

# 2020 AIM Environmental Scan: Vaccine Disinformation, Misinformation, and Mal-information

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# Executive Summary

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## Executive Summary

### BACKGROUND AND METHODOLOGY

Vaccine disinformation is the single biggest issue in immunization today. Vaccine confidence and support has suffered over the years as incorrect vaccine information is more widely disseminated. According to Gallup, the number of Americans who believed that vaccines were “extremely important” decreased by 11% between 2001 and 2015 (Newport 2015). To create more targeted messages and identify key resources to combat incorrect vaccine information, AIM solicited the development of an Environmental Scan, as well as a Q&A and Resource Catalog based on the Environmental Scan.

The key questions this Environmental Scan sought to answer were:

1. What are the main categories/themes of incorrect vaccine information?
2. What is the recurring incorrect vaccine information in each category/theme?
3. What information and resources exist to address incorrect vaccine information?

This scan was conducted from February 2020 to June 2020, and observed the vaccine information from May 2017 to May 2020 that were published and disseminated across the social ecology. Research was conducted across peer-reviewed journals, media articles, legislative bills, blogs, websites, social media, and other digital channels and a few in-depth interviews.



## KEY FINDINGS

1. **Types of incorrect vaccine information:** The majority of incorrect vaccine information produced is disinformation, not misinformation.
2. **Vaccine hesitancy:** The majority of vaccine hesitancy begins with a kernel of truth, is fed by incorrect vaccine information, and is rooted in anxiety.
3. **Incorrect vaccine information producers, responders, and interpreters:** The producers and influencers of incorrect vaccine information mainly reside in the individual, interpersonal, and community environments.
4. **Incorrect vaccine information categories and themes:** The majority of incorrect vaccine information falls into three categories (safety, conspiracy, pseudo-science) across eight themes.
5. **Incorrect vaccine information channels:** The digital space is the primary source of vaccine disinformation.
6. **Information/resources to address incorrect vaccine information:** Producers of resources to address incorrect vaccine information generally focus on four major activities, but there are still significant gaps.
7. **Strategies to address vaccine misinformation and disinformation:** Inaccurate beliefs are difficult to change. Therefore, it is critical to proactively address dissemination of misinformation and disinformation.
8. **Beliefs on science and the role of media:** Those opposed to vaccines and some vaccine hesitant parents have low trust in medical authorities and science. The perception that the vaccine opposition movement is larger than it actually is has been fueled by media attention.
9. **Incorrect vaccine information and politics:** Individuals who oppose vaccination exist across political ideologies. There is vaccine legislation being debated in almost every state as well as on the national stage.
10. **Drivers of incorrect vaccine information:** Many major organizations that oppose vaccination are personality- and sales-driven.

## RECOMMENDATIONS

### For Q&A Document and Resource Catalog

- Develop Messages that are:
  - That are clear on the intent of disinformation and mal-information.
  - That directly delegitimize disinformation.
  - That directly address misperceptions regarding Vaccine Information Statements (VIS) and package inserts.
  - That are clear and direct in addressing vaccine hesitancy issues, recognizing that these issues begin with truthful information.
  - That are empathetic and affirming for those who are feeling anxious about vaccine decision-making.
  - That directly address incorrect vaccine information and vaccine hesitant messages.
  - That are tailored to each of the themes and categories for all social ecology spheres.
  - That explain why the misinformation or disinformation is wrong.
  - That combat Dunning-Kruger effect.
  - That depoliticize public health generally and immunization specifically.

- Develop Q&A content about the science and business of vaccines.
- Ensure Q&A content is written at a 6th grade reading level or lower.
- Provide clear factual information framed in a way that matches the audience's values and world view.

#### Additional recommendations for consideration

- Quickly identify, report, and publicly rebuke mal-information.
- Work with partners to train volunteers on identifying and reporting disinformation and mal-information on social media platforms.
- Develop a network of diverse partners, particularly those that understand vaccine hesitant demographics and are committed to denouncing disinformation and mal-information.
- Understand the importance of emotional support in building vaccine confidence and explore emotional quotient (EQ) strategies to address this.
- Identify and support more grassroots and community pro-vaccine individuals or groups that reside in the innermost spheres of the social ecology model and equip them to address incorrect vaccine information.
- Work with partners to develop inner sphere organic content.
- Develop handles that inspire engagement to amplify efforts.
- Recognize that organizational sphere members are not always trusted sources for vaccine hesitant parents, and cultivate community-level social media influencers.
- Understand and develop a strategy to address alternative social media, where vaccine opposition organizations have set up shop after being banned/censored from Facebook and/or Twitter.
- Cultivate partnerships with influencers who reside in the inner spheres of the social ecology model.
- Proactively disseminate accurate vaccine supportive information through local media outlets and regularly engage audiences on social/digital channels.

## Proposed Themes for Q&A and Resource Catalog

### CATEGORY 1: SAFETY

- Theme 1a: Vaccine safety
- Theme 1b: Vaccine schedule safety
- Theme 1c: Vaccine testing, research, and oversight

### CATEGORY 2: CONSPIRACY

- Theme 2a: The role of pharmaceutical companies and the government in vaccines
- Theme 2b: The role and importance of vaccine policies and mandates

### CATEGORY 3: PSEUDO-SCIENCE

- Theme 3a: Natural immunity myth
- Theme 3b: Sanitation/hygiene disease reduction myth
- Theme 3c: Vaccine-derived disease myths

# Introduction

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## Introduction

This report is the first deliverable for the **Environmental Scan and Vaccine Misinformation Q&A Project**.

The objectives of this report are to:

- Synthesize the findings from the Environmental Scan
- Outline categories and themes to determine structure for the Q&A and Resource Catalog
- Provide high level recommendations for AIM based on the findings

This report contains:

- Detailed methodology of how the Environmental Scan was conducted and references
- Key findings and recommendations
- Proposed themes for the Q&A and Resource Catalog

## Background

Vaccine disinformation is the single biggest issue in immunization today. Vaccine confidence and support has suffered over the years as vaccine disinformation is more widely disseminated. According to Gallup, the number of Americans who believed vaccines were “extremely important” decreased by 11% between 2001 and 2015 (Newport 2015).

Researchers from the Universities of Georgia and Delaware attribute measles outbreaks in the United States and other countries to incorrect vaccine information (Benecke 2019). These researchers also identify the online environment as a major contributor to vaccine hesitancy, stating:

*According to an analysis of YouTube videos about immunization, 32% opposed vaccination. Perhaps more concerning, these videos had higher ratings and more views than pro-vaccine videos. In addition, a study that explored the content of the first 100 anti-vaccination sites found after typing “vaccination” and “immunization” into Google revealed that 43% of websites were anti-vaccination. Skeptics also use online platforms to advocate vaccine refusal; as many as 50% of tweets about vaccination contain anti-vaccine beliefs. Research suggests that it only takes 5 to 10 minutes on an anti-vaccine site to increase perceptions of vaccination risks and decrease perceptions of the risks of vaccine omission.*

