

## Lessons from an online debate about measles-mumps-rubella (MMR) immunization.

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Published in Vaccine Volume 30, Issue 25, 28 May 2012, Pages 3806–3812

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### Acknowledgements

National Centre for Immunisation Research and Surveillance is supported by the Australian Government Department of Health and Ageing, the NSW Department of Health and The Children's Hospital at Westmead.

### Conflicts of interest

Julie Leask has received support for research via an Australian Research Council Linkage Grant. Sanofi Pasteur are partner investigators in the grant. Some participants in the forum were known to Julie Leask and included three individuals with whom she has a professional relationship.

## ABSTRACT

### Objective

To provide strategies for immunization advocates on how best to participate in online discussion forums about immunization.

### Methods

Content and thematic analysis of an online discussion forum held following the national screening of a documentary about the measles-mumps-rubella (MMR) vaccine and autism scare. A subsample of branches containing more than 20 posts was analysed. Each distinct message (a "post") was coded for the author's manifest position on immunization, author type, topic, and evidence presented or sought.

### Results

From 103 distinct branches there were 1193 posts sent over a 3½ h period. We selected the 13 longest branches containing 466 posts from 166 individuals. One third of these individuals were explicitly critical of MMR immunization and one third sought information. The remainder were ambivalent but seeking no information (5%), supportive (14%), or unstated (15%). Among five author categories, only 4% identified themselves as health professionals. Topics included alleged adverse effects of immunization (35%); autism spectrum disorders treatment and causes (31%); vaccine ingredients (12%); a conspiracy (9%); immunization policies (8%); and measles, mumps or rubella (4%). Scientific concepts of evidence failed to compete with lay concepts and personal anecdotes prevailed.

### Conclusions

Health professionals and other advocates of immunization should engage in similar types of post-broadcast online discussion forums in a planned and strategic manner that accounts for the decision processes of lay people. This involves expanding and diversifying the support base of people contributing to the forum; setting the agenda; introducing messages known to influence behaviour; not overselling vaccination; and avoiding personal attacks.

## INTRODUCTION

The online environment presents unprecedented challenges and opportunities for communicating about immunization. Individuals and groups with a wide range of views can communicate beliefs, experiences and information in multiple forums. Organised groups who are critical of immunization have been quick to capitalise on these environments and use social media to communicate their messages. Such groups are now active on Facebook, Twitter, MySpace[1], You Tube[2], message boards, and also have dedicated websites.[3-5] While opponents of immunization are limited in number, they are vocal and active. Many will actively engage in online comment forums to communicate their beliefs, sometimes in an organised fashion.[6] They express strong views against the safety and efficacy of vaccines and provide personal accounts their own children who they believe to have been sickened or disabled by a vaccine.[3]

This paper analyses one such forum that was convened following the broadcast of a documentary about immunization.[7] In September 2005 a British documentary concerning a now discredited link between measles-mumps-rubella (MMR) vaccine and autism was broadcast on a prestigious Australian current affairs television program. Simply titled *Does the MMR Jab Cause Autism?* the documentary outlined Andrew Wakefield's hypothesis linking the MMR vaccine to autism.[8] This research has since been subject to allegations of fraud[9] and was retracted by the Lancet in 2010.[10] However, at the time the MMR debate held currency in many public arenas. The documentary provided several narratives from parents who attributed their child's autism to MMR alongside experts in the area of vaccination stating that no causative effect had been proven.

At the conclusion of the documentary, viewers were invited to participate in an online forum hosted by a moderator and four invited panellists: an immunization expert; a developmental paediatrician specialising in the autism spectrum disorders; a director of an autism support group; and the president of a consumer activist group opposed to immunization. The response was intense, with the debate extending for over three hours and featuring 1193 separate posts. While concerns about the perceived adverse effects of immunization remained pivotal, the issues covered were vast, ranging from neurotoxicity of mercury to the government's perceived assault on civil liberties through its coercive promotion of the immunization schedule. Arguments were presented and refuted; evidence sought and cited in multiple formats. It is this expression of evidence and the public's response to it that becomes crucial in understanding the public debate surrounding MMR and vaccines more generally.

