

LOGICAL FALLACIES AND VACCINES

WHAT YOU SHOULD KNOW

Have you ever heard someone say, “You have your facts, and I have mine?” In this time of “alternative facts,” it is easy to forget that scientific facts can’t simply be chosen based on convenience or beliefs. Even more difficult, is sorting through a series of statements to ascertain what the facts actually are. Sadly, the result is that *myths*, or false ideas, can be considered as truths. In many cases, the arguments that support myths are based on fallacies. *Fallacies* are errors in reasoning that make an argument unsound. In the case of vaccines, fallacies have been used to intentionally mislead parents seeking information to make sound decisions for their children and families. This sheet describes some common types of fallacies as well as examples of how they have been used to argue that vaccines are not safe.

AD HOMINEM ATTACK

Ad hominem attacks criticize the messenger in the absence of counter-arguments related to the facts being discussed.

Example: When vaccines are suggested to be unsafe because of a conspiracy between government officials and pharmaceutical companies, this is an example of an ad hominem attack because it does not address vaccine safety but rather groups that state vaccines are safe.

Reality check: Vaccine safety is not established by who says vaccines are safe, but rather the result of thousands of studies and years of experience.

STRAW MAN ATTACK

Straw man attacks address a position or fact that was not actually put forth. Oversimplification of a complex subject or statement to make it appear false is an example of this.

Example: When someone responds to statements about vaccines preventing infectious diseases by arguing that they cause chronic diseases, this is an example of a straw man attack because chronic diseases were not part of the original statement.

Reality check: As concerns about vaccines causing chronic diseases have been brought forth, they have been addressed through scientifically controlled studies. Vaccines have not been shown to cause chronic diseases.

CIRCULAR ARGUMENT

Circular arguments use the preliminary assumption as the basis for arriving at the same conclusion.

Example: When someone claims that it is “a fact” that vaccines suppress the immune system and then say that the components in vaccines suppress immunity leading to autoimmune diseases, this is an example of a circular argument.

Reality check: Vaccines prepare the immune system to protect recipients from severe infections; they do not weaken the immune system.

continued >

APPEAL TO IGNORANCE

Appeals to ignorance take advantage of what is not known. Sometimes, they focus on the notion that something has never been, or can never be, proven definitively.

Example: When someone argues against vaccine mandates because we don't know if certain individuals have genetic predispositions that can cause them to be harmed by receiving the vaccine, this is an example of an appeal to ignorance.

Reality check: Science offers a way to understand the world in which we live. However, it does not allow us to definitively rule out that something will never happen. For this reason, many people arguing against scientific facts that they do not believe (or agree with) rely on this fallacy. It is a way to leverage the fear of the unknown. While genetic predisposition can increase risks associated with certain diseases, vaccines present a weakened or partial form of a potentially harmful pathogen. Therefore, even if a genetic predisposition would be found in the future, it is more likely that someone would be harmed by the disease than the vaccine to prevent it.

FALSE DICHOTOMY

False dichotomy arguments incorrectly suggest an "either/or" situation when the options are not mutually exclusive or when more than two options exist.

Example: When someone argues against vaccine safety by stating they are "pro-information," they are suggesting that to believe vaccines are safe means being against information and vice versa. Another example of a false dichotomy related to vaccines occurs when people say that vaccines don't work because fully vaccinated people get sick during vaccine-preventable disease outbreaks.

Reality check: Believing vaccines are safe does not mean a person disregards information; these are not mutually exclusive understandings. Likewise, while vaccines work in most instances, we know they do not work for everyone. We also know that often when a vaccinated person gets the disease, their infection tends to be less severe than that of someone who was not immunized at all. So arguing that vaccines do not work because a vaccinated person got a disease presents a false "all or nothing" situation.



SLIPPERY SLOPE

A slippery slope fallacy argues against a fact or situation by suggesting unlikely, extreme outcomes.

Example: When someone suggests that a vaccine mandate will lead to a state takeover of parental rights when it comes to child-rearing, this is an example of a slippery slope fallacy.

Reality check: Vaccine mandates are not an attempt by the government to control parental decision making but rather to keep communities safe by ensuring that more people are vaccinated. Mandates increase immunization rates and ensure a vaccine supply for those who couldn't otherwise afford vaccinations.

HASTY GENERALIZATION

Hasty generalizations involve jumping to conclusions without reviewing all available evidence.

Example: When someone uses anecdotes of a small group of individuals as evidence for a link between vaccines and autism, this is an example of a hasty generalization.

Reality check: It is reasonable to observe a group of individuals who got vaccinated and were subsequently diagnosed with autism and hypothesize that a causal relationship could exist. However, it is not enough to stop with the observation. To know if there is a causal relationship, controlled studies need to compare people who did and did not get vaccinated to see if those who got vaccinated were more likely to be diagnosed with autism. The good news is this has been done — repeatedly — and no causal relationship has been found.

APPEAL TO PITY

Appeals to pity rely on evoking emotion to deter or replace the discussion of facts.

