amenorrhea and ovarian failure can occur with the use of hormonal contraceptives. In the original trial, there were a large number of girls taking contraceptives in essence totally eliminating any way of evaluating ovarian function in response to the vaccine [78]. Since licensure of Gardasil® in 2006, over 213 cases of amenorrhea, or POF have been reported to VAERS, with 88% of these occurring following the administration of Gardasil [79]. This number is in all likelihood an underreporting of the problem because; "Most primary care physicians are probably unaware of a possible association between HPV4 and POF and may not consider reporting POF cases or prolonged amenorrhea the Vaccine Adverse Event Reporting System (VAERS)". Under reporting to the VAERS, is an issue that has plagued the system since its inception raising questions about the reliability of VAERS data.

Because reports are submitted voluntarily, many patients and doctors do not report vaccine reactions. This hesitancy may be based on a belief that the reporting of vaccine side effects could label one as anti-vaccine. Different estimates exist for the amount of underreporting and range from a factor of 10 [80] to as much as a factor of 100 [81], thus the true number of vaccine reactions is between 10 and 100 times higher than what is reported to VAERS. The paper's authors went on to say;

*Preservation of reproductive health is a primary concern in the recipient target group. Since this group includes all prepubertal and pubertal young women, demonstration of ongoing, uncompromised safety for the ovary is urgently required. This matter needs to be resolved for the purposes of population health and public vaccine confidence [82].*

Braganza, et.al. recently make the observation that vaccine safety science has become a "hazardous occupation" [83]. The realm of vaccine research has become an area where scientists as well as professional groups now have second thoughts about publicizing their suspicions linking a vaccine to a particular adverse event or illness. The reason for this hesitation is the fear of professional retribution such as job loss or being personally criticized and ostracized by colleagues. The possibility of being labeled as part of the anti-vaccination movement has become a real fear and has been effective in silencing many scientists as well as practicing physicians.

Almost immediately following the publication that raised the alarm of a possible link between Gardasil® and POF the personal attacks on Deidre Little, MD the paper's lead author began. These attacks focused on questioning her motivation in writing the report mainly because of her association with a large Australian Catholic anti-abortion group. Little fought back with the following;

*"Its tortuous tale represents this shifting baseline of science. Words raised and swollen are ranting not for more information but for less. Roaring that inquiry be silenced and that questions be closed down, that research not be done and mounting the 'ad hominem' attack in a matter of biology is a new and unbecoming face of science. The audacity of reporting possible adverse events from Gardasil®!" [84]*

While Little, as an independent physician was able to fight back and accuse her critics of scientific censorship, this was not the case with Dr. Daniel Neides. Neides is the medical director and chief operating officer of the Cleveland Clinic's Wellness Institute. Following the publication of an article questioning vaccine safety on the news website Cleveland.com. Extreme pressure was brought on the Cleveland Clinic, with the hospital eventually issuing a statement saying that Dr. Neides, will be "appropriately disciplined," and additionally posting an apology from Neides [85].

In 2015 the Arizona Board of Medical Examiners opened an investigation of Dr. Jack Wolfson, a cardiologist who has publicly questioned the safety and efficacy of certain vaccines. After thorough investigation, in a 4-1 vote the board ruled that they would take no action against Wolfson's medical license saying [86];

*"Thirty-eight people filed formal complaints, and many more called the board to informally voice concern about Wolfson's anti-vaccine evangelism. However, the board noted, no one has filed any complaints about the Scottsdale cardiologist's 'actual medical care.'"*

Further attempts at silencing critics of vaccine safety can be seen as recently as 2016, when a peer-reviewed article published on January 9, 2016 in the online version of the journal *Vaccine* was retracted, claiming, "that the methodology is seriously flawed, and the claims that the article makes are unjustified." [87]. The study, titled "Behavioral abnormalities in young female mice following administration of aluminum adjuvants and the human papillomavirus (HPV) vaccine Gardasil®," linked the human papillomavirus vaccine (HPV) Gardasil® to behavioral abnormalities. It was accepted by *Vaccine* editors on September 24, 2015. Revisions were suggested and made by peer reviewers, and the study was then accepted in revised form on December 15, 2015. The authors have accused the journal's editor, Gregory Poland, MD the Co-Director of The Vaccine Research Group at Mayo Clinic of allowing a conflict of interest with Gardasil® manufacturer Merck & Co. to influence his decision to remove the paper from *Vaccine* [88]. The authors resubmitted to another journal and it was subsequently published [89]. Similar cases of retraction following publication of papers that raise the question of vaccine safety have recently occurred [90-92].