By the time the program had screened, MMR immunization rates in England were just rising from a 2003-04 low of 80% while in Australia they remained stable at 94%.[11, 12] Sensational media accounts of children affected by autism captured "the hearts and minds" of the public beyond the evidence offered by health experts and scientific studies.[13]

A debate is an art of persuasion. It involves each opponent promoting the superiority of his or her position with various types of evidence. Medical professionals have traditionally dominated discussions about evidence in health. However, with the internet giving voice to

wider publics, vaccine opponents have successfully appealed to notions of ‘evidence’ valued in the public domain, such as emotive testimonials and compelling trend observations. This paper attempts to examine the use of such evidence in the MMR-autism public debate. It outlines some distinctions between the kind of evidence shared among the medical community and that which is so effectively persuading the public of the so called dangers of immunization. The study involves descriptive coding of the forum’s content, authorship and the kind of evidence presented. A thematic analysis then highlights the persuasive power of evidence presented. The intention was to develop an understanding of how epidemiological, scientific and anecdotal evidence interacted with, and shaped, ideas about the MMR vaccine and to provide recommendations for strategically responding to future online debates about safe and effective vaccines like MMR.

## METHODS

Permission to utilise the online forum for research purposes was gained from its host, the Australian Broadcasting Commission. As this was a publicly available online forum, consent of forum participants was not obtained. However, we have changed potentially identifiable names to pseudonyms. The 3½ hour forum consisted of branches and posts. “Branches” refers to a conversation line initiated by an individual with a subject heading. “Posts” refers to a single item sent by an individual within an existing branch or commencing a new branch. For example, the “mercury” branch was initiated by an individual post followed by subsequent posts forming a textual conversation between individuals.

All online branches and posts were read. It was decided that coding all branches would be superfluous and not provide additional insights. Hence we restricted coding to branches with more than 20 posts indicating that participants had a higher level of engagement with the content. Technical messages from the moderator were also excluded. The posts were content and thematically analysed to develop an insight into various parties to the debate; the topic discussed; and the evidence advanced. This was facilitated via a reading of the entire forum with simultaneous documentation of codes (descriptive categories e.g., author category) and themes (conceptual categories) emerging throughout the debate. Categories were discussed between coders and modified.

All posts were entered into MS Excel and coded with frequencies calculated. Each code and theme is set out and described in tables 1 and 2. “Author category” was determined by the author explicitly outlining their relationship to the topic (many authors introduced themselves as a parent or by describing their profession) or as implied by their online username. If there were several posts by one author, the author category would be decided on the basis of all posts. Where it was not possible to determine the author’s categorisation we coded “Unstated”. Each author’s posts were also analysed according to the “position on MMR”. “Content of post” refers to the main topic that the post was addressing, regardless of other minor topics also discussed. “Evidence used/sought” refers to the type of evidence used as the basis of argument and inquiry.

## RESULTS

A total of 103 branches containing 1193 posts were identified. After excluding those which provided fewer than 20 posts (n=90 branches) or technical messages from the moderator (n=8 posts), 13 branches containing 466 posts were analysed (39% of total). The branches included a wide range of subjects including the availability of single vaccines, disputes about whether vaccines cause autism; child development; need for more research; and the causes of measles.

There were 166 contributors or “authors” with six authors posting 11 times or more (Figure 1). Of these, the largest number of posts from the anti-vaccine panellist (n=26). Table 1 shows a breakdown of contributors by type and position on MMR. Nearly half of the 166 did not indicate who they were (n=78) and one third (n=54) indicated a personal connection to an outcome they believed resulted from immunization, mostly a parent of an autistic child. Of note, 26 (16%) were parents seeking information about immunization and not falling into the previous category. One third of authors implied that they were critical of MMR immunization and one third sought information about MMR, immunization in general, or autism. Many of this information-seeking group posted once or twice only. Fourteen percent were clearly supportive of immunization.

