

Vaccination Nation

How Vaccines Have Transformed our Lives and Our Society in Modern Times

By
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The older I get, the harder it is for me to exercise, not because I don't have the time or energy, but because it hurts more than it used to. The pain that comes with my first set of heavy lifting subsides by my second, and I always feel a lot better after a workout. But I increasingly have to psyche myself up to face the initial pain in my right shoulder from an old injury, or the pulled muscle in my forearm, or thigh, or some other area that hasn't quite healed yet at a more recent injury.

It's hard to do things that are good for us when doing so is painful. But it's also immature not to. Mary Poppins sings, "Just a spoon full of sugar makes the medicine go down," because it's not enough to explain to young children that as bad as it tastes it's going to make you better. They've not yet learned the concept of delayed gratification, that the reward they receive later will be much better than indulging themselves now, in this case, by gratifying the immediate desire to avoid a little pain or distaste. So, we add sweet flavors to their medicines, which usually works better than promising them a treat afterward, given the ability to delay gratification usually doesn't develop until sometime between the ages of eight and thirteen.

When I was a child, the idea of going to the doctor was especially frightening because of the ever-looming possibility of getting a shot, no matter how much better it might make me feel or how necessary it was for protecting me against getting sick with a terrible disease. As an adult, I'm glad I was forced to endure what I then wished to forgo no matter how much worse the consequences would have been. Of course, shots were a bit more painful than they are now given that advances in technology have led to use smaller gauged needles for most routine shots. Still, I'm guessing no child looks forward to getting a shot, even if they are mature enough to recognize its necessity.

As loving parents, it is especially important that we are not overbearing, no matter how much we want to guide and protect our kids. For them to fully unfold as individuals, they need to be raised where they are free to express themselves and can learn to develop and trust their own ability to make sound decisions. Yet, as parents, we must balance such freedom with our own responsibility to protect them from making dangerous mistakes. So, at a certain age, we demand that they hold our hand while crossing the street, or to stay close in a crowd, and so on. It's the same with making them go to the doctor or dentist, no matter how much they protest. And, thanks to the modern era of vaccinations, doing so has benefited our children in ways we could not have imagined when it began.

Today, thanks in large part to vaccinations, the whole of humanity has an average of twenty-thousand more days of life than our relatives had just 200 years ago. That's almost 55 more years. But this doesn't mean 200 years ago most people lived to be about thirty before dying of old age. Those who lived that long were just as likely to go on living well into their seventies as we are. The average has changed, rather, because we have dramatically reduced child mortality rates. "When

you have a significant portion of the population dying at the age of five months or five years,” writes historian Steven Johnson in his new book, *Extra Life*, “those deaths pull the overall average life span down dramatically. But if most of those children survive into adulthood, average life expectancy spikes upward.”¹

So, taking our kids to the doctors for their shots has paid off in dividends, even if they went kicking and screaming. Today we are all living longer because our parents and/or our society required us to get vaccinated against potentially deadly viruses, not only for our own good, but for the good of those around us. Were it not for science, where the credit should go, we could define the results as nothing short of miraculous. Thanks largely to vaccinations, Johnson says, “as a species we have doubled our life expectancy in just one century, and we have reduced the odds of that most devastating of human experiences—the death of a child—by more than a factor of ten.”²

Since vaccinations have also become a global phenomenon, even in poorer nations, fewer children are being born, since more of them are surviving and there’s less need to have as many as possible in order to beat the odds of having none survive past adolescence. This has led, in part, to the sudden and unexpected decline in birth rates around the world. The population explosion happened but is now slowing and is soon expected to start declining, thanks to low birthrates almost everywhere. The only reason the human population is still increasing at all is because so many of us are living longer, not because too many kids are being born.

We’ve also been able to wipe out a few truly horrific diseases. Variola major, better known as smallpox, perhaps humanity’s oldest and most lethal enemy ever, which has been found existing on entombed Egyptian mummies and was responsible for killing over 300 million people in the last century alone, has finally been eradicated thanks to vaccinations. Not only was it the first disease we’ve ever eradicated, it was also disease that gave birth to vaccination science to begin with.

Edward Jenner, the 18th century physician who has been credited as the “Father of Immunology,” being the first to successfully immunize a child against it. Jenner, having heard that dairymaids who had contracted the lesser disease, cowpox, seemed to be immune against its more vicious cousin, smallpox, was the first to try using this milder illness to prevent the latter, and it worked. In fact, the very word, *vaccine*, comes from the Latin word meaning, “cow.” So we should give credit where credit is due.

But Jenner’s idea wasn’t born in a vacuum. More than a hundred years earlier, a British aristocrat, Mary Montagu, contracted smallpox when she was only twenty-five. Although she miraculously survived both the illness and the primitive attempts to cure her by the royal physicians, the once beautiful woman was left terribly scarred by the pox. Soon after recovering, she moved from England to Constantinople to be with her husband who was Ambassador to the Ottoman Empire, where she emersed herself in the culture, including wearing Turkish caftans to help hide her scars. More importantly, during her two years there, Montagu also discovered the practice of variolation

for treating smallpox. This involved using small amounts of matter taken from smallpox patients and inserting it into superficial scratches placed in the skin of those being inoculated. It worked so well that Montagu used the procedure on her own son, who is considered Britain's first citizen to have been immunized against the disease.