In 2016 Robert DeNiro, co-founder of the Tribeca Film Festival, initially approved the showing of the film "Vaxxed: From Cover-Up to Catastrophe" stating, "Grace and I have a child with autism and we believe it is critical that all of the issues surrounding the causes of autism be openly discussed and examined. ... This is very personal to me and my family and I want there to be a discussion, which is why we will be screening VAXXED. I am not personally endorsing the film, nor am I anti-vaccination; I am only providing the opportunity for a conversation around the issue." Ten days later, after "critics had pressured DeNiro" [93] a new statement was issued by DeNiro;

*"My intent in screening this film was to provide an opportunity for conversation around an issue that is deeply personal to me and my family. But after reviewing it over the past few days with the Tribeca Film Festival team and others from the scientific community, we do not believe it contributes to or furthers the discussion I had hoped for,"*

While speculation that the film was pulled because of the potential loss of sponsorship funding, no direct evidence for this has been shown [94].

One of the key features of the film is an interview with "CDC whistleblower" William Thompson, Ph.D. Thomas has alleged that the CDC omitted data that showed a link between the MMR vaccine and autism in young African-American males. The controversy focuses on a paper which Thompson coauthored which he now claims hid data [95]. A subsequent reevaluation of the data was published and showed a 3.4-fold increased risk of autism attributable to MMR vaccination in African American males [96]. Adding to the controversy was the subsequent retraction of the paper [97].

More recent attacks on scientists who are well entrenched in the research community have received little attention, but are at the heart of the issue, the attempt to silence vaccine dissent. An example is that of Dr. Vittorio Demicheli, a well-respected Cochrane reviewer whose published work stated that the Italian government's new expanded immunization protocol was lacked any scientific evidence. Similarly, British epidemiologist Dr. Tom Jefferson was forced to sit and eat alone as he was shunned by his colleagues at a meeting because of his published statement regarding the rather low effectiveness of influenza vaccination [98].

Another example of how pervasive suppression is can be seen the retraction without explanation of a paper by Mawson and colleagues. This was a study that examined the long-term health status of vaccinated versus unvaccinated children between 6 and 12 years of age. The authors found that vaccinated children suffered from Autism Spectrum Disorder, Attention Hyperactivity Disorder, and/or learning disabilities at a rate of 3:1 from those of unvaccinated children. After receiving provisional approval from the journal "Frontiers in Public Health" and in press status on the web it suddenly disappeared [99]. Like the earlier discussed retraction of a paper in the journal *Vaccine*, "experts" have stated that the survey of mothers of vaccinated/unvaccinated children had to many shortcomings for publication. The paper was subsequently published and again retracted by another journal, which eventually published the paper in full [100].

MIT researcher, Dr. Stephanie Seneff has begun to feel the heat from colleagues after publication of a paper that linked glyphosate the main ingredient in Monsanto's weed Killer Round-up, to vaccines. Dr. Seneff's theory is that the adverse effects seen following some vaccines is the result of glyphosate. She hypothesis that that; "Glyphosate could easily be present in vaccines since certain vaccine viruses including measles in MMR and flu are grown on gelatin derived from the ligaments of pigs fed heavy doses of glyphosate in their GMO feed. Gelatin comes from collagen which has lots of glycine. Livestock feed can have up to 400 PPM [parts per million] of glyphosate residues by the EPA rules, thousands of times higher than has been shown to cause harm in numerous studies."

The controversy erupted when an independent laboratory found that glyphosate, was also present in 5 different vaccines. Instead of the scientific community embracing this warning beacon it instead went into attack mode. First was the attack on the credentials of Dr. Seneff by pointing out that she is an MIT computer scientist with no expertise in genetics or chemicals. What is not mentioned is that Seneff has 13 papers (more than most of her critics) in peer-reviewed, indexed journals listed on the National Library of Medicine website. She is either lead author or co-author of all of these [101]. This was followed by an attack on the laboratory and the methods it used to reach its conclusion. St. Louis-based Microbe Inotech, has been challenged for

the testing methods it utilized to reach its conclusion. Experts have said that the testing method called ELISA, which is short for enzyme-linked immunosorbent assay is not accurate when measuring anything at very low concentrations.