Table 2 shows the topics and evidence used or sought in posts; definitions of each category and frequencies. The most common subject was various claims about the adverse effects of immunization (163 or 35%) and concerns about autism but with no mention of immunization (144 or 31%). Many of these posts sought information from other members or the panel. The least common subject was the viruses, referring to the clinical manifestations or complications of measles, mumps or rubella (19 or 4%). The most frequent type of evidence was case-based evidence, referring to a particular case or anecdote (187 or 40%) followed closely by biomedical evidence (166 or 36%). The least common evidence type was trend-related evidence (114 or 24%).

While the issues explored in the online forum were diverse, several themes or ‘conceptual categories’ emerged with regards to evidence and its impact. They are outlined in detail below. Extracts taken directly from the online forum are documented in italics accompanied by the authors username and the branch is stated in parenthesis.

### Source credibility

Participants in the forum assessed evidence in terms of its source and particularly the extent to which that source ‘cared’ about the outcome. While medical appraisals of evidence tend to value a sense of objectivity or distance from an issue being researched, the forum revealed a tendency for participants to value evidence when it came from someone intimate with the issue, such as the parent and carer of a child with autism. The intimacy was associated with real day-to-day knowledge about the issue. For example, the following father of an autistic child and neurophysiologist asserted,

*My point is that parents are not idiots. They are good judges of their own children. Despite going against all my medical background/training, the fact remains that I saw a disturbing change in my child's behaviour after MMR. So have thousands of other parents. Don't ignore them or ME!*

*Guest (re: developmental symptoms)*

This perspective empowered the arguments of MMR critics and opponents as they were generally posted by parents who felt that their child had been adversely affected by immunization. Even parents who did not view the immunization as the cause of their child's autism were viewed as credible examples of evidence against immunization because they testified to how serious autism could be. Thus objectivity as a currency for validating research was replaced by intimacy with the consequences.

*We are not paid by anyone to provide the service which we provide. We simply care about children and parents...*

*Activist group panellist (re: Conflict of Interest)*

Immunization opponents and critics frequently referred to themselves as concerned parents and sought an alliance with other parents.

Evidence from larger institutions, or from sources that the medical profession might regard as 'reputable', was occasionally received with caution by information seekers. From critics there were heated assertions that doctors, government and pharmaceutical companies were colluding.

*Like any parent, I'm concerned that the govt. has allowed such a controversial drug to be used – are the drug companies putting pressure on our national leaders to promote one method over another? One would certainly hope not.*

*Ducko (re: MMR INJECTIONS – SAFE OR NOT?)*

### **Emotive appeals trump epidemiological evidence**

The forum also provided an opportunity for parents of autistic children to express profound grief and frustration over their child's condition. There was a strong sense of needing to determine a cause of autism and many posts sought information about the relationship between genes, mercury and autism. Parents of children with bowel problems wrote with concerns about the potential development of autism. It was evident that the documentary had raised new concerns for some and furthered emerging hypotheses for others about why their child or grandchild had developed autism and other disorders like epilepsy.

Conversely the advantages of the MMR immunization were rarely explained in terms of individual outcomes and only two posts gave any example of a child suffering a late complication from wild measles.

*I've nursed one [a child with a measles complication]...at the Royal Children's Hospital when I was training. A young lad with SSPE. Sub-Acute Sclerosing Pan Encephalitis.*

*Landie (re: What about measles?)*

Several parents communicated the feeling that the medical profession did not listen to them properly. Parents of autistic children were facing enormous challenges and doctors were portrayed as being unwilling to hear their grief. They were concerned that their examples of evidence were falling on deaf ears. This played out pragmatically in the forum with an overwhelming number of questions in short succession which was impossible for one autism panellist to address alone.