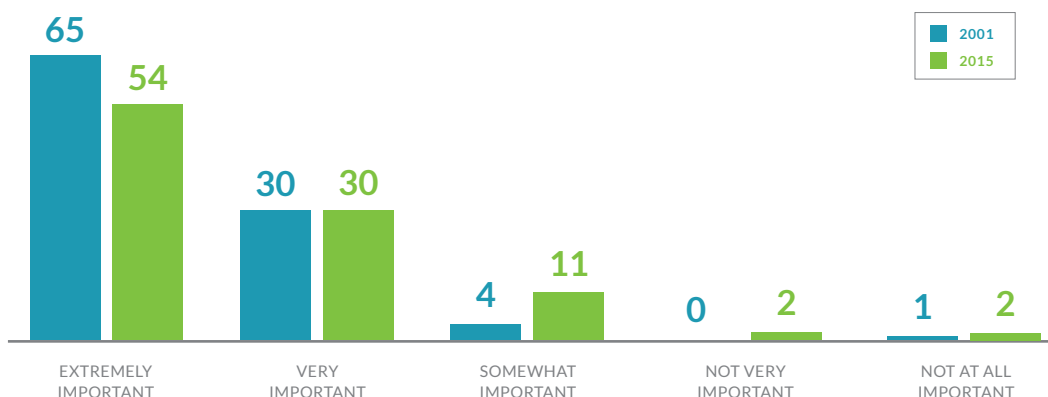


Figure 1: Importance of Vaccines Among U.S. Adults (Source: Gallup)

The World Health Organization (WHO) identified vaccine hesitancy as one of its “Ten Threats to Global Health” in 2019, stating:

*Vaccination is one of the most cost-effective ways of avoiding disease – it currently prevents 2-3 million deaths a year, and a further 1.5 million could be avoided if global coverage of vaccinations improved.*

In its report, WHO identified lack of confidence as a key reason (in addition to access) for vaccine hesitancy.

While those who oppose vaccines are still a minority, their outsized voice has undermined confidence in vaccines. A 2019 Harris Poll revealed that 45% of Americans doubt vaccine safety (Infection Control Today 2019). It is in this landscape that vaccine advocates need to provide coordinated, credible, and clear information to combat vaccine disinformation.



## Methodology

The key questions this Environmental Scan sought to answer were:

1. What are the main categories/themes of incorrect vaccine information?
2. What is the recurring incorrect vaccine information in each category/theme?
3. What information and resources exist to address incorrect vaccine information?

The team who developed this report utilized a tailored social ecological model to identify incorrect vaccine information across spheres of influence (Figure 2).

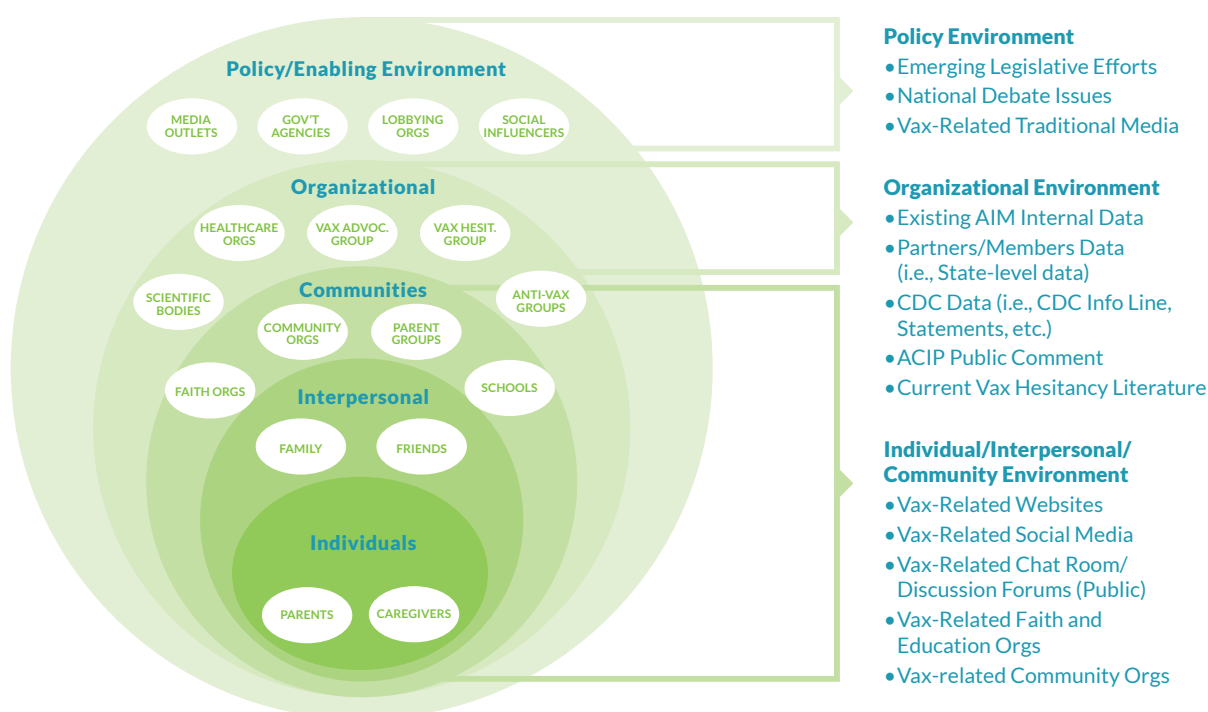


Figure 2: Spheres of Influence

A comprehensive search strategy was developed based on this model, and several hundred sources were identified. The metadata for sources of information were then narrowed down to focus on the most recent 36 months and the most influential organizations in the vaccine debate (both vaccine advocates and opposition).

The team reviewed:

- Digital content (websites, social media, blogs, etc.) (38)
- Immunization-related state legislative bills (43) and related media articles
- Journal articles (42)
- Media articles (11)
- Other sources (7)

Additionally, the team:

- Participated in online discussion forums (~18 hours) from March – May 2020.
- Subscribed to three vaccination opposition newsletters from April – June 2020 reviewing 63 individual newsletters
- Watched ~3 hours of vaccine-related congressional testimony
- Reviewed ACIP public comment from February 2019 – February 2020
- Conducted four informal subject matter expert interviews

For each of the organizations and/or individuals in the personal, interpersonal, and community environments, the team reviewed their public digital platforms and channels ranging from social media, websites, and newsletters. However, the team was unable to gain access to closed social media groups or member sections of websites.

The team conducted a literature search from January 2017 – April 2020 for journal and media articles with insight about incorrect vaccine information as well as strategies for addressing incorrect vaccine information and vaccine hesitancy. Efforts were focused on the U.S. but also included some articles from other countries. In total, the team reviewed more than 50 journal and media articles.

The data was analyzed for key themes with and across segmented spheres of influence.



## The Findings

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**FINDING 1**

## Types of incorrect vaccine information

The majority of incorrect vaccine information produced is disinformation, not misinformation.

This first finding is significant because the vaccine-supportive community often uses the term “misinformation” as an overarching term for inaccurate vaccine information. However, it was found that the majority of the information that organizations and influencers who do not support vaccination (or mandated vaccination) produce is **disinformation**. This is an important distinction because 1) the prefix “mis” infers an error rather purposeful deception, and 2) while those who do not support vaccines are still the minority, their incorrect vaccine information influences the vaccine hesitant community (see Finding 2).

The team evaluated the 139 most recent Facebook and Twitter vaccine-related posts across some of the larger groups who are unsupportive of vaccines, as identified by a vaccine social media expert. Posts/tweets that were event advertisements were excluded because it was not possible to discern the content or intent of the event. Additionally the team omitted posts/tweets selling essential oils and/or supplements and Ultra-Right/Alt-Right posts/tweets because they were not vaccine related. If these two categories were kept in the analysis, they would have comprised 7% and 12% respectively of the total posts/tweets analyzed.

The team found that of the post/tweets analyzed,

<b>68% contained disinformation</b>	Defined as knowingly developing and disseminating incorrect information intended to deceive
<b>20% contained mal-information</b>	Defined as knowingly distributing information such as personal information or “shock-value” information intended to harm
<b>12% contained misinformation</b>	Defined as unintentionally distributing incorrect information

Within the **disinformation** category, 31% of posts/tweets had to do with vaccine safety, 26% had to do with personal freedom conspiracy, and 21% had to do with pharmaceutical or governmental conspiracy. They focused on obviously deliberate misrepresentation of science and or easily debunked conspiracy theories.

