

The Impact of the Anti-Vaccination Movement and Vaccine Hesitancy on the Health of the Child

Janet Green, Julia Petty, Lisa Whiting, Fiona Orr, Karen Walker, Ann Marie Brown, Elaine P. Crisp, Cathrine Fowler, and Linda K. Jones

It has been claimed that vaccinations (also known as immunizations) have made the greatest contribution to global health than any other measure (Greenwood, 2014). The COVID-19 pandemic, or more specifically, the coronavirus SARS-CoV-2 virus outbreak, has led to a mass, global vaccination program that has started in many countries around the world. However, despite the success of many previous vaccination programs, there is a concerted effort by anti-vaccination groups to thwart the success of the vaccine rollout. Politicians and celebrities have created confusion by fuelling inaccurate, non-science-based information, even though the science is clear and the link between vaccination and autism has been debunked (Gould, 2017).

Few medical and nursing professionals and generations of the general public can remember the panic associated with the poliomyelitis (polio) epidemic and the rows of negative pressure ventilators needed to treat those who contracted polio. These are photographic

Green, J., Petty, J., Whiting, L., Orr, F., Walker, K., Brown, A.M., Crisp, E.P., Fowler, C., & Jones, L.K. (2021). The impact of the anti-vaccination movement and vaccine hesitancy on the health of the child. *Pediatric Nursing*, 47(5), 216-225, 243.

Few topics in medicine have been studied more thoroughly than vaccines. The science is clear on the public and global health benefits of vaccinations; however, the topic still results in vigorous discussion about their efficacy, safety, and possible adverse effects. Anti-vaccination groups and conspiracy theorists have found a place in the online world and on social media sites to spread misinformation. Parents want the best for their children, but when they are influenced by the anti-vaccination movement, the health of their children when not vaccinated can be compromised. They also present a risk to the health of others in the community. Health professionals, including nurses, have a responsibility to educate themselves and others about the science of vaccination, and take active steps to dispel misinformation.

Key Words: Childhood vaccinations, anti-vaccination movement, vaccine hesitancy, immunizations.

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PNJ 2114

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Deadline for submission:
October 31, 2023
1.4 contact hour(s)

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reminders; however, in contemporary society, those photographs do not convey the visceral fear that was experienced at the time (Kurlander, 2020). U.S. President Franklin D. Roosevelt, who had himself been paralysed by polio, founded the National Institute of Infant Paralysis, which later became known as the March of Dimes. President Roosevelt encouraged Americans to send their dimes to the White House to fund the treatment of polio victims and research a cure (Kurlander, 2020).

The purpose of this discussion paper is to outline the rise of the anti-vaccination movement and vaccine hesitancy, and to consider the implications for the health of children and the risk the unvaccinated child presents to other vulnerable populations, such as older adults and those with comorbidities. With the COVID-19 vaccine being distributed throughout the world, this paper will be a timely reminder and a snapshot of the issues related to the importance of vaccination. Sadly, a consequence of COVID-19 is orphanhood, which is the death of one or both parents or caregivers from COVID-19. The rapid nature of COVID-19 death means that COVID-19 can lead to death within weeks, and this means that children are not prepared for the trauma they will experience when a parent or caregiver dies (Hillis et al., 2021). Many of these deaths and orphanhood, especially in industrialized nations, could have been prevented with vaccination.

The Science of Vaccination

Immunity is the ability of the body to tolerate the presence of material that belongs to itself and to eliminate foreign material (Simon et al., 2015). At birth, the infant is exposed to an enormous number of environmental antigens. This predisposes them to a wide range of bacteria, therefore risking infection. The innate immune system is immature at birth, so the newborn is more prone to bacterial and viral infections (Simon et al., 2015). As the young child develops, the immune system begins to mature but remains at risk from infection

in the early years. As the child grows, the immunity is shaped by varied exposure to infections, and of course, vaccinations when administered.

Immunity can be identified as active or passive. Passive immunity is the transfer of an antibody produced by the mother to the fetus. This provides temporary protection of two months to one year; therefore, the baby requires vaccination thereafter. Active immunity is achieved by the person's own immune system, by recovering from an infection and is often lifelong (Simon et al., 2015). An antibody-antigen reaction is a specific chemical interaction between antibodies and antigens during an immune reaction. An antibody is a Y-shaped protein that binds together in a 'Lock and Key' fashion (Ghose, 2020) to foreign invaders, such as bacteria or viruses. The antibody can be referred to as an immunoglobulin (Ig) produced by the immune system in response to an antigen (foreign substance). Each antigen has a specific response due to its distinctive surface, or epitopes (MacDonald, 2017).