For one to truly appreciate to what extent pharmaceutical manufactures will go in their efforts to stifle dissent one needs to look no further than the case of Dr. Nancy Olivieri. The case of Dr. Olivieri began in the mid 1980's and resulted in the University of Toronto dismissing one of the top pediatric researchers in hereditary blood diseases in North America. When Dr. Olivieri, a principal investigator in a drug study funded by Apotex Pharmaceuticals found inconsistencies in data that suggested that the drug may fail to perform as expected Olivieri insisted on explaining the risks to participants. When notified of Olivieri's request the drug's manufacturer and study funder, Apotex, terminated her the study and served her with legal warnings against disclosing the relevant risks saying; "the company 'could not allow such information to be transmitted to patients.'" Not satisfied with trying to prevent the disclosure Apotex orchestrated a program intent on ruining the academic and professional career of Dr. Olivieri. This was done by making private and unfounded allegations to hospital and university officials citing deficiencies in the scientific quality of her work. What was not made public at the time was that The University of Toronto had been in negotiations with Apotex to secure a multimillion dollar donation to build a biomedical research center. Following 10 years of harassment that resulted in a libel suite, Dr. Olivieri was reinstated and to this day remains one of the top hereditary blood diseases specialists. While a summary of the events is presented here, the entire account of the events can be found by reading the detailed published paper of this classic case of silencing dissent, which Olivieri insists is not limited to her [102].

Sociologist Brian Martin's paper "*Public mobbing: a phenomenon and its features*" explains how organized attempts to silence vaccine dissent occur. He explains the technique used by many groups to discredit researchers that question vaccine safety. He defines mobbing as a group systematically attacking a person's reputation for a long period of time, using negative communication as a weapon, with the intention of destroying the persons value as a reliable individual, causing them to lose power and prestige, with the long-term goal of achieving their dismissal, resignation or general ostracism which if exercised by peers can be extremely damaging.

In mobbing, targets are judged "guilty" and condemned. Afterwards, evidence to justify this initial judgement is gathered. Martin successfully argues that this kind of behavior can also occur in the public sphere. To prove this, he uses the example of attacks on the anti-vaccine movement in Australia.

Established in 1994, The Australian Vaccination Network (AVN) is a vaccine-critical group. AVN's key figure, its driving force, is Meryl Dorey. In 2009, a pro-vaccination group was established called Stop the Australian Vaccination Network (SAVN) with the explicit aim of closing down the AVN. While SAVN's use of social media, especially Facebook to attack to AVN is common, Martin notes that instead of challenging the science posted by AVN or attacking the group, attacks are aimed personally at Dorey continually devaluing her. "*The key finding is that a significant proportion of this material is devoted to attacking Dorey as a person.*" In addition, SAVN participants have made numerous complaints to government bodies aiming to restrict or shut down the AVN's activities. SAVN also monitors Dorey and tries to stop her activities, such as lectures, and undermine her support structures, including supporters and sources of money.

The attacks against Dorsey degenerated to comments such as calling her “*a fucking idiot*.” Martin notes that while there is discussion on SAVN’s page about vaccination, their preoccupation is not isolated with destroying the AVN but Dorey as well [103].

### Let’s Talk Spin:

Accusations of media manipulation including social media by anti-vaccine groups is another method of attack, accusing the groups of putting lives at risk. One example can be seen in *Anti-vaxxers have embraced social media. We’re paying for fake news with real lives*. In the article, the authors state; “*...anti-vaccine groups have attempted to manipulate public opinion and undermine public trust with fabricated stories and appeals to emotion over hard fact, and in doing so they have put lives at risk...*” [104] This accusation of manipulation of public opinion and fabricated stories may in fact be true, but it’s not the anti-vaccine crowd doing the manipulation. In a 2012 paper published in *PLOS Medicine*, researchers looked at the scientific articles, press releases, and news items associated with 41 clinical trials [105]. They found that instances of “spin” in the press releases and news items corresponded strongly to the presence of spin in the abstracts, or summations, of the scientific articles. A second paper regarding newspaper reports of ADHD treatments stated; “*Because newspapers preferentially echo initial ADHD findings appearing in prominent journals, they report on uncertain findings that are often refuted or attenuated by subsequent studies. If this media reporting bias generalizes to health sciences, it represents a major cause of distortion in health science communication.*” [106].