Within the **mal-information** category, 44% of post or tweets had to do with political or pharmaceutical conspiracy, and 28% had to do with vaccine safety. Inflammatory, graphic false narratives about dead babies due to unsafe vaccines comprised most vaccine safety posts/tweets in this category.

Of posts/tweets within the **misinformation** category, 100% of them dealt with vaccine safety and were first person stories of parents who had lost babies and attributed the deaths to vaccines. These were characterized as misinformation because the team believes that the parents, while misguided, had no intent to deceive or inflict harm.

**FINDING 2**

## Vaccine hesitancy

The majority of vaccine hesitancy begins with a kernel of truth, is fed by incorrect vaccine information, and is rooted in anxiety.

A common hook to legitimize incorrect vaccine information is to start with a truth – for example, citing legitimate scientific journal articles or CDC side effects information. The content will point to legitimate sources but purposefully misinterpret the sources content or findings. A common example of this is to state that CDC itself acknowledges that there are side effects to vaccines (the truth) and then go on to state something like febrile seizures are the body's response to the brain "cooking itself" (the disinformation). But by using legitimate sources, the disinformation feels legitimate to vaccine hesitant parents.

This is significant because while most incorrect vaccine information is produced and distributed by groups who do not support vaccination, the majority of the consumers of incorrect vaccine information are vaccine hesitant (self-described as On The Fence or OTF parents). This group is arguably more important to vaccine-supportive organizations because they have not yet decided for or against vaccines, and are in search of information to address a broad spectrum of beliefs and concerns regarding vaccines (Smith 2017).

As part of the Environmental Scan, the team joined two vaccine online discussion groups as a listening exercise. Groups were engaged with daily from 1 March through 31 May 2020. To ensure the group's rules were respected, no actual quotes or screen captures were taken, and the groups are not identified. The data gleaned from this exercise is useful in understanding vaccine hesitancy, but should be considered anecdotal due to the limitations in data collection.

### The role of anxiety

The single most common words used in OTF parents' posts were "anxious" (1,232 instances) and "anxiety" (842). Other common words included "worry"/"worried" (641) and "afraid" (439). Common themes in OTF posts were:

- Seeking clarification regarding language in VIS and vaccine package inserts that frightened them and/or were used as proof points in incorrect vaccine information
- Seeking help interpreting vaccine-related journal articles
- Seeking input on incorrect vaccine memes ("Are they true? Why or why not")
- Seeking assurances and support for upcoming well-baby visits

### The role of scientific publications and materials

Materials that were most commonly used in vaccine decision-making by OTF parents in the discussion groups were the VIS and the vaccine package insert. The package insert is a legal document, not an educational tool. The VIS authors have made strides over the years to make the information more accessible, but it is still driven by legal requirements rather than health education and informed decision-making.

After reviewing conversations with parents, following posts in the online discussion groups, and

work with other vaccine organizations, a recurring comment was found that the VIS are difficult to understand for parents. They are both technical and written at a 10th grade or higher level; health education materials should, ideally, be written at a 6th grade level or lower. The VIS captures all the risks, but parents feel they do not contextualize risks in a way that parents can accurately assess the risk and make a true informed decision.

While some studies show an increased confidence in vaccine after reading the VIS, a common comment in the online discussion groups was concerns the VIS raised. There has been a call to improve VIS by writing at a lower reading level and providing more relevant and comprehensive information to improve understanding of real risk and support informed decision-making (Vannice 2011). In the discussion forums, many OTF parents expressed a higher level of anxiety after reading VIS than before.

Additionally, when provided links to websites to help with information gathering and informed decision-making, on average 20-30% of the OTF parents expressed distrust with CDC and did not use the website.

### **The role of emotional support**

In the discussion groups, OTF parents reaching out for reassurance and to quell anxiety about upcoming well-baby visits was a common post. In these discussion groups, 66% of parents expressed anxiety over an upcoming well-baby visit, citing provider “disinterest,” impatience,” or “lack of ‘bed-side’ manner” as fueling their anxiety. This common, recurring theme in both discussion groups speaks to a need for both the rational and emotional needs to be met as part of vaccine decision-making.

## **FINDING 3**

### **Incorrect vaccine information producers, responders, and interpreters**

*The producers and influencers of incorrect vaccine information mainly reside in the individual, interpersonal, and community environments.*

This finding, and the remainder of the findings, deal with the production, sources, and dissemination of incorrect vaccine information; it is critical to understand it in the context of vaccine hesitant parents. Through the data collected during the environmental scan, the team found that the source of incorrect vaccine information is almost entirely the innermost spheres of the social ecology, with the bulk of the production occurring at the community sphere-level. While there is some personal and interpersonal incorrect vaccine information production, mostly in the form of personal stories, the overwhelming majority of content is disinformation from vaccination opposition organizations or influencers.

These inner spheres are prolific producers of incorrect vaccine information. They primarily produce high quantity, low quality content. In contrast, vaccine-supportive websites produce significantly higher quality content (BMC Public Health 2016). This difference is likely, in part, due to:

- The level of professionalism (the majority of vaccine-supportive content is produced in the organizational sphere rather than the inner spheres) and
- The volume of content produced from vaccination opposition organizations or influencers negates the ability to carefully craft it.

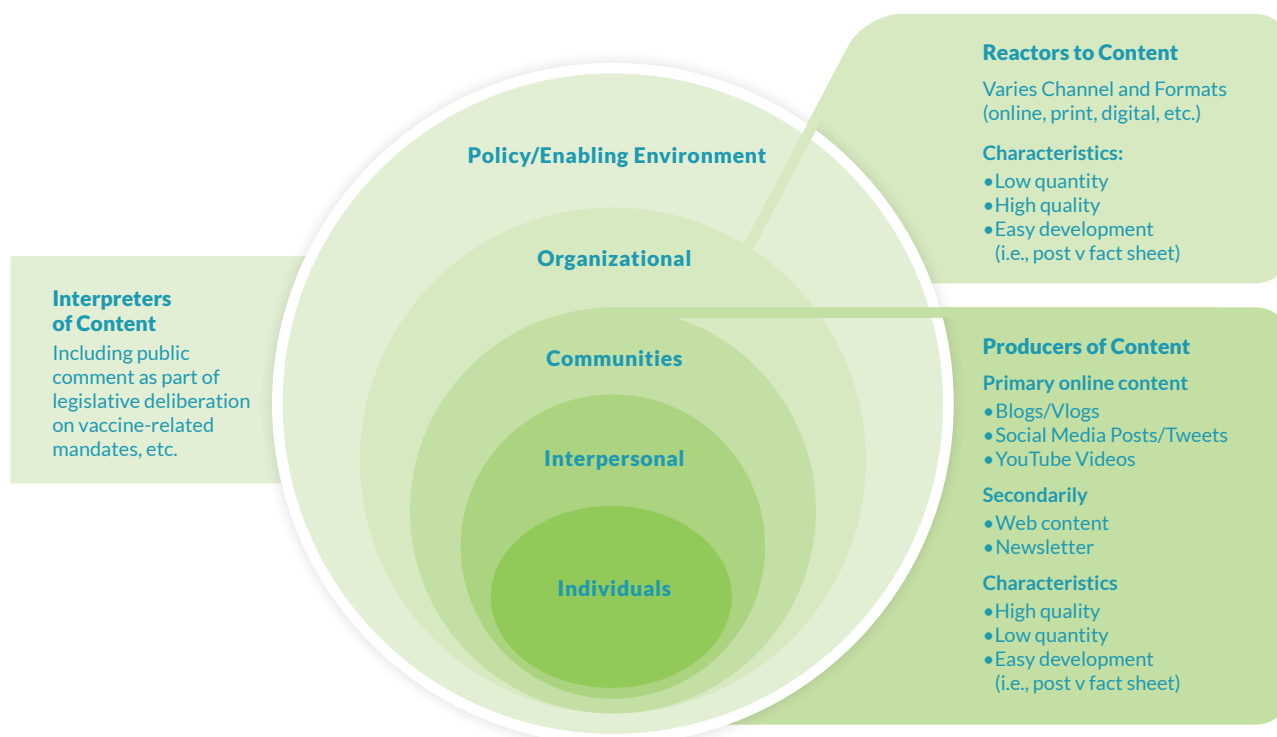


Figure 3: Producers, Responders, and Interpreters of incorrect vaccine information

The organizational sphere responds to the information produced by the inner spheres by producing information and/or strategies to combat vaccine hesitancy, but usually does not directly respond to individuals or organizations who produce incorrect vaccine information. It is believed that those already opposed to vaccines are not receptive to information that counters their strongly held beliefs.