Vaccines contain antigens to stimulate the B lymphocytes of the immune system to respond by producing plasma cells secreting specific antibodies (primary response). Some of these can become memory cells to assist in future recognition of the illness (secondary response) (MacDonald, 2017). The aim of a vaccine is to produce a protective response to a specific target pathogen without the risk of acquiring the disease (Vetter et al., 2018). Vaccines are classified into two basic types: attenuated and inactivated (Oxford Vaccination Group, 2021).

Attenuated vaccines are those that are alive. These vaccines contain a version of the virus or bacteria that has been weakened so that the person receiving the vaccination does not develop serious disease (Vetter et al., 2017); that is, they do receive immunity but do not develop illness. Examples of live attenuated vaccines are measles, mumps, and rubella (MMR) and varicella (chicken pox) (Oxford Vaccination Group, 2021). Inacti-

vated vaccines are made by inactivating or killing the germ in the process of making them. They can be made up of whole viruses or bacteria in small amounts. An example of this is polio vaccine. These vaccines respond differently than the live vaccines, therefore requiring multiple vaccinations (Vetter et al., 2018).

Although vaccinations have been proven to be safe, reactions can occur. Most reactions from vaccinations are minor and often short-lived. These can be local reactions, such as redness and pain at the site, occurring shortly after injection. A local reaction means the vaccine is interacting with the immune system (Australian Academy of Science, 2020). Other reactions, such as fatigue, slight fever, and general aches and pains, may also occur. Some side effects may take up to 7 to 12 days to identify if an attenuated vaccine has been administered because extra time is required to induce an immune response (Australian Academy of Science, 2020). Some adverse reactions have been incorrectly linked to the administration of the vaccine, such as the MMR and the link to autism. Many common reactions to vaccinations are often not caused by the vaccine but occur by chance at the time of administration (Australian Academy of Science, 2020). Serious side effects are rare.

The COVID-19 Vaccine

The COVID-19 Messenger-RNA (mRNA) vaccine represents a new approach to vaccines. Although other vaccines rely on inactivated pathogens to trigger an immune response, the COVID-19 mRNA vaccine gives cells the instructions to make a small piece of the 'spike' protein found on the surface of the virus. As the protein has been made, the body's cells break down the instructions and remove them from the body (Centers for Disease Control and Prevention [CDC], 2020). The body's cells display the protein fragment on its surface, thereby prompting the immune system that recognizes the protein as foreign and thereby building an immune response and making antibodies (CDC, 2020). It is noteworthy

thy that conspiracy theorists and anti-vaccination groups claim that vaccines alter the body's DNA. In fact, the COVID-19 mRNA never enters the nucleus of the cell; therefore, it does not encounter the cellular DNA (CDC, 2020).

It has been established that children's rates of hospitalization and death due to COVID-19 are significantly lower than adults (World Health Organization [WHO], 2020a). However, a rare disease named multisystem inflammatory syndrome that causes critical illness in children has been linked to COVID-19 (WHO, 2020a). Although the priority is to target high-risk groups in the adult population, vaccination against COVID-19 for children may be required. It has been recommended that older children and adolescents who are more at risk of severe and fatal disease than younger children be vaccinated first, and then extend the vaccination to younger children (Wong et al., 2021). The CDC (2021) recommends everyone 12 years and older should get a COVID-19 vaccination. Currently there are three major vaccines available. The U.S. Food and Drug Administration (FDA) has given the Pfizer-BioNTech COVID-19 vaccine emergency use authorization for children ages 12 through 15 years. The FDA has also approved this vaccine, now called Comirnaty, to prevent COVID-19 in people age 16 years and older. The Pfizer-BioNTech vaccine has been authorized for young people aged 16 and above, and trials for those 12 to 15 have been announced by Pfizer (Jenco & Koriath, 2021). Pfizer and Moderna have been given permission to increase the size of their clinical trials for children ages 5 to 11 years. Moderna's vaccine has received emergency use authorization (EUA) for those aged 18, and Moderna has started trials on children from 6 months to 12 years (Jenco 2021). The KidCOVE Study conducted by Moderna is researching a COVID-19 vaccine that may protect children who are ages 6 months to 11 years (Kaiser Permanente Research, 2021). Johnson and Johnson/Janssen has also received EUA for individuals 18 years and older (Verdict, 2021) to test its vac-

cine on newborns, pregnant women and those with a compromised immune system.

The Rise of the 'Anti-Vaxxer'

The anti-vaxxer movement is almost as old as the history of vaccination itself. Edward Jenner, the originator of the smallpox vaccine, faced opposition from both physicians and clergy, and called these people 'anti-vaxx' in the early 19th century (Howard, 2003). The medical men were a powerful opposing force, using the developing power of the 'press' to spread their arguments against the procedure, arguing that the safety of vaccination could not be proven (Howard, 2003).