When it comes to the issue of media manipulation there is bigger culprit than the vaccine manufacturers themselves. In August 2016, the Washington Post ran a story that discussed, “*...a fierce debate over whether the pharmaceutical giant is trying to shame parents into getting their children vaccinated for the most common sexually transmitted infection.*” The ads were targeted during daytime and prime-time hours and during the Olympics, all times that are large family viewing hours. While not specifically mentioning Gardasil®, but aim directly at parents and how they need to do right by their kids.

One spot opens with a woman saying, “I have cervical cancer from an infection — human papillomavirus.” Photos of her as a preteen are flashed on the screen. “Who knew HPV could lead to certain cancers?” she continues. “Who knew that there was something that could have helped protect me from HPV when I was 11 or 12, way before I would even be exposed to it?” The spot ends with a version of herself as a child looking up from a birthday cake adorned with candles and asking plaintively, “Did you know — Mom, Dad?” [107] An objective observer would note that the claims in this advertisement far exceed the evidence in the scientific literature. Merck is claiming that HPV vaccines “could have” prevented HPV-related cancers, a claim of their products’ performance beyond that supported by available research. Because HPV-induced cancers can take 20-40 years to manifest, no study has been conducted that demonstrates a decrease in the rates of overall HPV-related cancer types. Merck’s claim in all likelihood is based on an often-quoted paper by Markowitz, that on its surface appears to back up this claim, however a detailed reading of this paper actually shows that HPV vaccine has failed to lead to a decrease in overall HPV infection rates [108].

### Kook, Nuts, and Conspiracy Theorists

Despite the efforts of organizations such as Cochrane who have questioned the validity of much of the published scientific data supplied by the pharmaceutical industry, vaccine safety doubters are

relegated to the same groups as those who believe Paul was killed in a car accident, the United States and Israel blew up the World Trade Center and the CIA is responsible for the spread of AIDS. When a parent dares to question the physician’s cultural authority on matters of health, disease or medical treatment, especially vaccines they are usually labeled as one of the three adjectives above. These attacks are coming from groups who are relying on their “*real science*”, with an attitude that any published data that opposes their position is “*junk science*”. This position does nothing to protect patients and to honor the Hippocratic Oath, to first do no harm.

### Conflict of Interest

The author declares that there is no conflict of interests regarding the publication of this article.

### References

1. Government of Canada (2015) Vaccine coverage in Canadian children: Highlights from the 2013 childhood National Immunization Coverage Survey (cNICS).
2. Gottlieb S (2016) Vaccine resistances reconsidered: Vaccine skeptics and the Jenny McCarthy effect. *BioSocieties* 11: 152.
3. Poland GA, Jacobson RM (2011) The age-old struggle against the antivaccinationists. *N Engl J Med* 364: 97-99. [\[Crossref\]](#)
4. The New England Journal of Medicine 364: 97-99.
5. Comis E (2017) Vaccines, Pesticides, and Narratives of Exposure and Evidence. *Can Bull Med Hist.* [\[Crossref\]](#)
6. Diep F (2013) How To Argue With The Anti-Vaccine Crazies: A Guide. *Popular Science* p. 17.
7. Geier DA, Kern JK, Homme KG, Geier MR (2017) Thimerosal exposure and disturbance of emotions specific to childhood and adolescence: A case-control study in the Vaccine Safety Datalink (VSD) database. *Brain Injury* 31: 2.
8. Geier DA, Kern JK, Geier MR (2017) Increased risk for an atypical autism diagnosis following Thimerosal-containing vaccine exposure in the United States: A prospective longitudinal case-control study in the Vaccine Safety Datalink. *J Trace Elem Med Biol* 42: 18-24. [\[Crossref\]](#)
9. Jafari T, Aziz N, Fallah A, Hesami A (2017) The association between mercury levels and autism spectrum disorders: A systematic review and meta-analysis. *J Trace Elem Med Biol* 44: 289-297. [\[Crossref\]](#)
10. Ryu R, Ha HH, Kim BN, Ha H, Yangho K, et al. (2017) Associations of prenatal and early childhood mercury exposure with autistic behaviors at 5 years of age: The Mothers and Children’s Environmental Health (MOCEH) study. *Science of The Total Environment* 15: 251-257.
11. Dórea JG (2017) Abating Mercury Exposure in Young Children Should Include Thimerosal-Free Vaccines. *Neurochemical Research* 42: 2673-2685.
12. Kocourková A, Honegr J, Kuca K, Danova J (2017) Vaccine ingredients: components that influence vaccine efficacy. *Mini Rev Med Chem* 17: 451-466. [\[Crossref\]](#)
13. Grohskopf LA, Sokolow LZ, Broder KR, Walter EB (2017) Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices - United States, 2017-18 Influenza Season. *MMWR Recomm Rep* 66: 1-20. [\[Crossref\]](#)
14. WHO (2012) Thimerosal for Vaccines: AAP Endorses WHO Statement
15. Thimerosal in Vaccines Questions and Answers. [\[Crossref\]](#)
16. Inbar R, Weiss R, Tomljenovic L, Arango MT, Deri Y, et al. (2017) Behavioral abnormalities in female mice following administration of aluminum adjuvants and the human papillomavirus (HPV) vaccine Gardasil. *Immunol Res* 65: 136-149. [\[Crossref\]](#)
17. Lerner A (2012) Aluminum as an adjuvant in Crohn’s disease induction. *Lupus* 21: 231-238. [\[Crossref\]](#)
18. Exley C (1999) A Molecular Mechanism of Aluminum-Induced Alzheimer’s Disease? *Journal of Inorganic Biochemistry* 76: 133-140.
19. Shaw CA, Petrik MS (2009) Aluminum Hydroxide Injections Lead to Motor Deficits and Motor Neuron Degeneration. *J Inorg Biochem* 103: 1555-1562. [\[Crossref\]](#)