Because of Montagu's social stature, others respected and followed her example, which saved a lot of lives although the procedure remained risky. It's estimated that 2 percent of those who underwent variolation contracted smallpox and died from it, and many who recovered from the procedure were permanently disfigured by the disease it caused. "But Montagu had seen enough of variola major to recognize that those dark possibilities were lesser threats than leaving your child vulnerable to smallpox in the wild," Johnson writes. "In a world where more than one in four children died before the age of ten—many of them killed by smallpox—the 2 percent chance of death by inoculation was in fact a risk worth taking."³ He goes on to explain that the procedure remained controversial in British society throughout the 18th century, but its adoption by society's elites had widespread influence and by the middle of the 1700s life expectancy was already on the rise because of it, "as a whole generation of British peers survived their childhoods thanks to their increased levels of immunity to variola major"⁴—smallpox.

This brings us back to Jenner who, speculating that a lesser case of cowpox could immunize one against smallpox, tested his hypotheses by "scraping some pus from the cowpox blisters of a milkmaid, and inserting the material into the arms of an eight-year-old boy. The boy developed a light fever, but soon proved to be immune to smallpox."⁵ Jenner was still using variolation because the first hypodermic needle wouldn't be invented for another 47 years. His innovative idea of inoculating patients with a weaker version of the disease was groundbreaking and gave us the first vaccine that transformed the world. But we also have to thank the observant and courageous Mary Montagu for bringing the knowledge to the Western world, along with the Turks, who may have gotten the idea from China, and India, and other countries that also practiced variolation, all of which deserve our thanks.

Indeed, were it not for Montagu, it is likely the idea would never have crossed Jenner's mind. As a child, Jenner himself underwent variolation against smallpox and, as soon as he became a doctor, practiced it on his patients. "As a scientist and a doctor, Jenner had inherited a long-established principle that injecting smallpox-infected material subcutaneously could produce immunity," Johnson writes. "Without a lifelong familiarity with variolation, it is unlikely that Jenner would have hit upon the idea of injecting pus from a less virulent but related disease."⁶

Only four years after Jenner's experiments with cowpox proved successful, a Harvard medical professor, Benjamin Waterhouse, successfully repeated it by inoculating several members of his own family. Seeking a bigger audience to spread the good news, Waterhouse wrote to a respected amateur scientist in Virginia explaining that he needed his help eradicating smallpox. The Virginian wanted to oblige, but the vaccine samples Waterhouse mailed him didn't survive the trip. After three failed attempts, the amateur scientist invented a new technique for transporting it by

placing each vile inside a larger vile filled with water and tightly corked in order to keep it cool and to prevent it from being exposed to air. It worked. The Virginian was able to successfully inoculate over 200 people, most of whom were his own family and friends. That Virginian, by the way, was only moonlighting as a scientist. His real job was serving as the third President of the United States, Thomas Jefferson.

“A decade or so after Jefferson’s pioneering experiments, in 1813,” Johnson says, “Congress passed the Vaccine Act, with the aim to ‘furnish . . . genuine vaccine matter to any citizen of the United States.’ In England, the Vaccination Act of 1853 required all children under three years of age to be administered a smallpox vaccine . . . Germany made vaccination compulsory in 1874.”⁷ And so, the age of vaccinations was in full swing only a few decades after it began.

Perhaps as significant as the first is the last person to have been inoculated against smallpox, Rahima Banu Begum, a three-year-old girl from Bangladesh who contracted the illness in October of 1975. Keep in mind, however smallpox began, perhaps transferred to us initially from another animal, maybe a cow, it thrived so well among humans that the virus evolved to a point that it could only survive in humans. Virologists knew that if they could stop its spread among our species, it would have no place else to go. It turns out that Begum happened to live on an island off the coast of Bangladesh. So the World Health Organization vaccinated her along with all those on the island who had been in contact with her, which kept it from spreading any further. “Four years later,” Johnson says, “on December 9, 1979, after an extensive global search for other outbreaks, a commission of scientists signed a document proclaiming that smallpox had been eradicated.”⁸

Just let that sink in because it’s a mouthful. Humanity’s deadliest disease, estimated to have killed 300-million people during the 20th century alone, was completely eradicated just 79 years into that same century, thanks to vaccinations. And consider all the other many diseases that have been eliminated, or rendered almost harmless, because of vaccinations: diphtheria, measles, meningitis, HPV, mumps, hepatitis A and B, rubella, whooping cough, chickenpox, tetanus, and so on. This month’s Rotary magazine has a cover story featuring the picture of a happy Pakistani girl, entitled, “Delivering on a Promise: A Polio Free World is Within Reach.” Rotary International has been working for years with the WHO to completely eradicate this crippling and devastating childhood illness and has successfully confined it to just two countries, Afghanistan and Pakistan, where this year there have been only two cases reported, one in each country.