Immunization critics, of whom there were many, made a point of empathising with these parents and alternative therapists were generally portrayed as being keen to accept evidence from parents. One contributor compared her alternative practitioner to a paediatrician:

*It has made a huge difference doing the gluten free casein free diet and all the supplements etc. She cared enough to run the blood tests. Our paediatrician just said "see you next year".*

*cyndiq (re: Other causes)*

### **Messages about absence of evidence tolerated poorly**

Throughout the forum, the concept of 'no evidence of harm' was not considered equivalent to 'evidence of safety'. Hence while supporters of immunization interchanged statements such as 'there is no evidence that MMR causes autism' with statements such as 'MMR is proven to be safe' this was not always accepted as adequate evidence of safety.

*Prof... please send proof that you have safe and effective vaccinations...there is no scientific proof!!!!!! Are you a scientist or a professor in propaganda.....I repeat again, I have not been able to get any scientific proof... Not from authorities, manufacturers etc.. Why is this?*

*Terminex (re: MMR as opposed to single shots)*

Statements regarding no evidence of harm were viewed as a lack of knowledge by some with the implication that no evidence of harm now could mean evidence in the future, when it was too late.

*Once upon a time there wasn't any evidence that smoking caused cancer...*

*leslie (re: deliberate confusion)*

This lack of evidence therefore was far from proof of safety but rather framed as ignorance on the part of the doctors and researchers, or worse, as an attempt to hide the truth.

In contrast, vaccine critics had multitudes of their version of evidence. They drew on statistics of increasing autism rates, personal examples of children diagnosed with autism following a vaccine, and on scientific terminology such as neurotoxicity. While these examples would be

regarded as poor evidence in the medical realm, they fitted together to form a convincing argument in the forum.

### ***Competing outcomes***

There was an obvious contrast between the way that autism was represented against the health risk of measles, mumps and rubella outbreaks. While many opponents stated that they no longer regarded the diseases to be a concern for their children, autism was literally described as an epidemic.

*As to the toll of measles and mumps, I bet its not rising exponentially in cases like autism is.*

*terminex (re: MMR as opposed to single shots)*

Autism was depicted as a life-long condition placing immense strain on the child and their family while measles mumps and rubella were seen as benign, with an almost nostalgic reference to measles infection.

*You could always use the method used by my parents for preventing measles in adulthood, and that was sending us down to play with the little Johnny down the street who had it...Everyone caught it [measles] as a child and there were no side effects except for life long immunity.*

*bette (re: What about measles?)*

While the infectious diseases were generally regarded as harmless, there were exceptions in the form of questions from concerned parents who wanted to know about the complications. However amid the abundance of evidence implicating the immunization to autism, there was little information provided to answer such questions.

*I have chosen not to immunise my son, who is four, against any diseases. What is the effect of measles on an adult male?*

*Nikala (re: What about measles?)*

### **Anecdotes**

Some anecdotes from parents were portrayed as 'grass roots' and supporters of such evidence were portrayed as staging a much needed rebellion against medical paternalism. The issue of ownership became apparent, implying that parents were striving to claim back their children from an over-bearing government and medical patriarchy.

*... Whose children are they, the governments or the parents?*

*Noel Brown (re: can parents be trusted?)*

The proposed public benefits of immunization were generally cited as epidemiological outcomes, such as a reduction in cases, therefore depicting immunization as being for 'the



good of society'. Critics responded negatively to this, suggesting that children were being forced to endure the collateral damage of an effort to maintain social order. Parents who abstained from immunising were quickly praised by opponents for their efforts to protect their children:

*Monna, as a pregnant mum to be I really admire your stance. How did you come to your decision. What does it mean for schooling – day care etc?*

*Nicole M (re: Anti jabs, but more research essential.)*

Arguments became increasingly inflammatory as an expert on the panel explained that the combined MMR vaccine was the only one available for the immunization of measles, mumps and rubella in Australia with the exception of the rubella vaccine. Contributors, including those seeking information or undecided, expressed anger regarding the lack of choice for separate vaccines.