The strategies developed and recommended in this sphere to address vaccine hesitancy include:

1. Healthcare Provider Training and Support
2. Patient Education
3. Social Media
4. Communication Campaigns

In the policy sphere, legislative work is influenced by the incorrect vaccine content. Political actors do not produce vaccine content; rather, they interpret it as part of their legislative activities. Those in the political sphere, at the state level (and to a lesser degree, the national level) are lobbied by vaccine opposition groups to eliminate vaccine mandates and broaden exemptions. While not common, some in this sphere do share incorrect vaccine information.

**FINDING 4****Incorrect vaccine information categories and themes**

The majority of incorrect vaccine information falls into three categories across eight themes.

Looking across digital content and through a comprehensive literature review, a pattern emerged (see Figure 4) that the categories of incorrect vaccine content are narrowly focused on three major themes: safety, conspiracy, and pseudo-science.

SAFETY			CONSPIRACY		PSUEDO-SCIENCE		
Vaccine Safety	Vaccine Schedule Safety	Vaccine Testing, Research, and Oversight	Role of Pharmaceutical Companies and Government in Vaccines	Role/Importance of Vaccine Politics and Mandates	Natural Immunity Myth	Sanitation/Hygiene Disease Reduction Myth	Vaccine-derived Disease Myths
<ul style="list-style-type: none"> <li>Vaccines contain toxins/heavy metals</li> <li>Vaccine cause injury/death (autism, SID, autoimmune disease, etc.)</li> <li>Flu vaccine in early pregnancy increases risk of miscarriage</li> <li>Vaccine schedule has too many vaccines too soon</li> <li>Vaccine schedule is too aggressive for baby's immune system</li> <li>Vaccines are not sufficiently tested</li> <li>Vaccine schedule is not properly tested</li> <li>Recommendations are not made based on sufficient data</li> </ul>			<ul style="list-style-type: none"> <li>Big Pharma/Government vaccine are profit sources</li> <li>The government doesn't do comprehensive research/hides research to bury negative vaccine outcomes and risks</li> <li>Big Pharma/Government prioritize vaccine development/promotion over safety</li> <li>Vaccine mandates are a government conspiracy to infringe on personal freedoms (Medical Freedom Movement)</li> <li>Vaccine mandates are not legal or constitutional</li> </ul>		<ul style="list-style-type: none"> <li>Natural immunity is better/more effective/safer than vaccine-acquired immunity</li> <li>Decreases in VPDs is due to hygiene and sanitation, not vaccination</li> <li>Disease cases are driven by vaccine shedding, not unvaccinated individuals.</li> </ul>		

Figure 4: Incorrect vaccine information themes, categories, and common key messages

These incorrect vaccine messages have been broadly disseminated and are starting to plant seeds of concern among even vaccine-supportive parents. Stecula et al. (2020) conducted a nationally representative survey which found that among U.S. adults:

- 15% believe vaccines are full of toxins
- 18% believe vaccines cause autism
- 19% believe it is better to develop immunity by getting disease
- 20% did not believe there was a difference whether parents delay or spread out vaccination instead of following the recommended CDC schedule

Incorrect vaccine messages are slightly altered when providing arguments at the policy level in an effort strengthen exemptions and reduce mandates, but fall into the same themes and categories. The most common arguments used are:

- Parental right
- Medical freedoms
- Vaccine safety/injury
- Religious freedoms
- Informed choice
- Vaccine efficacy

### Public comment on ACIP vaccine recommendations

The Advisory Committee on Immunization Practices (ACIP) is responsible for setting the recommended vaccination schedule to be implemented in the U.S. Review of public comments on ACIP proceedings between February 2019 – February 2020 reflect a number of negative themes supported by incorrect vaccine information (summarized in Figure 5). In addition, the right to choose and freedom is a common argument against vaccine mandates.

THEME CATEGORY	ANTI-VACCINE SUPPORTING POINTS
<b>SAFETY</b>	
<b>Vaccine harm</b>	<ul style="list-style-type: none"> <li>Vaccine cause seizures, GBS, autism, paralysis, SIDS, infertility, gut, and autoimmune issues.</li> <li>Child disorders increased from 12.8% to 54%.</li> <li>VICP has compensated \$4.2 billion for injury.</li> <li>Vaccines harmed my family.</li> <li>Vaccines are not safe for everyone</li> </ul>
<b>Insufficient testing</b>	<ul style="list-style-type: none"> <li>There are no studies of long-term vaccine effects.</li> <li>Vaccines are tested only with healthy people.</li> <li>There has been no true double blind/placebo study.</li> <li>There have been no impartial studies.</li> <li>WHO 2019 Vaccine Summit confirmed that vaccines are not adequately tested.</li> <li>Supreme Court ruled that vaccines are unavoidably unsafe.</li> <li>We rely on monitoring data to track safety.</li> </ul>
<b>Schedule Concerns</b>	<ul style="list-style-type: none"> <li>There has been no testing of schedule as a whole.</li> <li>Recommended vaccines are too much for children.</li> <li>Increase from 8 injections to 50-60.</li> <li>Other countries that vaccinate less are healthier.</li> </ul>
<b>Unsafe Ingredients</b>	<ul style="list-style-type: none"> <li>Vaccines contain preservatives; formaldehyde; aluminum.</li> </ul>
<b>POLITICAL/CONSPIRACY</b>	
<b>Corruption</b>	<ul style="list-style-type: none"> <li>CDC is not unbiased; they work with pharma and have patents.</li> <li>Manufacturers cannot be sued.</li> <li>Providers do not obtain fully informed consent.</li> </ul>
<b>Liability/Accountability</b>	<ul style="list-style-type: none"> <li>Vaccines are the only drug that has no liability.</li> <li>Adverse events are underreported (only 1%) due to conflicts of interest.</li> </ul>
<b>PSUEDO-SCIENCE</b>	
<b>Lack of efficacy</b>	<ul style="list-style-type: none"> <li>Vaccines are ineffective.</li> <li>Outbreaks are caused by vaccinated people due to shedding/live spread.</li> </ul>
<b>Increasing concern</b>	<ul style="list-style-type: none"> <li>More people are questioning vaccines, including providers who have vaccination experience. You need to take it seriously.</li> </ul>

Figure 5: ACIP Anti-Vaccine Public Comment

One prominent organization that opposes mandated vaccination has developed a comprehensive guide that lays out the main arguments and messaging used by those advocating for exemptions across the U.S. (Fisher 2017). See Appendix I for these key messages and data points.

There are two principles that underscore the arguments against vaccine mandates:

1. **Ethics/informed consent:** People should have complete/accurate information and be free to make voluntary decisions without being subject to harassment, coercion, or sanctions.
1. **Precaution/do no harm:** Public policy and law should minimize the potential for harm; scientific uncertainty, incomplete evaluation, and limited understanding can have unintended negative consequences.

