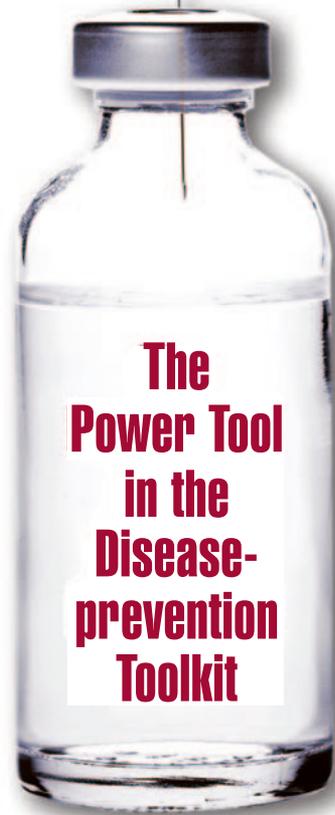


# VACCINES



**I**oana Czegledi was a rosy-cheeked Romanian girl with blond hair who would have been 10 years old in May of 2017. Instead, the previous month, she was wracked with fever, her skin covered with spots, and her body unable to keep food down. Despite the best efforts of her healthcare team, she died of complications from measles.<sup>1</sup> Ioana had been born with medical problems that made it dangerous for her to be vaccinated. Her mother did her best to protect her from exposure to contagious diseases, but because Ioana became badly dehydrated that April, she had to be admitted to the pediatric hospital in nearby Timisoara. It was there that she contracted the disease that so quickly killed her; she was one of at least 59 Romanians who have died since the measles epidemic began in 2016.

Prior to the development of a measles vaccine, which became available in the United States in 1963, it



was estimated that most U.S. children contracted measles by the age of 15, and that somewhere between three and four million individuals in the U.S. were infected annually, resulting in 400 to 500 deaths.<sup>2</sup> In 2000, the U.S. declared measles eliminated, providing an excellent illustration of the efficacy of vaccines for reducing the **mortality\*** and **morbidity\*** associated with communicable diseases. Likewise, other diseases have been at least partially controlled by vaccines including diphtheria, whooping cough, and polio—and smallpox has been declared eradicated worldwide.<sup>3</sup>

Yet despite these apparent success stories, the powerful tool of vaccination has not yet realized its full potential. Ioana's story is just one of many tragic cases, and measles remains a serious health threat in parts of the world today. The World Health Organization estimates that despite an 84 percent decrease in measles deaths between 2000 and 2016, at least seven million people contracted

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measles infections in 2016.<sup>4</sup> The World Health Organization's tracking of global vaccination coverage also indicates that in the past several years, the proportion of children, worldwide, who have received recommended immunizations has not increased, despite efforts, but has instead remained steady at 85 percent.<sup>5</sup>

Influenza is another communicable disease that, to many, seems unpleasant but not especially dangerous. Thus, despite easy access to annually updated influenza vaccines in many parts of the world, getting immunized isn't a high priority—it's common to hear people say, "I haven't gotten around to it yet, but I need to get it done"; or "I think I'll just skip it this year; I didn't get it last year, and I was fine." The potential danger of this type of thinking is highlighted by the experience of two Texas (U.S.) physicians whose healthy and active son, Leon, died of the flu on Christmas Day in 2017.<sup>6</sup> He had begun to feel sick just two days earlier, and in less than 48 hours, he was dead. The sad irony is that he was scheduled to receive a flu vaccine on January 3 when his 2-year-old brother would also be receiving needed vaccinations. In an interview, his mother said, "It wasn't even on my radar as something that I really, really needed to prioritize. . . . it just slipped through the cracks." The U.S. Centers for Disease Control and Prevention (CDC) reported that Leon was just one of 180 children killed by the flu during the 2017-2018 season, and that some 80 percent of those children had not been given a flu shot.