As smallpox case numbers dropped significantly, the efficacy of the vaccine became clear, and this first wave of opposition waned. People eagerly took up vaccination against this disease. However, the poorer classes were unable to afford treatment, and unhygienic procedures often led to secondary infections leading to a drop in vaccination rates among the working class. To counteract this, the United Kingdom government passed an Act in 1853 making smallpox vaccination mandatory for infants, with parents facing a fine or imprisonment for disobeying the law. Similar laws were also passed in the United States to mandate vaccination (Howard, 2003), resulting in an organized and formal anti-vaccination movement on both sides of the Atlantic. Both middle- and working-class people fought against what they saw as increasing coercion by the elite forces of government and medicine, threatening their rights and liberties (Durbach, 2005).

In the United Kingdom, the Leicester Anti-Vaccination League formed in 1869, and mass demonstrations of up to 100,000 people protested in the streets of Britain (Wolfe & Sharp, 2002). This League and its American counterpart, the Anti-Vaccination League of America, claimed that improved hygiene was the cause of decrease in disease, rather than the vaccinations them-

selves. To address these fears, the British Vaccination Act 1898 introduced the concept of 'conscientious objection' to mandatory vaccination, which was picked up rapidly by the antivaccination activists (Howard, 2003).

In the early years of the 20th century, a series of devastating epidemics, namely, smallpox, diphtheria, cholera, measles, and polio, prompted a greater uptake of vaccines despite the antivaccination lobby. Vaccination programs for an increasing number of diseases led to what became known as 'herd immunity.' However, several tragic events involving contaminated and faulty vaccines eroded public trust and confidence (Flaherty, 2011; Wolfe & Sharp, 2002). These disasters added to the argument against vaccination. Public fear was also compounded by apathy, as vaccines became 'victims of their own success' (Camargo, 2020, p. 2). As herd immunity grew, once-common diseases became less visible in the community. The importance of vaccination began to wane, leading to rejection or at least, hesitancy (Smith, 2017). This situation deteriorated further with what has been described as "the most damaging medical hoax of the last 100 years" – Andrew Wakefield's infamous study (Wakefield et al., 1998) linking the measles-mumps-rubella (MMR) vaccine to autism (Flaherty, 2011), later proven to be completely unsubstantiated. Moreover, autism is a condition with no known etiology and no cure and affects children in the age range during which most vaccines are administered.

Nonetheless, for parents gripped to discover their child had developed autism and searching for something to blame, this study provided them with a reason they could understand (Flaherty, 2011). Parents began to refuse the MMR vaccine, and it seemed the proven benefits of vaccination against these common childhood diseases were outweighed by the tiny possibility they might cause another condition that would be life-changing. Vaccination rates consequently plummeted (Smith, 2017).

Today's antivaccination move-

ment may seem to fly in the face of science, but it may simply be due to hysteria, a response that depends not only on what is happening now, but also on what happened in the past. Many of the issues prompting antivaccination sentiment today can be seen in the history of the antivax movement – mistrust of a new and unproven treatment, fear of curtailment of liberties, class struggle, public apathy, and the spread of misinformation through a new and rapid form of communication (Wolfe & Sharp, 2002).

Vaccine Hesitancy

An important consideration in the immunization debate is vaccine hesitancy, defined as “the reluctance or refusal to vaccinate despite the availability of vaccines” (WHO, 2019). Vaccine hesitancy has been described as the main contributor to the reduction to herd immunity globally (Haroune & King, 2020) and contributed to outbreaks of preventable diseases in some countries (Gordon, 2020). It is, therefore, an important issue that needs to be addressed early before it becomes vaccine refusal, which is an increasing problem (McGee & Suh, 2019). Vaccine-hesitant people have not yet decided about whether they will vaccinate or not; they instead are merely questioning whether they should vaccinate and therefore can be persuaded to immunize. In comparison, those who are ‘anti-vaxx’ have already made up their minds to not vaccinate, hence why it is important to address hesitancy before this situation arises.

Vaccine hesitancy is complex and not just about parents agreeing or disagreeing to vaccinate their child or themselves (McGee & Suh, 2019). Factors that contribute to vaccine hesitancy have been explored in a study that identified three main themes: vaccine safety, effectiveness, and health care issues (Haroune & King, 2020). Vaccine safety referred to a concern about the ingredients in the vaccine as well as toxicity and potential side effects from the vaccine, with autism being the main concern (Haroune & King, 2020). This

theme also included pain/discomfort from the vaccination and that vaccinating weakens the immune system. The effectiveness of the vaccine included the belief that some diseases had been eradicated, questioning the need for the vaccine. There was also a desire to fight off disease with natural immunity rather than by vaccinating, including breastfeeding, in the belief that this was more effective. The third contributing factor arose because of previous negative experience with health care, including delayed immunizations due to the child being unwell or difficulty getting appointments due to either the carer or general practitioner being too busy (Haroune & King, 2020). These parents may be motivated to vaccinate but have logistical difficulties, including not being able to take time off work or lack of public transport to access services. Conflicting or confusing vaccine information may also inhibit the decision to vaccinate.