## FINDING 5

### Incorrect vaccine information channels

The digital space is the primary source of vaccine disinformation.

Individuals and organizations in the inner spheres, on average, produce more information than their vaccination-supportive counterparts. For example, in a one-month period (May 2020), the team audited the information production of six organizations (three vaccine advocates, three vaccine opposition) and found the following:

#### Quantity

In one month, the six organizations published a total 887 Facebook posts. For every post a vaccine supportive group published, a vaccine opposition group published 6.5 posts. This means that for individuals looking for vaccine information there is simply more incorrect vaccine information available. Until social media algorithms were corrected, people searching for vaccine information were far more likely to find incorrect vaccine information. With the banning of several prominent vaccination opposition groups and correcting of algorithms, this is less of an issue today; vaccination opposition groups are still adept at pushing content through ads, affiliate groups, etc.

#### Engagement

While quantity is one factor in amplifying messages, the most effective is an engaged following. A 2017 study from University College of London and London School of Tropical Medicine and Hygiene created an “impact score” to determine the reach and impact of Twitter Influencers (Kostkova 2017). The study looked at HPV related tweets from 12 October 2015 – 2 January 2016. The analysis showed that the most influential Twitter handle was not the one with the largest followers, but the one with the most engaged followers. It also mapped increases in tweets to news stories; while multiple daily posts/tweets may flood the platform, targeting activity to correspond with news seemed to have a greater amplifying effect.

#### Facebook advertising

A 2019 study of 309 Facebook advertisements (53% vaccination advocates and 47% vaccination opposition) found that while the percentages of ads were comparable, the number of ads buys were significantly higher with incorrect vaccine information ads (Jamison 2020). The top themes for these ads were vaccine harm, promoting choice, and uncovering “fraud”.

### Quality

While the quantity of the incorrect vaccine content is greater than correct vaccine information, the quality is lower. In a 2016 study, researchers analyzed 514 webpages in favor of vaccination, 471 against, and 108 neutral. “Generally, webpages holding a favorable view toward vaccination presented more quality indicators compared to both neutral and anti-vaccination pages.” (Medscape/BMC Public Health 2016)

### Reading level

A gap for both correct and incorrect vaccine information websites is appropriate reading level. The BMC Public Health study found that most sites (for both correct and incorrect information) were written at too high a level for health content.

- Only 2% of correct and 3% of incorrect vaccine information websites were written to be “easy to read” (with a readability score of  $\leq$  6th grade reading level)
- 19% of correct and 21% of incorrect vaccine information websites were written at a “medium” reading level.
- The majority of pages (79% vaccination advocates and 76% vaccine opposition) were considered “difficult to read”, scoring at  $\geq$  10th grade reading level.

## FINDING 6

### Information/resources to address incorrect vaccine information

Producers of resources to address incorrect vaccine information generally focus four major activities, but there are still significant gaps.

Many agencies and organizations are proactively working to address incorrect vaccine information. This scan focused on efforts and recommended strategies of the following key players in the U.S.:

- American Association of Family Physicians (AAFP)
- American Academy of Pediatrics (AAP)
- American College of Obstetrics and Gynecology (ACOG)
- American College of Physicians (ACP)
- Association of Immunization Managers (AIM)
- American Public Health Association (APHA)
- Association of State and Territorial Health Officials (ASTHO)
- Centers for Disease Control and Prevention (CDC)
- CHOP Vaccine Education Center
- Every Child By Two (ECBT)
- Immunization Action Coalition (IAC)
- National Association of County and City Health Officials (NACCHO)
- National Foundation for Infectious Diseases (NFID)
- National Vaccine Advisory Committee (NVAC)

These organizations produce information to address incorrect vaccine information and focus on four major activities.

### 1. Provider Training and Support

The critical role of health care providers in addressing incorrect vaccine information is underscored by all organizations. Areas for training and support identified include:

- Making a strong presumptive recommendation
- Communicating accurate, understandable information
- Encouraging parents/patients to ask questions
- Listening to and acknowledging concerns with empathy
- Using motivational interviewing to understand the root of hesitancy
- Answering all questions about safety and efficacy with scientific backing
- Reassuring parents/patients with personal stories

Provider resources for vaccine recommendations and conversations, such as detailed factsheets, message maps, tip sheets, videos, toolkits, and webinars, have been developed by many organizations. (Key Resources will be detailed in the Resource Catalog).

### 2. Patient Education

In addition to equipping providers to address incorrect vaccine information, making sure patients and their caregivers have clear, accurate, credible educational resources is a recommended strategy to promote vaccine confidence and curtail the impact of incorrect vaccine information on vaccine decision-making. These should be shared through health professionals, community partners, and other trusted messengers. Additionally, ECBT and CHOP recommend teaching children directly about how vaccines help build immunity to fight disease, thereby equipping them with knowledge to help discern incorrect vaccine information.

Many organizations have patient education materials. Of note:

- CDC's extensive evidence-based materials are shared by partner organizations.
- AAP has a public-facing website [HealthyChildren.org](https://www.healthychildren.org) which includes articles and FAQs to address commonly found incorrect vaccine information.
- CHOP has a Parents Pack newsletter and Vaccine Education Center to share detailed, science-based information to answer commonly found incorrect vaccine information.
- ECBT has created the Vaccinate Your Family comprehensive website to share accurate and understandable information backed by science, answers to common questions, and stories with patients and their caregivers. Central to their approach is monitoring incorrect vaccine information/concerns and surrounding with positive, informed, trusted people.
- IAC has a patient education resource portal as well as a website specifically for the public at [vaccineinformation.org](https://vaccineinformation.org). They have compiled scientific evidence to counter misinformed claims about vaccine risk, injury, and efficacy, as well as to support vaccine confidence.

### 3. Social Media

The NVAC Vaccine Confidence subcommittee report at their February 2020 meeting highlighted the need to address incorrect vaccine information on social media. Vaccine opposition groups capitalize on confusion about the scientific process to manipulate good science into criticism and disinformation. They also use stories and speak directly to reasons that help in decision making and trust. Censoring those who promote disinformation allows them to paint themselves as martyrs, so organizations have focused on reliable information and true stories about why vaccines matter on social media to counter disinformation. The NVAC Vaccine Confidence report also noted the importance of calling out claims that have been debunked; they work with social media platforms to prompt the use of credible sources, partner with influencers, and promote the Vaccine Safety Network.

NFID shared its support for the Salzburg Statement on Vaccine Acceptance, which calls on social media platforms and web search engines to identify disproven, inaccurate, false claims about vaccine safety and share scientific information. CDC's Vaccine Confidence framework also includes working with social media companies to stop the spread of vaccine myths.

APHA hosted a webinar in 2019 on Exploring Effective Strategies to Address Vaccine Hesitancy and Misinformation, which urged public health communicators to understand and adapt to the changing social media landscape.

### 4. Communication Campaigns

NACCHO urges health departments to be proactive in communicating the value of vaccines to the public and recommends focusing on communities that are refusing vaccines with tailored messages, targeted channels, and credible messengers. APHA calls for national and targeted education campaigns on the value of vaccination in preventing dangerous VPDS. ASTHO urges health officials to make the case for vaccines as an important part of a healthy lifestyle; they recommend using positive messages and framing that to appeal to parents' choice and responsibility.

While these messages and resources are evidence-based and robust, based on the recurring themes in incorrect vaccine information and vaccine hesitant content there appear to be some important gaps:

- Transparency about the business of vaccines
- Adequate and audience-appropriate explanations about the science of vaccines and immunity
- Writing at appropriate levels (i.e. 6th grade reading level or lower)
- Lack of organizations/influencers in the inner social ecology spheres to reach those with distrust of medical and science authorities

**FINDING 7**

## Strategies to address vaccine misinformation and disinformation

Inaccurate beliefs are difficult to change. Therefore, it is critical to proactively address dissemination of misinformation and disinformation.