Example: When someone points out the challenges or stress related to having a child with autism as a way to suggest that vaccines are not safe, this is an example of an appeal to pity fallacy.

Reality check: The challenges that may come from having a child with autism, or any other condition or disease, are worth consideration, and supporting these families is essential. However, this notion has nothing to do with whether or not vaccines are safe.

APPEAL TO AUTHORITY

The appeal to authority fallacy occurs when something is considered to be true simply because a perceived authority said it is so (without evidence) or because it was said to be true by authority figures who are irrelevant or not qualified based on the topic being discussed.

Example: When someone suggests that vaccines cause autism because an actor believes it to be the case, this is an example of appealing to authority.

Reality check: Facts should never be based on who does the studies or who reports on them. The data, how the studies were done, and whether they are reproducible are what is important.

APPEAL TO HYPOCRISY

Appealing to hypocrisy occurs when someone suggests deception or insincerity of the messenger as a way to neutralize or distract from the message.

Example: When someone points at the CDC and the media for reporting that vaccines do not cause autism, this is an appeal to hypocrisy.

Reality check: The CDC formulates messages based on scientific studies and the media reports on them. Either way, who is reporting on the study does not impact the validity of the conclusions. Rather, if the study was not well-controlled or not able to be reproduced, those would be reasons for invalidating the conclusions.

BANDWAGON APPROACH

The bandwagon approach suggests something is true because it is a popular belief; it is accepted by authorities or large numbers of people; or because someone specific, based on their reputation, agrees.

Example: Suggesting that parents everywhere are concerned about vaccine safety is an example of using the bandwagon approach.

Reality check: It is fair to say that many people are concerned about vaccine safety. Public health officials, healthcare providers and many parents can be counted among those concerned about vaccine safety. However, the number of people “concerned about vaccine safety” does not mean that vaccines are unsafe.

CAUSAL FALLACY

Causal fallacies occur when two things are incorrectly identified as being causally associated without enough evidence to do so (false cause); solely based on one occurring before the other (*post hoc*); or because they were found together (correlational fallacy).

Example: When someone argues that aluminum adjuvants in vaccines must cause autism because aluminum adjuvants cause inflammation and inflammation causes autism, this is an example of a causal fallacy.

Reality check: While it would be reasonable to consider whether aluminum adjuvants lead to inflammation that causes autism, the notion that aluminum adjuvants cause autism because of inflammation is not sufficient by itself for establishing causality.



continued >

FALLACY OF SUNK COSTS

Fallacies of sunk costs occurs when a project continues, or is assumed to continue, because of the resources invested to date without consideration of future expenses that will be incurred.

Example: A suggestion that the CDC says vaccines are safe solely because of all that has been invested into promoting them is an example of a fallacy of sunk costs because it does not take into account all that would be lost if vaccines were not safe.

Reality check: The CDC adjusts vaccine recommendations based on new data regularly, including if they find out about any negative consequences. A recent example is when the intranasal influenza vaccine was not recommended during the 2017-2018 influenza season because it was not protecting vaccine recipients as it had previously.

EQUIVOCATION OR AMBIGUITY

Equivocation or ambiguity delivers messages that are intentionally deceitful or misleading.

Example: When someone says that vaccine injuries are actually much higher than reported because a) tens of thousands of reports are made to the Vaccine Adverse Events Reporting System (VAERS) each year and b) vaccine reactions are underreported in the system, this is an example of equivocation because they are intentionally leaving out important contextual details to mislead the reader about the number of vaccine-related reactions.

Reality check: VAERS is a voluntary reporting system, anyone can make reports whether or not they are accurate or found to be associated, and it does not reflect how many vaccines are given without vaccine reactions occurring. For these reasons, the VAERS system can alert scientists and public health officials to a potential issue, but it cannot establish causality or rates of vaccine reactions.

RED HERRING

A red herring fallacy uses a parallel or seemingly relevant argument to distract from the original point being discussed.

Example: When someone is discussing genetic mutations, such as the MTHFR mutation, and then describes how the “poisons” in vaccines provoke an immune response in genetically susceptible children, this is an example of a red herring because the original point related to the mutation, but moved to a discussion of vaccine ingredients as the problem rather than explaining why the genetic mutation is problematic.

Reality check: People with the MTHFR mutation can be vaccinated since the mutation has not been found to be problematic when it comes to vaccinations. Likewise, vaccine ingredients have been studied and are safe in the quantities presented in vaccinations.



Learn more: vaccine.chop.edu

Resources: vaccine.chop.edu/resources

This information is provided by the Vaccine Education Center at Children's Hospital of Philadelphia. The Center is an educational resource for parents and healthcare professionals and is composed of scientists, physicians, mothers and fathers who are devoted to the study and prevention of infectious diseases. The Vaccine Education Center is funded by endowed chairs from the Children's Hospital of Philadelphia. The Center does not receive support from pharmaceutical companies. ©2018 Children's Hospital of Philadelphia, All Rights Reserved. 18046-05-18.