Yet, only last year there were 140 cases. Why the difference? Because of vaccine hesitancy. Many in these two nations don’t trust westerners or our medicines but, having seen so many people in their communities die of COVID-19, and a new emphasis on vaccinations, has quickly changed this attitude, which has made them more open to vaccinations in general. This is an important point because vaccines don’t kill, at least not nearly as much as vaccine-hesitancy does.

Even in the 19th century, when western governments were mandating vaccinations, Victorian anti-vax movements arose in the U.S. and England, their proponents calling the mandates a violation of

their personal liberties, spreading unfounded fears about vaccine science, and claiming that taking them would be against their religious beliefs. In fact, it was in response to antivaxxers, not war protesters, that the term “conscientious objection” entered “English law.”⁹ In 1898 a British law was enacted giving exemptions to parents who claimed vaccinating their children were against their beliefs. “Similar exemption clauses have become flashpoints in the recent controversies over anti-vax movements,” Johnson says, “with a number of local governments in the United States revoking exemptions after new outbreaks of measles—long considered eradicated in the United States—began to appear in communities with high proportions of anti-vax families.”¹⁰

We should also keep in mind, as Johnson again points out, “The Victorian protesters had only the smallpox vaccine to consider, and limited statistical tools at their disposal to gauge its efficiency.” They had no sound reasons to trust the science, not back then. But today, as Johnson puts it, “The modern anti-vaxxer has a far more impressive track record to willfully ignore, both in terms of the ranges of diseases that vaccines now combat—diphtheria, typhoid, polio, and so on—but also the empirical evidence of the life-saving properties of these interventions.”¹¹

Today, many against taking the COVID vaccines believe they were rushed into existence, and therefore, can’t be trusted, or that they have been manufactured from new and untested technologies, or that, in extreme cases, they contain microchips, or are made from aborted fetuses, or are a form of genetic engineering. I won’t go into the most preposterous of these conspiracy claims, but, regarding the idea that these vaccines were rushed to market—a conspiracy begun by the mainstream media, I might add, not to discredit the science, but to discredit Donald Trump who correctly reported we’d have vaccines approved by the start of 2020—this claim simply is not so.

Rather, we are fortunate that recent advances in science have made it possible for us to develop effective vaccines at breakneck speeds. Compare this to what happened during the Great Influenza, the, so-called, Spanish Flu. “Given the world’s population in 1918 of approximately 1.8 billion,” Johnson calculates, “the upper estimate would mean that in two years—and with most of the deaths coming in a horrendous twelve weeks in the fall of 1918—in excess of 5 percent of the people in the world died.”¹² Back then, the science simply wasn’t advanced enough to intercede before the virus had time to do its worst. Yet, today, in less than a year of the outbreak, we have had several vaccines developed, not by rushing, but by using modern genomics to sequence the virus, modern communications to share information instantly with other scientists across the globe, machine learning that can quickly search articles for potential new drug combinations, computer data bases that can predict outbreaks and helps us respond before they worsen, along with new techniques to signal our own messenger RNA to create immune responses.

What a wonderful and fortunate time we live in. “Almost none of those resources were available to the doctors and public health authorities battling the Spanish flu a hundred years ago,” Johnson says. “The cost of the COVID-19 pandemic—in lives lost, in economic disruption—was immense, to be sure. And countless mistakes were made, in underestimating the scale of the threat in the early

days of the outbreak and in failing to adopt simple public health interventions like mask wearing. But millions more would have perished without the defenses that were ultimately put in place.”¹³

Yet, despite the real possibility of having rendered today’s Pandemic impotent in short order, we have seen a new surge emerge, worse than the first, because too many of us are afraid of getting our shots: exaggerating our fears and throwing tantrums at school board meetings and marches in the streets, and so on. This behavior is not merely a refusal to protect themselves but endangers all of us with breakthrough infections, as well those who already have compromised immune issues and cannot be vaccinated for genuine health reasons. It is responsible for overburdening our hospitals and medical workers who must now turn away those with other life-threatening ailments in order to care for unvaccinated patients who have contracted COVID-19. And it is further preventing our weakened economy from recovering as quickly as it otherwise could.

Perhaps the cure for such fear is a shot of history to remind us all of how far we have come thanks to vaccine science, of how many more blessed years of life each of us now has, of how uncommon it is to lose our kids to childhood illnesses, of the horrifying plagues we have already eradicated, of how quickly we can now respond, flatten, and prevent the spread of new plagues and pandemics, and of how fortunate we are among all generations to live in such a time as this.

¹ Johnson, Steven. *Extra Life* (pp. xxiii-xxiv). Penguin Publishing Group. Kindle Edition.

² *Ibid.* (p. xxv).

³ *Ibid.* (p. 43).

⁴ *Ibid.* (p. 44).

⁵ *Ibid.*, (p. 45).

⁶ *Ibid.*, (p. 46).

⁷ *Ibid.*, (pp. 53-54).

⁸ *Ibid.* (p.58)

⁹ *Ibid.*, (p. 56)

¹⁰ *Ibid.*, (p. 56-57)

¹¹ *Ibid.*

¹² *Ibid.*, (p. xvi).

¹³ *Ibid.*, (p0. 250-251).