### ***Vaccine composition***

There were frequent references to the artificial quality of immunizations, referring to them as unnatural and thus implying a possible toxicity. There were several suggestions that natural forms of immunization would present a better outcome. In this sense, the chemical ingredients of immunization were presented as evidence of its toxicity, while the 'natural' approach of vaccine critics was presented as evidence of safety. The threat of dangerous side-effects extended beyond immunization and into discussions over the management of measles, reiterating the belief that medical interventions were dangerous.

*The effect of measles on an adult male depends on how he is treated. If he goes to bed for 3 days, if light is kept out of the room, if he is given liquids to drink and not given drugs that suppress fever, he will recover just like a child recovers.*

*Charlise (re: What about measles?)*

In this way, the medical community was portrayed as meddling with natural processes for the purpose of questionable motives, such as maintaining a monopoly over health services. An extension of this argument presented alternative therapists as having a genuine desire for better health and wellbeing.

*Not drugs – the wellness industry is where you need to look. While there are drugs the doctors stay in business – they don't want to promote the wellness industry or they'd be out of a job!*

*Rumpleteaser (re: Other causes)*

## DISCUSSION

The rapid rise of the internet, mobile technologies and social media raises new challenges, particularly in regard to the “well connected” generations of parents frequently accessing online content. The implications of this are poorly understood. Our study contributes an insight into how notions of evidence were contested by different parties to an online debate about MMR immunization. Proponents of each approach interacted, not only on the grounds of evidence, but they also disputed conventional definitions of evidence as they relate to health.

The restriction of our sample to only branches with 20 posts or more may have resulted in a bias towards issues that were subject to more conflict and were less fully resolved. However, these topics clearly engaged the forum contributors.

An understanding of the concepts of evidence held by lay publics and how they relate to wider belief systems is crucial in engaging the public in persuasive advocacy. This is particularly the case as people increasingly interact with health information via the internet. Science demands evidence to prove a theory. The evidence should be reproducible and allow for a specific conclusion to form. However in the common vernacular, evidence is only required to offer an adequate explanation that adheres to common sense rather than absolute fact.[14, 15] Therefore in the MMR-autism debate, observed associations are upheld as evidence of disease aetiology. Medicine counters these examples of evidence on the basis that it is poor quality, needing to be confirmed with larger studies of high epidemiological quality and objective measurement of outcomes. However this fails to engage with an important aspect of the debate, that is, the various types of information that the public regards as evidence of harm. Indeed, more than a third of contributors in the sampled posts were concerned with seeking information and 40% of them were concerned with case-based evidence. The commonly seen approach of dismissing case-based evidence fails to allay certain anxieties about immunization.

A disconnect between how parents seek information and types of official information available was recently noted by Downs et al in their study of parent’s mental models of immunization.[16] The authors mapped the concepts that parents describe when they think about immunization and the strength of links between those concepts (e.g., personal values, health, herd immunity, risk of vaccinating etc). They compared parents’ mental models with the emphases contained in two official government websites and two anti-vaccine activist websites. They concluded that the activist websites provided a more coherent and appealing narrative structure while the official websites focused on statistical evidence which would be less convincing.[16] Similarly, Betsch et al’s recent work found that narratives carry more weight than statistics in influencing vaccine intentions among parents.[17]

In the online forum, parents of autistic children were seen to understand the issue because they had lived it. By that measure, doctors, scientists and governments were seen as less eligible to provide evidence because they did not have this tangible experience. Not only was the medical community accused as speaking from an ivory tower of sorts, but any dismissal of parental concerns as ‘insufficient evidence’ perpetuated their image as uncaring and narrow-

minded.[18] Godlee recognised that in failing to engage with parents and respond to their concerns, the medical profession left Wakefield with “a monopoly on taking these concerns seriously”.[13]