Vaccine-hesitant parents are also more likely to access social media for information to help them make the decision to vaccinate or not (McGee & Suh, 2019). A substantial amount of information is available through these platforms, and it is easy to find. Although it may lead to parents making the right decision for their child, it can also be detrimental because much information is inaccurate, and in some cases, deceptive (Grant et al., 2015). Generally, these platforms focus on creating communities of vaccine affected families, including resources about vaccinations allegedly presenting an unbiased opinion. However, these sites are found to be strongly biased against vaccinations (Grant et al., 2015). Social media vaccine sceptical information is, therefore, considered to be troublesome, discouraging parents from vaccinating through several strategies. These include portraying themselves as authorities on vaccination, listing adverse effects, presenting themselves as unbiased, and appealing to the user’s emotions through personal testimonies of adverse effects (Grant et al., 2015). The problem is compounded by the fact that vaccine critics are more successful at

using social media then vaccine promoters. Furthermore, the information disseminated is more difficult to dismiss by trying to educate the public to the contrary (Grant et al., 2015). Other issues that social media may present in the context of the vaccination debate will be further discussed below.

Conspiracy Theories

Conspiracy theories explain the origins of world events or situations as plots, led by powerful groups of people, usually malevolent, who hide the truth and disseminate misinformation (Douglas et al., 2019; Sutton & Douglas, 2020; Wood, 2017). They are also associated with medical conditions such as COVID-19 (Andrade, 2020; Chen et al., 2020; Duplaga, 2020; Romer & Jamieson, 2020) and HIV/AIDS (Brotherton et al., 2013; Friedman, 2020), vaccination use (Brotherton et al., 2013; Douglas et al., 2019; Romer & Jamieson, 2020), and can be detrimental to health promotion and illness prevention. Underpinning conspiracy theories is a distrust of people in power (Sutton & Douglas, 2020; Romer & Jamieson, 2020), an alleged conspiracy (Douglas et al., 2019), and belief in the conspiracy despite evidence of more probable causes (Brotherton et al., 2013; Freeman & Bentall, 2017; Wood, 2017). Confirmation bias, the acceptance of evidence that confirms a person’s existing beliefs and rejection or failure to consider contradictory evidence (American Psychological Association [APA], 2020), and the backfire effect, whereby a person’s beliefs are strengthened in the face of contradictory evidence (Noor, 2020), can perpetuate conspiracy beliefs.

A range of psychosocial and demographic factors are associated with holding conspiratory beliefs. A tendency to accept weak beliefs (Sutton & Douglas, 2020) and attempts to make sense of life during uncertainty and when faced with complex and threatening phenomena can contribute to a belief in conspiracy theories (Douglas et al., 2019; Freeman & Bentall, 2017). Younger people; males; those with lower levels of education, income,

and health literacy; those from an ethnic minority; the socially disconnected; and the politically disenfranchised are more likely to believe in conspiracy theories (Duplaga, 2020; Freeman & Bentall, 2017; Romer & Jamieson, 2020). Support of conspiracy theories is also associated with traits of individual and collective narcissism and exaggerated feelings of self-importance (Cichocka et al. 2016; Golec de Zavala & Federico, 2018).

Subscribing to conspiracy theories can have adverse impacts on an individual's health and wellbeing, including their mental wellbeing. Freeman and Bentall (2017) demonstrated in a general population that those who held a conspiratory world view had lower levels of physical and mental wellbeing, were more likely to have had adverse childhood experiences, had fewer current social connections, and experienced more negative emotions. Chen and colleagues (2020) found that health care workers who believed COVID-19 conspiracy theories were more likely to report psychological distress, anxiety, and lower satisfaction with their work and life as compared to those who did not.

Conspiracy beliefs may also be associated with some mental health conditions. People who experience paranoia, a mistrust and fear of harm from others, and who meet the diagnostic criteria for a paranoid personality disorder are likely to accept the beliefs of malevolence espoused in conspiracy theories (Andrade, 2020). Even after controlling for paranoia, those who adopt conspiratory beliefs were more likely to meet the diagnostic criteria for a mental health disorder and to consider attempting suicide, as compared to those who did not hold such beliefs (Freeman & Bentall, 2017). To counteract vulnerability to the misinformation of conspiracy theories, health professionals have a role in the promotion of critical thinking skills and development of coping strategies in health care consumers (Andrade, 2020; Friedman, 2020).