Scientific evidence clearly demonstrates that vaccines reduce the mortality and morbidity associated with communicable diseases but, despite the documentation regarding their safety and efficacy, recent *declines* in vaccination rates<sup>7</sup> have been noted in some areas of the globe. This, in part, explains the ongoing measles threat—we are now seeing resurgences in several diseases such as measles and whooping cough (pertussis) that were previously well-controlled or largely

eradicated.<sup>8</sup> The erosion of progress against preventable diseases is well illustrated by the fact that 98 countries, from Ukraine to the Philippines, reported more measles cases in 2018 than in 2017.<sup>9</sup> In some parts of the world, getting necessary vaccines can be difficult. For example, in the midst of Syria's civil war, it has been estimated that at least 400,000 children under the age of 5 have not yet been vaccinated against polio.<sup>10</sup> Internal

**The personal beliefs, knowledge, and social norms related to vaccine hesitancy are almost always linked to faulty data which, unfortunately, sometimes come through generally trusted channels (friends and family, religious groups, and social media).**

conflicts have also harmed vaccination efforts in places like Nigeria and Pakistan.<sup>11</sup> As a result, new cases are being recorded, although only those in eastern Syria have been numerous enough to be labeled an outbreak. Disease outbreaks in the U.S. and Europe are less likely to be due to lack of access and instead largely reflect personal beliefs and misinformation.

Inability to *access* vaccines versus *choice* not to vaccinate—these broad and very different explanations illus-

trate that failure to vaccinate is not a single-solution problem. The reasons that people fail to get recommended vaccines for themselves and their children include religion, resistance to influence of leaders/lobbies (pro-vaccine), objections to government and institutional policies (mandates), personal beliefs, social norms, knowledge/awareness, lack of trust in healthcare providers, schedule/mode of administration, geography, and economics.<sup>12</sup> The personal beliefs, knowledge, and social norms related to **vaccine hesitancy\*** are almost always linked to faulty data which, unfortunately, sometimes come through generally trusted channels (friends and family, religious groups, and social media). Perhaps the best example of this is the now infamous paper published by Andrew Wakefield and his colleagues in 1998 that linked the measles, mumps, and rubella (MMR) vaccine to autism.<sup>13</sup> Subsequent researchers were unable to replicate his findings, and the U.K.'s General Medical Council eventually concluded that Wakefield had acted in a dishonest and irresponsible manner in following data collection and analysis protocols; his medical license was revoked, and the paper was retracted by the *Lancet*, the medical journal that had published it (this means that it is no longer considered to be part of the scientific literature, due to scientific misconduct—specifically, fraud and data misrepresentation). Nevertheless, the false assertions in that paper had already made an impact, and some continue to believe its debunked claims. Addressing immunization gaps due to availability is difficult (requiring resources and investment), but the way to deal with this problem is straightforward. Interventions aimed at changing attitudes and personal beliefs have proved more problematic, however—they have often been ineffective and in some cases have even produced outcomes that were the opposite of those intended.

An example of this reverse effect was described by Nyhan and colleagues<sup>14</sup> whose MMR vaccine study

included a nationally (U.S.) representative group of 1,759 parents. Participants were randomly assigned to interventions that included (1) evidence that the MMR vaccine does not cause autism, (2) information on the dangers of the diseases the MMR vaccine protects against, (3) pictures of children with MMR vaccine-preventable diseases, and (4) a dramatic narrative about an infant who nearly died from measles. All of the interventions failed to increase parents' intentions to vaccinate their children. Providing evidence that the vaccine was not linked to autism successfully reduced erroneous beliefs about such a link but, for parents who held the most negative attitudes about vaccines at the start of the study, intention to vaccinate still decreased despite the fact that their beliefs were now more accurate. This is known as **confirmation bias**.<sup>\*</sup> Further, parents who saw pictures of children with MMR vaccine-preventable diseases expressed greater beliefs about a vaccine-to-autism link afterwards, and those who heard about the infant who nearly died of measles became more convinced that the vaccine itself had serious side effects. These surprising results provide a window on just how challenging it can be to change not only intentions (and their relevant behaviors), but also the underlying beliefs.