An area of imbalance in the debate is that allegations surrounding autism cause outrage, while measles, for example, is understood as a benign rite of passage in a normal childhood.[19] [20] At the time of the forum, the public encountered little evidence in everyday life to suggest that their children were at risk of measles, mumps or rubella. This was because measles had been controlled or eliminated in most worldwide regions. Consequently, references to measles in the forum suggested that concerns about the disease were over-rated and anachronistic. Brownlie and Howson suggest that medical practitioners may use their clinical experience and memories of the vaccine-preventable diseases to “make sense of the MMR issue”.[21] However narratives of clinical experience, while occasionally given in the immunization debate, are often trumped by highly available narratives of children with autism. It was not until the UK itself began to experience a resurgence of measles that parents again began to hear a stronger message about the impact of the disease.[22]

The forum provided a microcosm of the debate about MMR immunization as it was played out at its peak. Since then, the vaccines and autism debate has subsided in the UK and intensified in the USA with efforts by high profile individuals and well funded activist groups.[23] Despite these changes, the frames we describe, such as the use of anecdote and emotive appeals, hold currency across anti-vaccine activism in general.[3, 24, 25] Hence, while the online medium is unique in its ability to convey a rapid exchange of opinions and provide a window into immediate responses of various audiences, the messages themselves did not change remarkably from debates carried out over longer periods of time in traditional media such as newspapers.[25-27] Similar to the conventional media representations of immunization debates, the forum implied that people engaged in immunization were evenly weighted between those for and those against. Population based studies show that even in the UK, where the MMR controversy led to reduced coverage, the majority continued to accept the vaccine. In Australia, where the forum was screened, there was no evidence that the MMR scare had an impact on immunization coverage although health professionals reported getting more questions about MMR than any other vaccine.[28]

Hence, it would be erroneous to presume that the expression of anti-MMR sentiment seen in this forum represented wider community beliefs. Those with strong beliefs and direct experience on either side of the debate were clearly more engaged in this forum, and significantly, questioning parents were also present. And while this matter of representation is often self-evident, there is a tendency in the wider medical and scientific community to see publicly expressed sentiment as representing broader public opinion or to fear that such sentiment would readily sway audiences against immunization. However, research clearly shows that, first, most support immunization and second, decisions about immunization are not made in isolation nor in response to one factor alone[29] and that health professionals have an important role to play, both in clinical and online settings. We argue that the important actions lie in addressing debates in a strategic, pro-active and respectful manner that primarily aims to ensure that information-seeking parents have their needs met and their trust built. Accordingly, we provide recommendations for how advocates of immunization might engage in such forums in the future and suggest that some of the following

recommendations may also be applied in more general public debates. Since it is not possible to engage in all such forums, advocates should choose those likely to have a large group of fence sitters seeking information, such as after the screening of a national documentary about vaccination.

## RECOMMENDATIONS

**Resolve questions of whether to actively engage:** There is often the dilemma about whether to respond in such forums, which are often monopolised by vocal opponents of immunization. Here the concern is that participation in the discussion legitimises and even amplifies anti-vaccine arguments. In this case, the forum followed a nationally screened documentary and 37% of posts were information-seeking. The absence of vaccine advocates might have created a void into which misinformation could dominate uncontested.

**Prepare:** Engage a group of vaccine advocates; agree on the most important messages; and who will advance them. Ensure sufficient numbers of designated experts and advocates who are able to type quickly and are available to respond for the duration of the discussion, or arrange 'shifts'. In this forum, many requests for information about immunization from wavering parents went unanswered as panellists grappled to respond to the large volume of posts.

**Diversify the support base.** Ensure that each participating advocate is able to address various issues including vaccinology, disease outcomes, primary care practice, and consumers and professionals who can identify with people experiencing specific outcomes, but who support immunization. This forum included an expert in child development who could answer some general questions about autism, offer a position that supported MMR and thus attempt to bisect the dividing line between MMR proponents and parents of children with autism. There were also health professionals who had cared for children affected by measles as noted in this exchange in the "*What about measles?*" branch:

*Well, I have yet to meet a parent whose child has died from any of these diseases.*