20. Meroni PL (2011) Autoimmune or auto-inflammatory syndrome induced by adjuvants (ASIA): old truths and a new syndrome? *J Autoimmun* 36: 1-3. [\[Crossref\]](#)

21. Jara LJ, Garcia-Collinot G, Medina G, Cruz-Dominguez MDP, Vera-Lastra O, et al. (2017) Severe manifestations of autoimmune syndrome induced by adjuvants (Shoenfeld's syndrome). *Immunol Res* 65: 8-16. [\[Crossref\]](#)

22. Flanagan-Klygis EA, Sharp L, Frader JE (2005) Dismissing the family who refuses vaccines: a study of pediatrician attitudes. *Arch Pediatr Adolesc Med* 159: 929-934. [\[Crossref\]](#)

23. Martin M, Badalyan V (2012) Vaccination practices among physicians and their children. *Open Journal of Pediatrics* 2: 228-235.

24. Posfay-Barbe KM, Heininger U, Aebi C, Desgrandchamps D, Vaudaux B, et al. (2005) How do physicians immunize their own children? Differences among pediatricians and non-pediatricians. *Pediatrics* 116: e623-633. [\[Crossref\]](#)

25. [No authors listed] (2008) A case of junk science, conflict and hype. *Nat Immunol* 9: 1317. [\[Crossref\]](#)

26. Rodwin MA (2015) Do We Need Stronger Sanctions to Ensure Legal Compliance By Pharmaceutical Firms? *Food Drug Law* 70: 435-452.

27. Paul Gaita (2017) Senator Reveals First Findings in Opioids Inquiry.

28. Dunn AG, Coiera E, Mandl KD (2016) Conflict of interest disclosure in biomedical research: A review of current practices, biases, and the role of public registries in improving transparency. *Res Integr Peer Rev* 1: 1-8. [\[Crossref\]](#)

29. Manzoli L, Flacco ME, D'Addario M, Capasso L, De Vito C, et al. (2014) Non-publication and delayed publication of randomized trials on vaccines: survey. *BMJ* 348: g3058. [\[Crossref\]](#)

30. Freedman D (2010) Lies Damned Lies, and Medical Science. *The Atlantic*.

31. Stamatakis E, Weiler R, Ioannidis J (2013) Undue industry influences that distort healthcare research, strategy, expenditure and practice: A review. *Eur J Clin Invest* 43: 469-475. [\[Crossref\]](#)

32. Ioannidis JP (2005) Why most published research findings are false. *PLoS Med* 2: e124. [\[Crossref\]](#)

33. Ioannidis JP (2016) Why Most Clinical Research Is Not Useful. *PLoS Med* 13: e1002049. [\[Crossref\]](#)

34. Anti-vaccine kooks still at it. *Skeptical Science* 2011.

35. A shocking truth anti-vaccine nuts don't want you to know.

36. See Global 500 (2014) Fortune.

37. Almashat S, Wolfe S (2012) Pharmaceutical Industry Criminal and Civil Penalties: An Update. Washington, D.C., Public Citizen's Health Research Group.