But *why* is it so difficult to debunk erroneous beliefs about vaccines? Lewandowsky and colleagues<sup>15</sup> summarize several cognitive processes that are involved in people's acceptance and retention of misinformation. First, misleading information isn't always easy to identify—it can be difficult to know whether the information we encounter is reliable or not. Second, when attempting to make this determination, we weigh new information against what we already believe to be true. Information that doesn't match what we already believe is more difficult to process<sup>16</sup> and also elicits negative feelings,<sup>17</sup> creating a bias against accepting informa-

tion that is incompatible with our existing beliefs. Lewandowsky also notes that coherence of the information (whether it seems to fit together in an organized and reasonable way), whether others in our social groups believe it, and the perceived credibility of the source also contribute to whether it is accepted.

Besides these cognitive factors, an additional problem exists with regard to vaccines—their very success may now be contributing to people's hesitancy regarding them. Taking the U.S. as an example, most vaccine-preventable diseases are at historically low levels, meaning that young parents have never seen the ravages of once-common communicable infections firsthand and thus have less sense of urgency regarding getting their children vaccinated.<sup>18</sup> When this

is added to the cognitive factors already described, it is not surprising that shifting the beliefs, attitudes, and behaviors related to vaccines is a difficult task.

What, then, can be done at the school-level to ensure that students are protected by vaccinations? Schools should have in place policies regarding vaccine requirements that must be met for entrance and continued enrollment for students as well as administrators, teachers, staff, and volunteers who will have contact with students (see Sidebar 1). The literature<sup>19</sup> provides recommendations that, while not guaranteed to eliminate vaccine noncompliance, may be useful in moving individuals toward better adherence to vaccination recommendations. Let's examine these in more detail:

### Box 1. Terms\*

**Confirmation bias** – selectively using new evidence to support existing beliefs and prejudices and dismissing information that does not support these ideas. For more, see <https://www.psychologytoday.com/us/blog/science-choice/201504/what-is-confirmation-bias>.

**Herd immunity** – a population's level of resistance to a contagious disease that is determined by the number of individuals who have been vaccinated and are already immune to the disease. This protects those who are unable to be vaccinated due to age, compromised immune systems, or complications from disease, and helps to retard the spread of the disease. For more, see <https://www.vaccines.gov/basics/work/protection>.

**Mortality** – relating to death or death rates.

**Morbidity** – state or rate of disease.

**Vaccine hesitancy** – beliefs about vaccines that range from uncertainty about their benefits to outright rejection of them despite access to immunization services. Hesitancy grows out of a complex set of factors that can influence individuals and groups to hold certain beliefs about vaccines and demonstrate a lack of confidence in data or complacency toward the need for them. For more information see [https://www.who.int/immunization/programmes\\_systems/vaccine\\_hesitancy/en/](https://www.who.int/immunization/programmes_systems/vaccine_hesitancy/en/).

\*Definitions compiled from the following sources: Shahram Heshmat, "What Is Confirmation Bias?" *Psychology Today* (2015): <https://www.psychologytoday.com/us/blog/science-choice/201504/what-is-confirmation-bias>; U.S. Department of Health and Human Services, "Vaccines Protect Your Community" (2019): <https://www.vaccines.gov/basics/work/protection>; Dictionary.com: <https://www.dictionary.com>; and World Health Organization, "Addressing Vaccine Hesitancy" (September 2018): [https://www.who.int/immunization/programmes\\_systems/vaccine\\_hesitancy/en/](https://www.who.int/immunization/programmes_systems/vaccine_hesitancy/en/).

**Keep good records.** Vaccinations need to occur before students are enrolled in school. Check with the state or government department of health Websites for specific guidelines about what is needed prior to enrolling in school (see Box 2). Conduct regular assessments of which vaccinations students at your school have had. Knowing your school's vaccination rates will help to determine whether there is a problem that needs to be addressed (and many countries require schools to keep vaccination records). These records are also useful in the case of a disease outbreak.