*(Activist group panelist)*

*I've nursed one....at the Royal Children's Hospital when I was training. A young lad with terminal SSPE. Sub-Acute Sclerosing Pan Encephalitis.*

*(landie ®)*

**Set the agenda:** The leader of the vaccine opponent group panelist was the first to post to the forum, thus setting the agenda. From this point, MMR advocates were placed in a reactive mode, trying to refute the claims about the vaccine. Vaccine advocates should lead the discussion and avoid the traditionally defensive mode in which debates operate. An early post could state, "Welcome to the discussion all those parents of children with autism. Our resident expert Dr Smith is here to answer general questions." Simple informative messages could also be posted such as "Three things every parent should know about immunization."

**Introduce messages known to positively influence behaviour:** Promote messages that appeal to core parental values of protecting children from diseases and facilitating the telling of stories around disease impact. For example, “Immunization is important to protect children against measles, mumps and rubella. Has anyone looked after people with these diseases?” Other messages known to increase intention to immunise include emphasising potential regret of not vaccinating in a non-confrontational way;<sup>[30]</sup> appealing to altruism in terms of protecting the vulnerable;<sup>[31]</sup> and the band wagoning phenomenon where learning that others are vaccinating makes a parent more likely to want to do so.<sup>[32]</sup>

Social media’s advantages include the capacity to role model positive health behaviours. Those who have immunised could be asked what factors influenced their decision, which allows wavering parents to see potential advantages of immunization that they may not have considered.

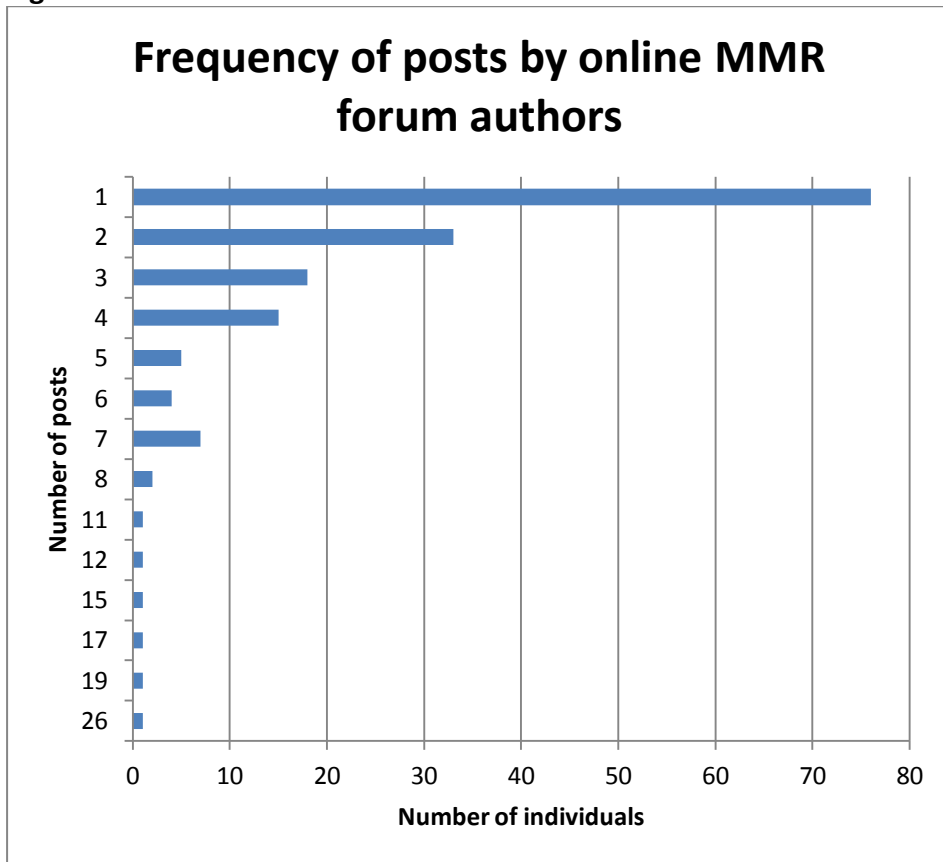
**Don’t over sell the product:** At the same time, it is important to acknowledge that vaccines can produce common minor side effects and rare but serious reactions. Promotional messages that also acknowledge the side effects of immunization paradoxically lead to lower risk perceptions.<sup>[33]</sup> Given what is known about vaccine risk defines the boundaries between fact and fiction and signals that the person conveying the information is knowledgeable and balanced, increasing their trustworthiness.