38. Department of Justice Office of Public Affairs.

39. GlaxoSmithKline pays \$105 million to settle accusations of 'off-label' marketing June 4, 2014

40. Significant false claims act settlements & judgments.

41. Wolford B (2014) Big Pharma Plays Hide-The-Ball With Data Newsweek Online 11/13/14

42. Cohen D (2009) Complications: tracking down the data on oseltamivir. *BMJ* 339: b5387. [\[Crossref\]](#)

43. Riveros C, Dechartres A, Perrodeau E, Haneef R, Boutron I, et al. (2013) Timing and completeness of trial results posted at ClinicalTrials.gov and published in journals. *PLoS Med* 10: e1001566. [\[Crossref\]](#)

44. Doshi P, Jefferson T, Del Mar C (2012) The imperative to share clinical study reports: recommendations from the Tamiflu experience. *PLoS Med* 9: e1001201.

45. Goldacre B (2016) Bad Pharma: How Drug Companies Mislead Doctors and Harm Patients. *Br J Clin Pharmacol* 75: 1377-1379. [\[Crossref\]](#)

46. Christian A, J Gen Philos Sci (2017) On the Suppression of Medical Evidence 48: 395.

47. Influenza Pandemic (2011) Lessons from the H1N1 Pandemic Should Be Incorporated into Future Planning. Report to Congressional Requesters, GAO: United States.

48. Clarie McCaskill's (2017) McCaskill Opioid Investigation Releases First Report Detailing Systemic Manipulation of Prior Authorization Process by Insys Therapeutics. Fueling an Epidemic: Insys Therapeutics and the Systemic Manipulation of Prior Authorization.

49. Kessler AM (2017) Drug company faked cancer patients to sell drug.

50. Culp DR, Berry I (2007) *Merck and the Vioxx Debacle: Deadly Loyalty: Journal of Civil Rights and Economic Development* 22: 1-34.

51. Kaitin KI (2010) Deconstructing the drug development process: the new face of innovation. *Clin Pharmacol Ther* 87: 356-361. [\[Crossref\]](#)

52. Krumholz HM, Ross JS, Presler AH, Egilman DS (2007) What have we learnt from Vioxx? *BMJ* 334: 120-123. [\[Crossref\]](#)

53. Smith R (2006) Lapses at the new England journal of medicine. *J R Soc Med* 99: 380-382. [\[Crossref\]](#)

54. Topol EJ (2004) Failing the public health--rofecoxib, Merck, and the FDA. *N Engl J Med* 351: 1707-1709. [\[Crossref\]](#)

55. Canestaro WJ (2017) Publication Bias: Assessment and Impact.

56. McGahey L (2009) Pharmaceutical controversies and the performative value of uncertainty. *Science as Culture* 18: 151-164.

57. Mokhiber R, Weissman R (2004) The Ten Worst Corporations 25: 12.

58. Schafer A (2015) pseudo-evidence-based medicine: when biomedical research becomes an adjunct of pharmaceutical marketing. University of Regina Press p. 40-45.

59. Ross JS, Hill KP, Egilman DS, Krumholz HM (2008) Guest authorship and ghostwriting in publications related to rofecoxib: a case study of industry documents from rofecoxib litigation. *JAMA* 299: 1800-1812. [\[Crossref\]](#)

60. Nesi, Tom (2008) Poison pills: the untold story of the Vioxx drug scandal. Macmillan.

61. Avorn, Jerry (2008) Powerful medicines: the benefits, risks, and costs of prescription drugs. *Vintage* 307-308.

62. Chandler RE, Juhlin K, Fransson J, Caster O, Edwards IR, et al. (2017) Current Safety Concerns with Human Papillomavirus Vaccine: A Cluster Analysis of Reports in VigiBase®. *Drug saf* 40: 81-90. [\[Crossref\]](#)