**Ensure accessibility.** In some countries, the socialized healthcare system ensures that vaccinations are accessible to all, but this is not true everywhere. Even so, most vaccines are not prohibitively expensive, but screening to identify and remove existing financial barriers will be helpful. County (or other regional) immunization clinics are one good source for low-cost vaccinations, and urgent-care clinics sometimes contract with schools to provide discounts on required vaccines. Accessibility has been shown to increase the numbers of individuals receiving the vaccine.<sup>20</sup>

**Provide vaccinations on-site.** Students need to have obtained certain vaccines before they are allowed to enroll in school. Financial as well as time-related accessibility may be enhanced by making vaccinations available on-site, perhaps by hosting an annual "vaccination day" when a school nurse, delegating nurse (administers medication), physician, or public-health nurse can provide at least some necessary vaccinations for students. These might include HPV (human papilloma virus), influenza, Tdap (tetanus, diphtheria, pertussis), Meningococcal, Hepatitis (A/B), Varicella (chickenpox), MMR (measles, mumps, rubella) or necessary boosters. Establish the expectation that vaccinations will be obtained on this day (make this the default) to encourage parents to have their children participate; more detailed discussions with parents around the topic should follow throughout the school year,

## Sidebar 1. Sample Exclusion Letter for Schools

*(To be used for students who were temporarily admitted/retained in school)*

Month, Date, Year

Dear *(Parent or Guardian)*:

Students must be vaccinated according to *(Insert state or government requirements)* to attend school.

A review of *(Child's Name)* vaccination record shows that we do not have record of him/her receiving the following vaccination(s):

\_\_\_\_\_

Please have your child vaccinated and/or provide proof that your child already has received the vaccination(s).

Because *(Child's Name)* was temporarily admitted to school, if you do not provide proof that your child has received the vaccine(s) listed above, he/she will **NOT** be allowed to attend school after *(DATE)*.

### **Where do I get more information? Where do I get forms?**

For more information about immunization requirements, visit *(Insert Weblink to requirements)*

You can reach us at *(Insert telephone contact number)* for help or more information.

Sincerely,

*Name of School Representative*

(Print name and title of school administrator)

## Box 2. Weblinks to Schedules for the Most Commonly Recommended Immunizations

- Children From Birth through 6 Years Old (<https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html>)
- Preteens and Teens (<https://www.cdc.gov/vaccines/schedules/easy-to-read/adolescent-easyread.html>)
- Childhood Vaccine Assessment Tool (<https://www2a.cdc.gov/vaccines/childquiz/>)
- Adult Vaccine Assessment Tool (<https://www2a.cdc.gov/nip/adultimmsched/>)
- WHO Immunization Schedule by Country ([http://apps.who.int/immunization\\_monitoring/globalsummary/schedules](http://apps.who.int/immunization_monitoring/globalsummary/schedules))

and the guidelines outlined later in this list will help school administrators frame the content of these sessions (see Box 2 for links to Schedules for the Most Commonly

Recommended Immunizations).

**Clearly define vaccination requirements.** Data show that when nonmedical exemptions are easier to get, disease rates are higher.<sup>21</sup> Because states or local governments



have various requirements for school enrollment, schools should set policies that make vaccinations the “default option” and make it more difficult for parents to file an exemption with the school. The Seventh-day Adventist Church does not support religious waivers—the denomination’s current guidelines on immunizations can be found at: <http://www.adventist.org/en/information/official-statements/guidelines/article/go/-/immu>

nization (see Box 3). Making exemptions more difficult to obtain can be an effective strategy<sup>22</sup> for improving vaccination rates.