Once inaccurate beliefs are formed, they are difficult to change even with clear and credible corrections (Swire 2018). Proactive strategies to address dissemination of incorrect vaccine information (Rodgers 2020) include:

- Partnering with existing coalitions and advocacy groups to prepare the public to identify evidence-based research, recognize signs of misinformation and disinformation, and fact-check.
- Disseminating information through verified local media outlets, which are more trusted than national outlets.
- Engaging audiences on social and digital channels to be positioned as a consistent and trustworthy source.

Increasing vaccine-supportive content in social and traditional media is important (Stecula 2020, Smith 2017), especially since true information only gains interest shortly after it is published and loses popularity quickly, while fake information can remain popular for a much longer time (Del Vicario 2016 in Xu 2018).

But it is not enough to share positive information about vaccines. Immunization program silence can inadvertently imply agreement with incorrect vaccine information, so it is important to correct it (MacDonald 2018). The recommended approach is to be proactive, provide facts first, then address incorrect vaccine information with targeted strategies (Dube 2020, MacDonald 2018, Mendel-Van Alostne 2018).

### Recommended strategies to correct incorrect vaccine information (Swire 2018; Lewandowsky 2017):

- **Provide an alternate explanation** that is more plausible and easier to understand to “switch out” inaccurate info and fill the gap left by retraction. Appeals to coherence are more effective than fact checking or challenging credibility (Walter, 2018).
- **Do not repeat incorrect vaccine information.** Do explain why the “misconception” was disseminated and provide ample information on why it is wrong. Corrections can be more persuasive when they directly attack opposing arguments than when they only acknowledge opposition or do not address it at all (Xu 2018).
- **Use high credibility sources.** Trust and perceived honesty/integrity matters more than expertise. People are more likely to trust information from an unknown source shared by a trusted sharer than the same information from reputable source shared by someone they do not trust (Rodgers 2020).

While health care providers are in the best position to influence vaccine decisions and correct incorrect vaccine information, vaccine opposition groups discredit professional health organizations by creating conspiracy theories or including testimony from doctors of stopping or delaying vax due to their own

research or observations (Xu, 2018). Engaging community leaders and other trusted messengers to address negative perceptions is important (Tull 2019; Smith 2017), as is reinforcing vaccine acceptors so they continue to be vaccine proponents (MacDonald 2018). Scientists and subject matter experts can also be effective advocates for vaccination (Smith 2017).

- **Frame corrections in a way that is consistent with the audience's values and worldview.** Vaccine-related messages should be framed to align with values of the intended audience (Dube 2020) and demonstrate benefits to both individual and community protection (MacDonald 2018). Rossen (2019) found that compared to vaccine accepters, rejecters and fence-sitters exhibited a heightened moral preference for liberty (belief in the rights of the individual) and harm (concern about the wellbeing of others). Compared to acceptors and fence sitters, rejecters exhibited a heightened moral preference for purity (an abhorrence for impurity of body), and a diminished moral preference for authority (deference to those in positions of power).

For information that has been proven false, the incorrect vaccine information should be retracted and corrected as soon as possible with permanent notice of retraction and links to corrections (Chan 2017). Sharing of retracted information should be tracked and limited as possible.

What does not seem to work

- Arguing aggressively about factual misconceptions (MacDonald 2018) and advocating too strongly for vaccination does little to stem hesitancy (Dube 2020).
- Engaging directly with active rejecters is unlikely to be effective (Smith 2017).
- Attacking or discrediting antivaccination groups might not be effective in changing vaccine intentions (Xu 2018).
- A study of vaccination supportive strategies (Pluviano 2017) found that a myth versus fact format induced stronger beliefs in the vaccines/autism link and in vaccine side effects over time. It also found that fear appeals through images of sick children led to increased misperceptions about side effects.

## FINDING 8

### Beliefs on science and the role of media

Those opposed to vaccines, and some vaccine hesitant parents have low trust in medical authorities and science. The perception that the vaccine opposition movement is larger than it really is has been fueled by media attention.

Stecula et al. (2020) found that those with low trust in medical authorities tended to believe disinformation across demographics, religious and political beliefs. Those who get more information from social media were more misinformed, while those who get information from traditional media had more accurate information.

Overconfidence (i.e. someone thinking they know as much or more than doctors and scientists about autism) and the Dunning-Kruger Effect<sup>1</sup> are associated with endorsement of disinformation, opposition to mandatory vaccination policy, and increased support for the role of nonexperts in policymaking process (Motta 2018). Conservatives are more likely to reject well-established scientific findings than liberals; they are also more likely to accept untrue claims about hazards (Lewandowsky 2017).

<sup>1</sup> In the field of psychology, the Dunning-Kruger effect is a cognitive bias in which people with low ability at a task overestimate their ability. It is related to the cognitive bias of illusory superiority and comes from the inability of people to recognize their lack of ability.

Media echo chambers reinforce disinformation and make it seem like beliefs are more widely held than they actually are (Lewandowsky 2017). Further, incorrect vaccine tweet volume increases after vaccine-related news coverage (Tomeny 2017). The study found that California, Massachusetts, New York, and Pennsylvania had a larger than national average of vaccine opposition Twitter activity, which authors believe was due to:

- larger populations
- higher concentrations of new mothers
- higher household income levels
- men aged 40 – 44
- men with minimal college education

## FINDING 9

### Incorrect vaccine information and politics

**A: Individuals who oppose vaccination exist across political ideologies.**

A decade ago, opposing vaccination was considered a more liberal position. Kiera Butler, a reporter who has covered the vaccine opposition movement for more than 12 years, wrote “the loudest voices came from politically liberal, mostly white, and affluent enclaves—think famously hippie places like Marin County, California, or Boulder, Colorado—where parents worried about the side effects of what they perceive as toxins in vaccines”. But perceptions and driving ideologies began to shift as early as 2007, and by 2017 a radical change in the vaccine opposition movement had occurred – the cause was embraced by the far right.

Researchers found that people skeptical of vaccines identified “purity” and “liberty” as important values. But liberty meant human rights for the left and libertarianism for the right (Amin 2017). As a result, the vaccine opposition movement has unlikely partners in the far left, and increasingly in the far right.

The team conducted a digital content audit of ten organizations who are unsupportive of vaccines and found 67% of the sites contained ultra-right or alt-right content. For some of these organizations, the shift has been significant. It is unclear if this is an ideological shift or a strategic one to increase their audience and membership. But much of these organization’s digital content reaches far beyond their original scope of health or vaccines.

Additionally, public health issues are being politicized in these forums, particularly around COVID-19 and the potential of a vaccine. The most COVID-19 common narratives on these sites are:

- COVID-19 shelter-in-place orders are violations of personal freedoms
- Masks harm, don’t work, or are part of a conspiracy
- VPDs have decreased since COVID-19 because there have not been well-baby visits

## B: There is vaccine legislation being debated in almost every state and on the national stage.

### State level debate

All states have legislation requiring specific vaccines for students, and all states allow medical exemptions. All states except CA, ME, MS, NY, WV grant religious or philosophical exemptions; 45 states and DC have religious exemptions, and 15 states have both religious and philosophical exemptions (NCSL 2020).

Goldstein (2018) analyzed trends of 175 proposed and enacted state legislation related to childhood vaccination exemption between 2011-2017. They found that 53% of introduced bills sought to expand exemptions; these were more likely to be sponsored by Republicans and were more often introduced in Northeast and Southern states. The other 47% sought to limit ability to exempt. Almost all legislation that became law (12 out of 13) limited exemptions.