63. Álvarez-Soria MJ, Hernández-González A, Carrasco-García de León S, del Real-Francia MA, Gallardo-Alcañiz MJ, et al. (2011) Demyelinating disease and vaccination of the human papillomavirus. *Rev Neurol* 52: 472-476. [\[Crossref\]](#)

64. Afdhal N, McHutchison J, Brown R, Jacobson I, Manns M, et al. (2008) Thrombocytopenia associated with chronic liver disease. *J Hepatol* 48: 1000-1007. [\[Crossref\]](#)

65. Orbach H, Agmon-Levin N, Zandman-Goddard G (2010) Vaccines and autoimmune diseases of the adult. *Discov Med* 9: 90-97. [\[Crossref\]](#)

66. Arnheim-Dahlström L, Pasternak B, Svanström H, Sparén P, Hviid A (2013) Autoimmune, neurological, and venous thromboembolic adverse events after immunisation of adolescent girls with quadrivalent human papillomavirus vaccine in Denmark and Sweden: cohort study. *BMJ* 347: f5906. [\[Crossref\]](#)

67. Gatto M, Agmon-Levin N, Soriano A, et al. (2013) Human papillomavirus vaccine and systemic lupus erythematosus. *Clin Rheumatol* 32: 1301-1307. [\[Crossref\]](#)

68. Vaccine (2016) New Concerns about the Human Papillomavirus Vaccine American College of Pediatricians. American College of Pediatricians.

69. AAIC (2017) Letter: Vaccination and the problems with R.I. HPV vaccine mandate.

70. Annual reports to VAERS. About VAERS – Centers for Disease Control.

71. Rosenthal S, Chen R (1995) The reporting sensitivities of two passive surveillance systems for vaccine adverse events. *American Journal of Public Health* 85: 1706-1709.

72. Miles Braun M (2017) Vaccine Adverse Event Reporting System (VAERS) Usefulness and Limitations.

73. Jefferson T, Jørgensen L (2016) Human papillomavirus vaccines, complex regional pain syndrome, postural orthostatic tachycardia syndrome, and autonomic dysfunction - a review of the regulatory evidence from the European Medicines Agency. *Indian J Med Ethics Publ Online*.

74. Clendinnen C, Zhang Y, Warburton RN, Light DW (2016) Manufacturing costs of HPV vaccines for developing countries. *Vaccine* 34: 5984-5989. [\[Crossref\]](#)

75. Mello MM, Abiola S, Colgrove J (2012) Pharmaceutical Companies' Role in State Vaccination Policymaking: The Case of Human Papillomavirus Vaccination. *Am J Public Health* 102: 893-898. [\[Crossref\]](#)

76. New Concerns about the Human Papillomavirus Vaccine (2016).

77. Little DT, Ward HRG (2012) Premature ovarian failure 3 years after menarche in a 16-year-old girl following human papillomavirus vaccination. *BMJ Case Reports*. Doi: 10.1136/bcr-2012-006879

78. Colafrancesco S, Perricone C, Tomljenovic L, Shoenfeld Y (2013) Human papilloma virus vaccine and primary ovarian failure: another facet of the autoimmune/inflammatory syndrome induced by adjuvants. *Am J Reprod Immunol* 70: 309-316. [\[Crossref\]](#)

79. <http://wonder.cdc.gov/vaers.html>

80. Goldman GS (2005) Adverse effects of varicella vaccination are under-reported in VAERS, mitigating against discovery of the true-cost benefit. *Medical Veritas* 2: 406-408.

81. Kessler DA (1993) Introducing MEDWatch A New Approach to Reporting Medication and Device Adverse Effects and Product Problems. *JAMA* 269: 2765-2768.

82. Little DT, Ward HRG (2014) Adolescent Premature Ovarian Insufficiency Following Human Papillomavirus Vaccination: A Case Series Seen in General Practice. *J Investig Med High Impact Case Rep* 2: 2324709614556129. [\[Crossref\]](#)

83. Bragazzi NL, Watad A, Amital H, Shoenfeld Y (2017) Debate on vaccines and autoimmunity: Do not attack the author, yet discuss it methodologically. *Vaccine* 35: 5522-5526. [\[Crossref\]](#)

84. <https://www.flri.org.au/wp-content/uploads/2013/11/Lifelines-Vol.-26-No.-1.pdf>

85. Wadman M Cleveland Clinic will discipline doctor who wrote antivaccination column.

86. Arizona Anti-Vaccine Doc to Keep His License Medical Board Rules.

87. WITHDRAWN: Behavioral abnormalities in young female mice following administration of aluminum adjuvants and the human papillomavirus (HPV) vaccine Gardasil.