There are significant numbers of people worldwide who espouse conspiracy theories, which are

explanations for important events that involve secret plots by powerful and malevolent groups (Douglas et al., 2017; Douglas et al., 2019), when other explanations are more plausible (Brotherton et al., 2017). For example, significant numbers of people around the world believe COVID-19 was created deliberately, is a hoax, and has killed far fewer people than reported, and the vaccine will have untenable side effects (Henley & McIntyre, 2020). Conspiracy theories are dangerous and even more so in a pandemic when they encourage people to ignore the official advice (Henley & McIntyre, 2020).

The Power of Social Media

In 2013, the World Economic Forum lamented that massive digital misinformation was a great threat to society (Schmidt et al., 2018). Social media provides a platform for people to engage with, share views and opinions, and learn from others. It has the advantage over mainstream media because it can facilitate public participation in science and health communication, and the sheer number of social media users makes it the main channel of communication during a health crisis (Orr et al., 2016). In October 2020, Facebook was the largest online social network, ranked as the most popular social networking site (SNS) in the world, with 2.9 billion monthly active users (Zephoria, 2021).

Websites and Facebook groups opposing vaccination are prevalent, and they are places where anti-vaccine activists can effectively spread their messages questioning the legitimacy of science (Kata, 2012). Anti-vaxx websites and groups are problematic because individuals turn to the Internet and Facebook for vaccination advice, and these sites influence whether people vaccinate themselves and/or their children (Kata, 2012). In fact, Betsch and colleagues (2010) found that visiting online anti-vaccination sites for 5 to 10 minutes increases perceptions of vaccination risks, and therefore, decreases an individual's intentions to vaccinate. Several studies have found that the

power of the online anti-vaxx sites is about appealing to the emotions of their website visitors, using narrative and personal stories with photos that are designed to increase perception of risk and decrease vaccination (Betsch et al., 2012).

Buchanan and Beckett (2014) analyzed the vaccination pages on Facebook and found that it may play a large role in the propagation of vaccination misinformation, with the anti-vaxx groups promulgating anger, fear, and scepticism. What is concerning is that although information dispelling vaccinations myths can be readily found on Facebook, there was less interest in this information compared to the misinformation on the anti-vaxx websites (Buchanan & Beckett, 2014). Smith and Graham (2017) analyzed the anti-vaxx Facebook sites and found that participating in a community of like-minded others reinforced anti-vaxx beliefs. Participants were active across several anti-vaxx Facebook groups and pages, and by liking and actively commenting on a number of the anti-vaxx Facebook pages, they created a 'bubble effect' that made the network appear larger than it actually was, thus reinforcing anti-vaxx sentiment (Smith & Graham, 2017). Facebook pages designed to dispel the fearmongering of the anti-vaxx sites and educate the public include 'Refutations to anti-vaccination memes,' 'Stop the anti-science movement,' 'One-vaxxed Nurse,' 'Pro-Vaxxer,' and 'Nurse Doodle,' to name but a few.

In 2020, a major conspiracy theory erupted on Facebook linking COVID-19, the virus originating from China, the vaccine that was being researched and manufactured, and 5G technology, with concerns that 5G could make COVID-19 more virulent (Bruns et al., 2020). The dissemination of a rumor on Facebook started from conspiracy groups can be amplified when it is picked up by celebrities, sports stars, and media outlets (Bruns et al., 2020). This situation may be further complicated by echo chambers. These are online environments in which 'like-minded' users are exposed to confirming opinions, and alternative voices are excluded or discredited, leading to

polarisation and even radicalisation (Risius et al., 2019). Facebook encourages echo chambers, and it is noteworthy that confirmatory information gets accepted even if containing deliberately false claims while dissenting information is mainly ignored or might even increase group polarization (Del Vicario et al., 2016). On a positive note, in August 2021, Facebook removed hundreds of accounts involved in anti-vax disinformation campaigns that arose from Russia. The Russian network recruited influencers to spread misinformation undermining the confidence in the COVID-19 vaccine (Carmichael & Haynes, 2021).

The COVID-19 vaccine has started to roll out throughout the world. As of October 6, 2021, 46% of the world's population has received at least one dose of a COVID-19 vaccine (Mathieu et al., 2021). It is now believed that social media and Facebook are the main vehicle by which anti-vaxx groups spread lies and misinformation by strengthening and popularizing anti-vaccination rhetoric (Smith & Graham, 2019). Facebook's capacity for user-generated content means the messages are accessed by an extensive and diverse audience (Bradshaw et al., 2021). In fact, Facebook has been accused of creating a direct path for users to produce and consume content with the intention of spreading misinformation (Schmidt et al., 2018) and spreading anti-vaccination ideas on a global scale (Smith & Graham, 2019). It is interesting that Facebook posts about anti-vaxx stories, articles, and photos were shared between multiple Facebook groups (Hoffman et al., 2019). This contributes to the bubble effect discussed earlier.