In reviewing the 43 state bills proposed in 2020 state legislative session (IAC 2020):

- 15 aim to restrict exemptions
- 14 aim to strengthen exemptions or reduce mandates
- Four aim to reduce sanctions against those who choose not to vaccinate
- Four aim to share information about vaccine ingredients with patients
- Three aim to increase investigation of vaccine correlation in infant deaths
- Two aim to increase compliance with NCVIA informed consent and adverse reporting requirements
- One aims to increase awareness about serological testing to reduce unnecessary vaccination

The most common arguments in support of restricting exemptions are:

- Vaccine-preventable diseases are serious and devastating.
- Vaccines are safe and save lives.
- Nonmedical exemptions lead to outbreaks.
- Herd immunity protects those who cannot be vaccinated and are at high risk for severe complications from vaccine-preventable diseases.

The most common arguments used to strengthen exemptions and reduce mandates are:

- |                      |                    |                         |
|----------------------|--------------------|-------------------------|
| ▪ Parental right     | ▪ Medical freedoms | ▪ Vaccine safety/injury |
| ▪ Religious freedoms | ▪ Informed choice  | ▪ Vaccine efficacy      |

### National debate

On February 27, 2019, the Oversight and Investigations Subcommittee of the House Committee on Energy and Commerce held a hearing entitled “Confronting a Growing Public Health Threat: Measles Outbreaks in the U.S.” While there was considerable concern among members of the public who attended regarding vaccine mandates, the bipartisan subcommittee was focused on strategies to address incorrect vaccine information and hesitancy.

Following this hearing, a bill entitled “Recognizing the importance of vaccinations and immunizations in the United States” was introduced in the House with 35 bipartisan sponsors. This bill affirms that there is no evidence that vaccines cause life threatening or disabling diseases in healthy people,

encourages commitment to vaccine research, and urges everyone to follow scientific evidence and experts for timely vaccination to avoid public health crisis.

On March 5, 2019, the Senate Health, Education, Labor, and Pensions (HELP) Committee held a hearing entitled “Vaccines Save Lives: What is Driving Preventable Disease Outbreaks?” to understand how the federal government can support higher vaccination rates in the U.S. Only one senator spoke out against vaccine mandates. The remaining bipartisan committee members spoke overwhelmingly in support of vaccines as safe and effective.

Despite this strong support for vaccination among public officials at the national level, there are some that share incorrect vaccine information (SciCheck and AP Factcheck 2017-2020).

## FINDING 10

### Drivers of incorrect vaccine information

Many major organizations that oppose vaccination are personality- and sales- driven.

#### Vaccine opposition personalities

Most organizations that are unsupportive of vaccines have a prominent figurehead. The team believes that this is in large part due to where they reside in the social ecology. By residing in the inner spheres, these organizations are closer to the individual sphere and more connected to the value of relationships.

Given that vaccine decision-making is both a rational and emotional process, having a real person and first-person voice may be a benefit for organizations that are unsupportive of vaccines.

Conversely, almost no vaccine-supportive group has a recognized influencer at the helm. This is probably because, in large part, these groups reside in the organizational sphere – by definition, a more professional and less personal sphere.

#### Sales of supplements and other holistic products

A digital presence audit of nine major organizations who are unsupportive of vaccines showed that 44% of the organizations are actively engaged in selling their products on their websites and social media platforms (see Figure 10). Not only are these sites using the vaccine opposition platform to sell health alternatives, but the sales versus other content can be high.

## Recommendations

### Finding 1: Types of incorrect vaccine information

The majority of incorrect vaccine information is disinformation, not misinformation.

#### For Q&A Document and Resource Catalog

- Develop messages that are clear on the intent of disinformation and mal-information.
- Develop messages that directly delegitimize disinformation.

#### Additional recommendations for consideration

- Quickly identify, report, and publicly rebuke mal-information.
- Work with partners to train volunteers on identifying and reporting disinformation and mal-information on social media platforms.
- Develop a network of diverse partners, particularly those who are from the communities that you're aiming to communicate with and are committed to denouncing disinformation and mal-information.

### Finding 2: Vaccine hesitancy

The majority of vaccine hesitancy begins with a kernel of truth, is fed by incorrect vaccine information, and is rooted in anxiety.

#### For Q&A Document and Resource Catalog

- Develop messages that directly address misperceptions regarding VIS and package inserts.
- Recognize that many vaccine hesitancy issues begin with truthful information, and
- Develop messages that are clear and direct in addressing these issues.
- Develop messaging and narratives that are empathetic and affirming for those who are feeling anxious about vaccine decision-making.

#### Additional recommendations for consideration

- Understand the importance of emotional support in building vaccine confidence and explore emotional quotient (EQ) strategies to address this.

### Finding 3: Incorrect vaccine information producers, responders, and interpreters

The producers and influencers of incorrect vaccine information mainly reside in the individual, interpersonal, and community environments.

#### For Q&A Document and Resource Catalog

- There are no message-specific recommendations.

#### Additional recommendations for consideration

- Identify and support more grassroots and community pro-vaccine individuals or groups that reside in the innermost spheres of the social ecology model and equip them to address incorrect vaccine information.

#### Finding 4: Incorrect vaccine information categories and themes

The majority of incorrect vaccine information falls into three categories (safety, conspiracy, pseudo-science) across eight themes.

##### For Q&A Document and Resource Catalog

- Develop key messages that directly address incorrect vaccine information and vaccine hesitant messages.
- Create tailored key messages in each of the themes and categories for all social ecology spheres.

#### Finding 5: Incorrect vaccine information channels

The digital space is the primary source of disinformation.

##### For Q&A Document and Resource Catalog

- There are no message-specific recommendations.

##### Additional recommendations for consideration

- Work with partners to develop inner sphere organic content.
- Develop handles that inspire engagement to amplify efforts.
- Recognize that organizational sphere members are not always trusted sources for vaccine hesitant parents, and cultivate community-level social media influencers.
- Understand and develop a strategy to address alternative social media, where vaccine opposition organizations have set up shop after being banned/censored from Facebook and/or Twitter.

#### Finding 6: Information/resources to address incorrect vaccine information

Producers of resources to address incorrect vaccine information generally focus on a four-pronged strategy, but there are still significant gaps.

##### For Q&A Document and Resource Catalog

- Develop Q&A content about the science and business of vaccines.
- Ensure Q&A content is written at a 6th grade reading level or lower.

##### Additional recommendations for consideration

- Cultivate partnerships with influencers who reside in the inner spheres of the social ecology model.

#### Finding 7: Strategies to address misinformation and disinformation

Inaccurate beliefs are difficult to change. Therefore, it is critical to proactively address dissemination of misinformation and disinformation.

**For Q&A Document and Resource Catalog**

- Provide clear factual information framed in a way that matches the audience's values and world view.
- Explain why the misinformation or disinformation is wrong.

**Additional recommendations for consideration**

- Proactively disseminate accurate vaccine supportive information through local media outlets and regularly engage audiences on social/digital channels.
- Partner with advocacy groups to prepare the public to identify evidence-based research, recognize signs of misinformation and disinformation, and fact-check.
- Use trusted, credible sources to correct incorrect vaccine information.

**Finding 8: Beliefs on science and the roles of media**

Those opposed to vaccines and some vaccine hesitant parents have low trust in medical authorities and science. The perception that the vaccine opposition movement is larger than it actually is has been fueled by media attention.

**For Q&A Document and Resource Catalog**

- Develop messages to combat Dunning-Kruger effect.

**Additional recommendations for consideration**

- Identify and train bank of skilled media commentators in digital, print, radio, and TV to keep vaccine supportive messages relevant and in the news consistently. Ensure the bank is diverse and does not solely rely on doctors and scientists as medical and science authorities are not always trusted sources of information among vaccine hesitant.
- Prepare social media strategies ahead of anticipated vaccine news to take advantage of increased attention in social media.
- Develop social media rapid crisis communication plan for unanticipated vaccine news.