88. UBC researcher defends Gardasil vaccine study after it gets pulled (2014).

89. Inbar R, Weiss R, Tomljenovic L, Arango MT, Deri Y, et al. (2017) Behavioral abnormalities in female mice following administration of aluminum adjuvants and the human papillomavirus (HPV) vaccine Gardasil. *Immunol Res* 65: 136-149. [\[Crossref\]](#)

90. Mawson AR, Ray BD, Bhuiyan AR, Jacob B (2017) Pilot comparative study on the health of vaccinated and unvaccinated 6- to 12-year-old US children. *J Transl Sci* 3: 1-12.

91. Vaccine-autism study retracted - again (2017).

92. <https://www.thestar.com/news/2015/02/20/a-note-from-the-publisher.html>

93. Tarkan L (2016) Why Robert De Niro Promoted — then Pulled — Anti-Vaccine Documentary Fortune Magazine online.

94. Edits T (2016) Censorship of “Vaxxed” at Tribeca Festival.

95. DeStefano F, Bhasin TK, Thompson WW, Yeargin-Allsop M, Boyle C (2004) Age at first measles-mumps-rubella vaccination in children with autism and school-matched control subjects: a population-based study in metropolitan Atlanta. *Pediatrics* 113: 259-266. [\[Crossref\]](#)

96. Hooker, Brian S (2014) Measles-Mumps-Rubella Vaccination Timing and Autism among Young African American Boys: A Reanalysis of CDC Data. *Translational Neurodegeneration* 3: 16.

97. Hooker (2014) Retraction: Measles-mumps-rubella vaccination timing and autism among young African American boys: a reanalysis of CDC data. *Translational Neurodegeneration* 3: 22.

98. Jefferson T, Alderson P, Wager E, Davidoff F (2002) Effects of editorial peer review: a systematic review. *JAMA* 287: 2784-2786. [\[Crossref\]](#)

99. Mawson AR, Ray BD, Bhuiyan AR, Jacob B (2016) Vaccination and Health Outcomes: A Survey of 6- to 12-year-old Vaccinated and Unvaccinated Children based on Mothers’ Reports. *Front. Public Health* 4: 270.

100. Mawson AR, Ray BD, Bhuiyan AR, Jacob B (2017) Pilot comparative study on the health of vaccinated and unvaccinated 6- to 12-year-old U.S. children. *J Transl Sci* 3: 1-12.

101. [https://www.ncbi.nlm.nih.gov/pubmed/?term=Seneff%20S%5BAuthor%5D&cauthor\\_or=true&cauthor\\_uid=27773962](https://www.ncbi.nlm.nih.gov/pubmed/?term=Seneff%20S%5BAuthor%5D&cauthor_or=true&cauthor_uid=27773962)

102. Olivieri N (2003) Patients Health or Company Profits? The commercialisation of academic research. *Sci Eng Ethics* 9: 29-41. [\[Crossref\]](#)

103. Martin B, Pena F (2012) Public mobbing: a phenomenon and its features.

104. Anti-vaxxers have embraced social media. We’re paying for fake news with real lives. *Spectator Health*.

105. Yavchitz A, Boutron I, Bafeta A, Marroun I, Charles P, et al. (2012) Misrepresentation of Randomized Controlled Trials in Press Releases and News Coverage: A Cohort Study. *PLoS Med* 9: e1001308.

106. Gonon F, Konsman J-P, Cohen D, Boraud T (2012) Why Most Biomedical Findings Echoed by Newspapers Turn Out to be False: The Case of Attention Deficit Hyperactivity Disorder. *PLoS ONE* 7: e44275.

107. McGinley L (2016) Do the new Merck HPV ads guilt-trip parents or tell hard truths? Both. *The Washington Post online*.

108. Markowitz LE, Liu G, Hariri S, Steinau M, Dunne EF, et al. (2016) Prevalence of HPV After Introduction of the Vaccination Program in the United States. *Pediatrics* 137: e20151968. [\[Crossref\]](#)