**Engage in follow-up contacts.**

Have a school nurse or other school official make follow-up phone calls to families whose students are not vaccinated and have not been admitted to school (or have been sent home). Sometimes the personal request from a trusted and valued member of the social network can make a difference. Parents will also need to be made

aware of the requirements for their unvaccinated child(ren), should they be exposed to disease or in case an outbreak occurs (e.g., length of time they will need to be kept home from school). Local health departments may have pamphlets or other guidelines for schools on this topic.

Research also shows that having more in-depth discussions with hesitant parents can help improve vaccination rates.<sup>23</sup> During these discus-

sions, the techniques described later in this list can be used.

**Ensure consistent messaging.** Educate teachers (and other school officials) about the importance of vaccinations, including their efficacy and safety. This will help ensure that misinformation isn't accidentally shared and that clear and consistent messages are provided to parents and students—including the role-modeling of immunization compliance. It may be useful to have occasional articles in the school newspaper or on the school Website about the importance of being up-to-date on vaccinations—this presents a cohesive message from the school's administration. Information should also be included in the health-science curriculum.

Data indicate that when messages across healthcare providers and other trusted authorities are consistent, those messages are more compelling, and adherence is better.<sup>24</sup> Parents should consult with their family physician for guidance. The National Association of School Nurses' Statement on Vaccinations is also a good resource: <http://www.nasn.org/advocacy/professional-practice-documents/position-statements/ps-immunizations>.

**Don't reinforce myths.** When attempting to correct misinformation, it's easy to inadvertently reinforce the very thing you're trying to challenge by repeating it unnecessarily.<sup>25</sup> Therefore, emphasize correct information without repeating the misinformation, if possible. If inaccuracies must be addressed, preface the discussion with an explicit warning that *this is false information*. This will encourage people to be mentally vigilant and less likely to be influenced by the misinformation.

**Fill the information gap.** When fallacies are debunked, this creates a gap in knowledge, which makes it important that this gap be filled with accurate data. Provide correct information about the efficacy and safety of vaccines immediately after misinformation has been discredited. (See Sidebar 2).

### Box 3. General Conference of Seventh-day Adventists Official Statement Guidelines on Immunization

"The Seventh-day Adventist Church places strong emphasis on health and well-being. The Adventist health emphasis is based on biblical revelation, the inspired writing of E.G. White (co-founder of the Church), and on peer-reviewed scientific literature. As such, we encourage responsible immunization/vaccination, and have no religious or faith-based reason not to encourage our adherents to responsibly participate in protective and preventive immunization programs. We value the health and safety of the population, which includes the maintenance of 'herd immunity.'

"We are not the conscience of the individual church member, and recognize individual choices. These are exercised by the individual. The choice not to be immunized is not and should not be seen as the dogma nor the doctrine of the Seventh-day Adventist Church."

\* General Conference of Seventh-day Adventists Official Statement Guidelines on Immunization (March 2, 2015): <https://www.adventist.org/en/information/official-statements/guidelines/article/go/-/immunization/>.

### Sidebar 2. Additional Information on Vaccines and Immunizations

#### Valuable Resources for Schools

- Centers for Disease Control and Prevention (CDC) (<http://www.cdc.gov/>)
- CDC's Infectious Disease National Centers (<http://www.cdc.gov/ddid/centers.html>)
- CDC International Traveler's Line (1-877-FYITRIP or 1-877-394-8747) (<https://www.nc.cdc.gov/travel>)
- Ethical Issues and Vaccines (<http://www.historyofvaccines.org/index.php/content/articles/ethical-issues-and-vaccines>)
- GAVI – The Global Alliance for Vaccines and Immunizations ([http://www.who.int/workforcealliance/members\\_partners/member\\_list/gavi/en/](http://www.who.int/workforcealliance/members_partners/member_list/gavi/en/))
- Institute for Vaccine Safety—John Hopkins University (<http://www.vaccinesafety.edu/>)
- Parents of Kids with Infectious Diseases (PKIDS) (<http://www.pkids.org/>)
- The Vaccine Page (<http://www.vaccines.com/>)
- World Health Organization Vaccines (<http://www.who.int/topics/vaccines/en/>)
- Patti Herring and Elizabeth Holzhauser, "Important Facts About Immunizations," *The Journal of Adventist Education* 65:3 (February/March 2003): 9-16: <http://circle.adventist.org/files/jae/en/jae200365030908.pdf>