Facebook is now identifying content and fact-checking posts for misinformation, stating that it "rates the accuracy of stories through original reporting, including interviewing primary sources, consulting public data and conducting analyses of media, including photos and video" (Facebook Journalism Project, 2021). Moreover, with the number of anti-vaxx groups increasing and the potential public health consequences, Face-

book has been under increasing pressure to deal with the anti-vaxxers who spread false information about vaccines yet promote alternate treatments, such as high dose vitamin C, for vaccine injury (Pilkington & Glenza, 2018). Facebook has claimed it is addressing anti-vaccination misinformation by making those posts harder to find, removing anti-vaxx pages and any group that spreads misinformation, and elevating authoritative information about vaccines in the news feed (Barbaschow, 2020).

A Global Perspective

From a global perspective, there is no question that vaccination saves many children's lives, currently estimated as between 2 to 3 million lives saved each year (WHO, 2020b), and is an integral component in achieving the sustainable development goals. The measles vaccine single-handedly has avoided 23 million deaths in a decade (Patel et al., 2019). Furthermore, global elimination of disease is possible with vaccines, with smallpox being eradicated in 1979 and maternal and neonatal tetanus close to elimination (McIntyre & Walls, 2020).

Despite this, many of the world's youngest children do not receive any vaccinations, with an estimated nearly 20 million children less than one year of age not given the recommended vaccinations (WHO, 2020b). The global challenges are to ensure that vaccinations are available to all children, especially in those more likely to miss out and where the greatest impact can be made, in developing countries, and in fragile and humanitarian settings (Greenwood, 2014).

Fortunately, many stakeholders are committed to ensuring that vaccination programs reach all corners of the globe with one of the key organizations, which has made substantial contribution to improving vaccination and child mortality, the Global Alliance for Vaccine and Immunization (GAVI), a public-private partnership (Bustreo et al., 2015). In 2018, GAVI supported vaccination in 73 countries and has a five-year strategy to 'leave no-one behind' (GAVI, 2021). The organiza-

tion is also co-leading 'COVAX' with the Coalition for Epidemic Preparedness Innovations and the WHO, a collaboration to not only accelerate the development and manufacture of COVID-19 vaccines but to guarantee fair and equitable access globally (GAVI Covax Facility, 2020). The United Nations Children's Fund (UNICEF), being one of the largest vaccine purchasers, is also collaborating with the group to obtain and supply the vaccines using their experience with vaccination programs to support travel logistics, cold chain, and storage (United Nations Children's Fund, 2021).

In addition, to address the impact of the pandemic on vaccinations, in late 2020, the World Health Organization released a document, *Immunization as an Essential Health Service: Guiding Principles for Immunization Activities During the COVID-19 Pandemic and Other Times of Severe Disruption* (WHO, 2020c). This report provides strategies for countries to implement to ensure that vaccinations continue during major disruptions to health care services, such as during pandemics, emergencies, and humanitarian crises. Key principles and strategies focus on nine key areas: "health systems and policy; service delivery; catch-up vaccination strategies; mass vaccination campaigns; surveillance and coverage monitoring; supply chain, communication strategies and recovery and rebuilding" (WHO, 2020c). The report is congruent with the Immunization Agenda 2030, where the four central principles to this agenda is ensuring it is supported by the countries in which it is occurring, the strategies are concentrated on supporting the people it is aimed to help, and it is based on the best evidence from the available data (Immunization Agenda 2030, 2020). While most of the world's population (92%) believe vaccines are important for children, there is great variation in this belief across the world, with some countries, such as France, where support was 76%, while others, such as India and Mexico, had a rating 98%. The reasons for this are unclear (Vanderslott et al., 2019).

As previously discussed, one of the greatest threats to global health is that of vaccine hesitancy, highlighted following the recent outbreaks of vaccine-preventable diseases, such as measles in countries across the world (Gordon, 2020; Haroune & King, 2020; WHO, 2019). Vaccine hesitancy is not a new phenomenon and has been reported from countries around the world, not just in high-income countries (Cooper et al., 2018; Wagner et al. 2020). Lane and colleagues (2018) reported hesitancy in greater than 90% of countries surveyed and in all regions of the world. What is more recent is the speed and ease at which anti-vaccination information is spread around the world (Larson & Schulz, 2019).

