Chapters vs. Books: How Scientific Studies Tell a Story

Sometimes, parents ask us to provide the most recent data on a vaccine topic. This instinct is correct in that when reviewing scientific facts, it is important to ensure that one is looking at the most up-to-date understanding of that topic. However, the publish date is not the only criteria on which to judge the information. Let’s take a closer look.

Science is a series of stories

Scientific publications tell a story. The story has many authors. Together, their contributions show the evolution of humanity’s collective understanding of a topic. Because this understanding builds on the findings of many people over an extended time, by definition, some of the publications important to the story will be older. For example, while paralysis caused by polio was described for centuries, poliovirus was not isolated as the cause of the disease until 1908. Epidemics, or regional outbreaks, continued; but knowing the cause enabled scientists to more quickly understand, treat, and, eventually, prevent the disease.

In the 1940s and 50s, David Bodian and colleagues figured out how poliovirus traveled through the body, and that three types of the virus existed. In the late 1940s, John Enders and colleagues figured out how to grow poliovirus in tissue culture. While early efforts to vaccinate progressed into the 1930s, they were not successful. But the lessons of these early trials and the findings of the labs of Bodian, Enders and many others were important steps along the path to developing the polio vaccines that were eventually licensed in the U.S. during the 1950s.

In 2019, as public health officials work to eradicate polio, they still rely on work done in the early- to mid-1900s. If you look at the references in the article published in 2018 by Michael Famulare and colleagues, “Assessing the stability of polio eradication after the withdrawal of oral polio vaccine,” you will see more than 130 references spanning 60 years.

While the polio story is unlike other scientific stories in its details, it is like all other scientific stories in its progress. For this reason, to understand a scientific topic, it is not only important to look at its most recent papers, but also to understand the stories on which that paper is built.

Beware of the “video clips”

In this age of Instagram, YouTube, and Snapchat, we have become accustomed to telling or seeing stories in short clips. If we are watching a movie trailer, it’s OK not to know the entire story because we will learn it when we see the film. But numerous examples exist in the 24-hour news cycle where short clips of an event shared by a bystander do not accurately portray the full story. Often these clips are shared widely, people react quickly, and the truth of what actually happened might or might not catch up.

New studies are like video clips in that they represent a snapshot of a larger field. For this reason, the findings in recent papers must be evaluated in the context of the current understanding of a field. Unexpected results or or extraordinary claims, in particular, should be interpreted with caution until they can be reproduced by other scientists.

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Trivia Corner

What does an epidemiological study determine?

a.) The groups of people most likely to get a disease
b.) The age group most likely to get a disease
c.) The number of people who get the disease and the number who die from it.
d.) All of these

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For example, if we continue with the polio story, in 1994 Elswood and Stricker published an article in the journal *Medical Hypotheses*, titled “Polio vaccines and the origin of AIDS.” The authors hypothesized that polio vaccines tested in Africa between 1957 and 1959 were the cause of the AIDS epidemic. They had discussed this idea in other venues well before the scientific publication in 1994; for example, media reports aired at least two years prior to their published study. It took a few years for scientists to test the hypothesis and conclude that the oral polio vaccine was not the origin of AIDS as had been suggested.

So, while it is important to get the latest information, it is also important to review it in context. If it seems to stand out from the existing body of literature, it is important to look for it to be reproduced before accepting it as the final word — or said another way, take in the full movie.

Resources for additional reading

The History of Vaccines project, developed by the College of Physicians of Philadelphia, offers a timeline that shows key developments on the road to understanding and overcoming polio. The site also describes the details of the polio vaccine and AIDS story.

News & Notes

**CDC Launches New Video Series – How Vaccines Work**

The Centers for Disease Control and Prevention (CDC) recently launched a new video series for parents. *How Vaccines Work* introduces viewers to baby Jack and his parents as they get answers to common vaccine questions, including the importance of vaccinating on schedule.

The first video *How Vaccines Work: How Do Germs Make Your Baby Sick* explains how germs can infect babies, and how vaccines work with your immune system to protect you from disease. You can find this video and many other influenza and influenza vaccine resources at cdc.gov/flu.

3 Actions to fight the flu

Flu season is in full force. While it may seem like the flu is everywhere, you can take steps to protect yourself and your family. The CDC offers three important tips for fighting the flu:

1. Get yourself and your family vaccinated.
2. Take everyday preventative actions to help stop the spread of flu viruses.
3. Take antiviral drugs if your doctor prescribes them.

Vaccine hesitancy identified as global health threat

Each year, the World Health Organization identifies 10 issues that will demand the most attention in the coming year. In addition to infections like pandemic flu, Ebola and Dengue, this year’s list also includes drug resistance and vaccine hesitancy. Check out the full list or find out more about each item on the list by visiting the WHO’s website.