**Don’t attack the opposition:** Compassion and respect should underscore vaccine advocacy. Direct attacks of the opposition often result in vitriolic debates played out before ambivalent audiences who will often make their decisions via an assessment of source credibility. This became more prevalent as increasingly exasperated vaccine advocates tried to manage a large volume of spurious information, eg, “*This is woeful claptrap*” or “*you really should wake up to yourself*”. As one ambivalent mother asked an expert, “Let us decide for ourselves by spending time in the forum on giving us access to your expertise, not your vitriol.” (Lisa Mary) Parents who are dealing with the outcome alleged to result from immunization may be experiencing grief and distress. A pro-immunization stance is consistent with protecting children from harm, hence advocates should constructively and compassionately respond to claims of adverse reactions to immunization, both real and perceived. Positive actions can also be recommended, such as referral to clinics which specialise in immunization after a person has experienced an adverse event following immunization.

## CONCLUSION

This forum provides an example of the challenges for immunization advocates in communicating in online environments. Andrew Wakefield’s research created media attention and parental anxiety, some of which lingers today. The paper examines some of the complexities of the ongoing immunisation discourse and suggests that immunization debates are met in a strategic way, by recognising the appeals of various messages and mounting an appropriate, relevant and evidence-based response.

Figure 1



**Table 1 Type and frequency of contributor and implied position on MMR immunization from 166 authors in an online discussion forum.**

<b>Author category</b>	
	<b>Number of contributors (%)</b>
Unstated	78 (47)
Personal connection to autism or other related outcome	54 (33)
Parent with no stated personal connection to outcome	26 (16)
Health professional	6 (4)
Vaccine opponent group representative	2 (1)
<b>TOTAL</b>	<b>166 (100)</b>
<b>Position on MMR immunization</b>	
Critical	54 (33)
Seeking further information	55 (33)
Ambivalent about MMR but seeking no information	8 (5)
Supportive	24 (14)
Unable to determine position	25 (15)
<b>TOTAL</b>	<b>166 (100)</b>

**Table 2: Type and frequency of category related to content of posts and evidence used or sought from 466 posts to an online discussion forum.**

<b>Category</b>	<b>Definition</b>	<b>Frequency (% of category)</b>
<b>Content of posts</b>		
Adverse	the post is mostly concerned with alleged adverse effects of immunization	163 (35)
Disorder	the post is mostly concerned with information about autism spectrum disorder or a disorder that has been causatively linked to immunization, however the post does not discuss the immunization issue	144 (31)
Ingredients	the post may discuss alleged adverse effects of immunization but is mostly concerned with particular ingredients, such as mercury	58 (12)
Conspiracy	The post alludes to possible conspiracies, ulterior motives, and deceptions.	44 (9)
Policy	the post is mostly concerned with an issue of policy surrounding immunization such as the schedule or effect on schooling	38 (8)
Virus	the post is mostly concerned with the clinical nature of the measles, mumps or rubella virus	19 (4)
<b>TOTAL</b>		<b>466 (100)</b>
<b>Evidence used or sought in each post</b>		
Case-based	the post is mostly concerned with evidence of an individual case scenario or personal anecdote	187 (40)
Biomedical	the post is mostly concerned with evidence from biological, chemical or medical concepts, regardless of whether the concepts are scientifically plausible	166 (36)
Trend	the post is mostly concerned with evidence in the form of an observed trend, statistical change or historical development	113 (24)
<b>TOTAL</b>		<b>466 (100)</b>



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