#### Anti-Vaccination Arguments Schools Might Encounter

- Informed Consent Action Network (<https://www.icandecide.org>)
- A Voice for Choice (<http://avoiceforchoice.org/>)
- ProCon.org (<https://vaccines.procon.org/>)

**Keep it simple.** Presentations should be brief and straightforward, avoiding jargon and including illustrative materials (such as diagrams or animations) that help to illustrate important concepts. Make sure that the correct information and desired message are more compelling than and at least as easy to remember as the misinformation. In fact, research has consistently shown that making new (and true) information as easy to process as possible, and focusing on it as much as possible (versus focusing on the myth to be debunked) is an effective strategy for correcting erroneous beliefs.<sup>26</sup> This can be challenging because misinformation is often fear-based, and human beings tend to pay attention to, and remember, things about which they feel anxious. Clear directives that show people what they can do to address the anxiety-producing situation (e.g., getting a simple vaccine to avoid a dangerous disease) can help mitigate their apprehension.

**Support existing worldviews.** As much as possible, present information in a way that is consistent with the worldview and values of your audience—this makes linkages to existing knowledge easier and recall more effective.<sup>27</sup> With regard to religious practice, this is not generally a problem for Seventh-day Adventists. But people hold many values other than religious values. Some parents may believe, for example, that natural immunity is preferable for their children—even while acknowledging that vaccines are safe and effective. This unlocks the opportunity to introduce other values into the discussion—perhaps the value of caring for our community and the importance of **herd immunity\*** for protecting immunocompromised individuals who cannot be immunized for medical reasons.

The HPV (Human Papillomavirus) vaccine is unique because objection to this vaccination is often made on the basis of religious or moral

grounds.<sup>28</sup> Particularly in schools (and families) that encourage sexual abstinence prior to marriage, parents may feel that their child doesn't need this vaccination because he or she is not currently sexually active and is not going to engage in promiscuous behavior.

These attitudes reflect a misconception about the vaccine (that it is only necessary if teens and young adults are sexually active) and so reframing in terms of documented long-term risks may be helpful (e.g., the U.S. Centers for Disease Control estimates that every sexually active adult in the U.S. will be infected by HPV at least once in his or her life, and HPV infections account for ~27,000 cancer diagnoses annually including middle throat, cervical, and anal<sup>29</sup>).

**Help people assimilate the information.** If information must be presented that is inconsistent with parental values or worldview, provide assistance to help them assimilate it, perhaps by presenting it in a worldview-affirming manner (e.g., focusing on benefits rather than risks or reminding parents of biblical texts such as 1 Corinthians 6:19, “Do you not know that your bodies are temples of the Holy Spirit . . .” (NIV).<sup>30</sup> While this text is sometimes used to support arguments against vaccinations, it should be noted that the Bible also admonishes care for one another (Philippians 2:3-4) and recognition of our responsibility toward others (Galatians 5:13).

We are fortunate to have vaccinations as a tool for helping us to control and eradicate the many communicable diseases that have played such a devastating role in human history. Misconceptions about them, and hesitancy to use them, are understandable, but recognizing parental fears does not mean we should accept this state of affairs. The best medical advances are effective only if we use them. As Korean-American physician and anthropologist Jim Yong Kim (former President of Dartmouth, former head of the WHO's HIV/AIDS department, and

president of the World Bank from 2012-2019) said, “The real rocket science in health care is how you organize human beings to actually deliver what we already have....”<sup>31</sup> We have many effective vaccines. We must use them, and help others to do the same. ✍

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