**Finding 9a and 9b: Incorrect vaccine information and politics**

Individuals who oppose vaccination exist across political ideologies. There is vaccine legislation being debated in almost every state as well as on the national stage.

**For Q&A Document and Resource Catalog**

- Develop messages that depoliticize public health generally and immunization specifically.

**Additional recommendations for consideration**

- Encourage policy and grassroots partners to focus on state legislative efforts, rather than national efforts.
- Support vaccine supportive organizations and state level coalitions' efforts to build a bank of credible and compelling spokespersons for legislative public comment.
- Support vaccine supportive organizations and state level coalitions efforts to have messages to counter legislative efforts to expand exemptions.

### Finding 10: Drivers of incorrect vaccine information

Many major organizations that oppose vaccination are personality- and sales-driven.

#### For Q&A Document and Resource Catalog

- There are no message-specific recommendations.

#### Additional recommendations for consideration

- Identify and cultivate series of inner sphere-trusted influencers.
- Encourage partners efforts to develop a more personal voice and narrative as appropriate for parent-facing content and messages.

## Proposed Themes for Q&A and Resource Catalog

The below categories and themes for the Q&A and Resource Catalog are recommended to follow these findings:

### CATEGORY 1: SAFETY

Theme 1a: Vaccine safety

Theme 1b: Vaccine schedule safety

Theme 1c: Vaccine testing, research, and oversight

### CATEGORY 2: CONSPIRACY

Theme 2a: The role of pharmaceutical companies and the government in vaccines

Theme 2b: The role and importance of vaccine policies and mandates

### CATEGORY 3: PSEUDO-SCIENCE

Theme 3a: Natural immunity myth

Theme 3b: Sanitation/hygiene disease reduction myth

Theme 3c: Vaccine-derived disease myths

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## APPENDIX I

# Exemption Advocates Messaging and Science

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## Messaging and Information Used by Exemption Advocates

- Vaccines are administered to healthy people (unlike prescription drugs) and carry risks and may fail to prevent infection (like prescription drugs) – however they are recommended for universal use, mandated by states, required as a condition for school/employment, and shielded from liability.
- The life of a person harmed by a vaccine is as important as the life of a person harmed by an infectious disease.
- Inflexible implementation of one-size-fits-all vaccine mandates places a disproportionate and unequal risk burden on those individuals who are biologically, genetically, or environmentally at higher risk for suffering harm from vaccination.
- There is an unequal sharing of vaccine risks in America due to significant gaps in knowledge and incomplete vaccine safety science research and the inability of doctors to predict ahead of time with any certainty which children and adults will be injured or die from vaccination.
- It is not humane or just to compel everyone to use a pharmaceutical product that carries a greater risk of injury or death for those more vulnerable to suffering harm from use of that product.
- Medical contraindications have significantly narrowed, so few medical conditions qualify. Doctors should have right to refuse to administer vaccines if they have safety concerns.
- Special interest groups are lobbying to restrict/eliminate religious and conscientious exemptions, which is unconstitutional – as are sanctions and discrimination based on vaccination status.
- The VICP has already paid out \$3.7 billion in compensation, even though providers do not comply with adverse reaction reporting and recording.
- The U.S. recommends and mandates more vaccinations than many other countries and has high vaccination rates. Adults are now also recommended vaccines and turned into legal mandates for certain professions (influenza vaccine).
- New vaccines are more expensive and developed for infectious and noninfectious diseases. Most are genetically engineered using lab-altered animal and insect cells and will contain ingredients and experimental technologies designed to hyper-stimulate the immune system. Individual adverse responses to new vaccine will not be fully known until after licensure and widespread use, yet they are being mandated by state HD officials through rule making rather than vote by legislators.
- Parents, teachers, and healthcare providers are asking legitimate questions about 1) why U.S. children receive 4 times as many vaccines as before and other countries do not; 2) whether increased vaccination is a co-factor in poor infant mortality rate and unexplained rise in chronic inflammatory disorders and learning disabilities.
- Experience with the natural infection provides a different, usually longer lasting immunity than artificially acquired immunity from vaccination.
- Depending upon the infectious disease, a combination of naturally acquired and vaccine acquired immunity contributes to “herd” (community) immunity in populations.
- Vaccine reform efforts should uphold vaccine safety provisions (informed consent, records, reporting adverse events) and allow flexible medical exemptions.

### Data Used By Exemption Advocates to Support Arguments

- “Most vaccine-related research focuses on the outcomes of single immunizations or combinations of vaccines administered at a single visit. Although each new vaccine is evaluated in the context of the overall immunization schedule that existed at the time of review of that vaccine, elements of the schedule are not evaluated once it is adjusted to accommodate a new vaccine. Thus, key elements of the entire schedule – the number, frequency, timing, order and age at administration of vaccines – have not been systematically examined in research studies.” 2013 IOM Report Findings
- The 2013 IOM report also concluded that there is not enough scientific evidence to determine if the recommended child vaccine schedule is or is not associated with the development of the following brain and immune system disorders prevalent among children today:
  - Asthma
  - Atopy
  - Allergy
  - Autoimmunity
  - Autism
  - Learning disorders
  - Communication disorders
  - Developmental disorders
  - Intellectual disability
  - Attention deficit disorder
  - Disruptive behavior disorder
  - Tics and Tourette’s syndrome
  - Seizures
  - Febrile seizures
  - Epilepsy
- “Both epidemiologic and mechanistic research suggest that most individuals who experience an adverse reaction to vaccines have a pre-existing susceptibility. These predispositions can exist for a number of reasons – genetic variants (in human or microbiome DNA), environmental exposures, behaviors, illness or developmental stage, to name just a few, all of which can interact. Some of these adverse reactions are specific to the particular vaccines, while others may not be. Some of these predispositions may be detectable prior to the administration of vaccine; others, at least with current technology and practice, are not.” (2012 IOM Report Findings)
- In 2012, the Institute of Medicine (IOM) published *Adverse Effects of Vaccines: Evidence and Causality* and confirmed there are significant gaps in scientific knowledge about the biological mechanisms of vaccine injury and death.
- 99.99% of individuals with disorders or vaccine reactions are restricted from medical exemptions. (CDC Chart of Contraindications and Precautions for Commonly Used Vaccines 2017)
- Only 1-10% of all serious adverse events are reported to VAERS. (Rosenthal 1995)
- In 1984, 23 doses of 7 vaccines were federally recommended and state required for school attendance. By 2017, 69 doses of 16 vaccines recommended birth to 18; 50 doses of 14 vaccines before age 6. (CDC recommended schedules)
- The cost of vaccinating a child with all federally recommended vaccines in a private pediatrician’s office increased from \$80 per child in 1982 to more than \$2,900 per child in 2017. (CDC Price Lists)
- There has been a significant increase in child chronic disease (Delaney 2012) and disability (AAP 2013) at the same time as a significant decrease in VPDs (Yang 2014). (Miller 2011)

- Nearly 6 out of every 1000 babies died before 1st birthday (CIA World Fact Book 2016).
- US has the highest first day infant death rate of all industrialized countries. (Nat'l Geo News 2013)
- Pertussis: Unvaccinated are not primary cause of recent outbreaks (using CDC statements)
- Flu: Very limited 50-60% effectiveness (using CDC statements)

\*Although the link between vaccines and autism isn't a central argument used by NVIC (it is one of many learning disabilities mentioned in the broader argument about increase in chronic disease and disability), this misinformation persists in state and national vaccine debates.



*This publication is supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a Cooperative Agreement. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.*