Parents' Decision-Making

The decision for some parents about vaccinating their child can go beyond agreeing or disagreeing with vaccination (Haroune & King, 2020). Health literacy is important, and a complex decision-making process may be occurring that can result in conflicted views based on the parent's inability to interpret scientific evidence (Meppelink et al., 2019). This decision-making process can be further mediated by parents' cultural and religious beliefs (Dyda et al., 2020; Jolley & Douglas, 2014; Meppelink et al., 2019; Song, 2014), misinformation and conspiracy theories (Jolley & Douglas, 2014), and previous adverse immunization reactions (Chow et al., 2017).

In some circumstances, parents may be ambivalent or unaware about the importance of vaccination or be unable to easily access vaccinations. Trust has been identified as an important facilitator for vaccination, or if lacking, an inhibitor to vaccination (Benin et al. 2006). Significantly, trust in health professionals was a central theme within the literature as to whether parents vaccinate their children or where they sought sources of information to support their decision-making (Austvoll-Dahlgren & Helseth, 2010; Benin et al., 2006; Chow et al., 2017). Austvoll-Daglgran and Helseth (2010) expanded on the importance

of trust to include common-sense and experience to inform decision-making. A word of caution is provided that when decisions are based on trust in someone else, such as a health professional, rather than one's own knowledge as a parent, parental uncertainty may occur (Austvoll-Dahlgren & Helseth, 2010).

The decision to vaccinate involves a general decision-making process of "awareness, assessing and choosing, followed by either stasis or ongoing assessment" (Brunson, 2013, p. 2466). Decision-making may be difficult when parents express low levels of confidence in the decisions they have made in the past, and they can also be uncertain about their parental rights and responsibilities around decision-making for their children (Austvoll-Dahlgren & Helseth, 2010).

Another way to categorize parents on their decision-making was identified, and it depended on the decisions they made. For example, research by Benin and colleagues (2006) identified two main groups with subgroups. The first group included vaccinators, with subgroups of 1) acceptors who agreed with or did not question the use of the vaccination, and 2) vaccine-hesitant people who had significant concerns but accepted the vaccination (Benin et al., 2006). The second group was composed of non-vaccinators, with sub-groups of 1) late vaccinators who were selective in the vaccines they chose or purposely delayed their child's vaccination, or 2) rejectors who completely rejected vaccine use (Benin et al., 2006). An alternative approach by Brunson (2013) identified three groups: acceptors, reliers, and searchers (Brunson, 2013). Acceptors rely on general social norms to make decisions about vaccination. The second group of reliers depend on information and advice from other people. Finally, searchers find information on their own, usually from published sources (Brunson, 2013).

Wiley and colleagues (2020) grouped 21 parents into three groups: 1) never have vaccinated, 2) changed position once, and 3) changed position twice. This study found that in some cases, decision-

making progressed intuitively, starting with a generalized doubt, while for others, it started with an adverse event or specific issue, often compounded by feelings of being failed by the mainstream health care system (Wiley et al., 2020). In some situations, the parents' vaccination trajectories were intertwined with alternative or mainstream lifestyle choices (Wiley et al., 2020).

The Role of the Nurse in Promoting Vaccinations

One main responsibility of nurses is to promote the health and wellbeing of the patients and people who they encounter. This is firmly embedded in key nursing documents, for example: "Registered nurses make an important contribution to the promotion of health, health protection and the prevention of ill health" (Nursing and Midwifery Council, 2018, p. 3).

Global medical and nursing organizations have an important role and need to acknowledge and promote the importance of vaccinations in preventing deaths. With the global COVID-19 vaccination program, the International Council of Nurses (ICN) has stated that nurses are integral to the success of this program (ICN, 2020; International Pediatric Association, 2021).

Miller and colleagues (2015) commented on the fundamental role that nurses have in terms of promoting vaccine uptake. A number of strategies have been implemented to potentially facilitate this; for example, in the United Kingdom, the Make Every Contact Count program aims to change health related behavior by using "the millions of day to day interactions that organisations and individuals have with other people to support them in making positive changes to their physical and mental health and wellbeing" (Health Education England, 2021). These opportunities can be used to discuss vaccinations with a parent when, for instance, their infant visits an Emergency Department – using the contact to highlight the benefits of vaccinations, perhaps providing a supporting leaflet or referring the family to another service.

Promoting vaccination, however, is not without its challenges. McGee and Suh (2019) highlighted the importance of acknowledging vaccine hesitancy and taking steps to ensure it does not lead to vaccine refusal. The authors suggested that communication is of paramount importance, and they recommended that a 'presumptive' approach, which assumes the parent will be providing their consent, is initially undertaken. If concerns are raised, these can then be appropriately addressed in an honest, respectful manner. Several models have been developed to facilitate a discussion about vaccines; these enable nurses to use a framework to address any parental worries (such as the risks of vaccination), offer evidence-based information, and recommend the vaccine. Such models are discussed by Brewer, Chapman, and colleagues (2017) and include CASE (Corroborate, About Me, Science, Explain/Advise), EASE (Elicit, Acknowledge, Share, Explain), and Ask-Acknowledge-Advise. However, although these tools have been widely advocated, they should perhaps be used with caution because there is minimal evidence at the moment that substantiates their value. CASE itself has not been the focus of research (Brewer, Chapman et al., 2017), an evaluation of EASE was not able to highlight whether the model itself was effective in promoting vaccine uptake (Brewer, Hall et al., 2017), and Ask-Acknowledge-Advise was not effective in terms of altering parental confidence in vaccines (Henrikson et al., 2015).

If parents develop false beliefs about vaccination, these can be challenging to remedy; therefore, communication should focus on correct information as early as possible (Jolley & Douglas, 2017) rather than waiting to discuss vaccinations shortly before they are due, and ongoing brief discussions during health encounters could be of value. School nurses are, for example, in an ideal position to introduce the benefits of vaccinations to young people when they are in their teenage years. Social media has become an increasingly important communication mechanism, so nurses may feel their strategies

are not just restricted to the clinical setting, but also embrace websites and applications because they can provide a good arena to promote positive vaccine messages (The Health Policy Partnership, 2020). A range of resources is available for professionals (including nurses); accessing these to support discussions with families are crucial so up-to-date, evidence-based information is provided. Examples include the CDC (2016), the AAP (2021), the Australian Government Department of Health (2021), and Gov.UK (2021). In addition, sites such as the Children's Hospital of Philadelphia (2021) Vaccine Education Center offers suggested resources for families. The importance of directing parents to websites that provide accurate scientific information should not be underestimated. Grant and colleagues (2015) discussed 'vaccine-sceptical' websites that center on people affected by vaccines, which may not give a wholly balanced perspective.

It is crucial to remember that nurses may be recommending vaccinations for diseases that a parent has never seen or encountered; therefore, there may not be a full understanding of its dangers. Moreover, it has also been suggested that parent vaccine hesitancy is more likely to be related to safety factors rather than the procedure itself (Miton & Mercier, 2015); therefore, the building of a trusting relationship is of fundamental importance and may require several encounters with the family.

Recommendations

In summary, there are number of strategies nurses can use to promote vaccination uptake with parents:

- Maximize contact opportunities with families and discuss vaccination, even if that is not the prime intent of the appointment.
- Revisit the topic of vaccination in future health encounters (or ask a colleague to have a 'follow-up' conversation).
- Draw on a 'presumptive' approach that assumes the parent is intending to vaccinate their child.

- Spend time with a family to provide an individualized, compassionate, trusting, and understanding approach that facilitates an environment where parents feel 'safe' to ask questions.
- Think about and plan how parental questions will be answered so you are able to do so in a confident, professional, and authoritative manner. Consider using a model, such as CASE, EASE, or Ask-Acknowledge-Advise.
- Provide up-to-date, evidence-based information.

There is, however, no simple solution to this avalanche of information in social media. It is impossible to stop online misinformation or to stop people from searching this information. Instead, it is about providing a different way of communicating, according to McGee and Suh (2019). These authors have suggested a range of strategies, including communication with a caring, trusted, and concerned provider. This also includes how this communication is done. For example, persistent discussion on vaccines in same visit; introduction of the need for vaccine using presumptive style language rather a participatory style; discussion of the science that addresses only parents' specific questions rather than other common concerns, which could unintentionally give parents new areas of concern; and inclusion of brief personal anecdotes that bring the discussion to a more emotional level. This discussion then includes both logical and emotional arguments in support of vaccination and is described as being more effective (McGee & Suh, 2019).

In addition, there is a need to rethink how pro-vaccine information is presented through social media. Generally, information that is too technical and less certain in the conclusions does not help parents decide (McGee & Suh, 2019). Instead, the information needs to be focused more on a collaborative decision-making approach and be directed toward what the vaccine-hesitant parent requires, for example, story-telling or direct answers to questions.

Conclusion

The science is clear; vaccines are safe, efficacious, and play a significant and valuable contribution to global health. The challenge for the roll-out of the COVID-19 vaccine is to maintain the confidence in vaccination when 'anti-vaxxers,' conspiracy theorists, and those with vaccine hesitancy represent a growing threat to the success vaccination efforts. Governments and international health agencies have a critical leadership role to play in developing evidence-based recommendations and to disseminate them globally, and consistency is important. Efforts by social media platforms, such as Facebook, to manage misinformation is encouraging; however, it is impossible to curtail the avalanche of information that bombard people on the Internet and social media. Therefore, all health professionals need to take any opportunity to present scientific explanations that expose bad science and debunk misinformation, thereby helping the public to judge information based on scientific merit. ■

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continued on page 243

Vaccine Hesitancy on the Health of the Child

continued from page 225

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