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FEAR, REJECTION, AND CONSPIRACY THEORIES

The sad story of the anti-vaccination movement:
facts and myths about vaccinations

**Asst. Prof. Aneta Nitsch-Osuch,
MD, PhD**

Medical University of Warsaw

The origins of the anti-vaccination movement date back to the invention of the first-ever vaccine, against smallpox. In 1796, British doctor Edward Jenner took pus scraped from pustules that had formed on the hands of milkmaids and, using a special bifurcated needle, instilled it into the skin of an eight-year-old boy. Jenner had noticed that milkmaids infected with cowpox, a disease that manifested itself in unpleasant-looking yet

harmless lesions on the skin of their hands, were immune to the potentially deadly disease, smallpox. About two weeks after administering the cowpox vaccine to the boy, the doctor deliberately exposed the little patient to biological material taken from a person infected with smallpox. As he did not contract the disease, Jenner continued his experiments on other children. His results were a success, even though today, we would most probably consider such conduct unethical (the standards of that era were distinctly different, as for example experiments were then conducted on convicted criminals).

However, rather than fearing the dangerous disease that was decimating towns and villages, Jenner's contemporaries instead started to express concerns about his new technique of vaccination. For

ACADEMIA vaccination debate

example, they suspected that administering vaccines would cause people to grow horns. But if it had not been for vaccinations, epidemiologists would not have succeeded in eliminating smallpox – which the WHO officially declared eradicated in 1980.

Dangerous allegations

Another important “milestone” in the history of the anti-vaccination movement came in 1998, when Andrew Wakefield published a paper alleging possible links between the measles, mumps, and rubella (MMR) vaccine and the development of autism and colitis, based on the description of a dozen cases. Wakefield’s paper, published in the respected medical journal *The Lancet*, caused major public concern, prompting parents, chiefly in Western Europe and in the United States, to choose not to have their children vaccinated. Although it was later demonstrated that Wakefield had resorted to falsification and scientific manipulation, his paper was ultimately retracted, and the author received the harshest punishment (being stripped of his medical license), both the article and the alleged adverse effects cited there continue to be invoked by parents as a major argument against vaccination. None of the numerous papers published in subsequent years, reporting on studies carried out at various centers, properly planned, conducted, and reviewed meticulously at multiple stages, ever demonstrated any links between vaccines and autism.

Another turning point came in 2000, when the United States Food and Drug Administration (FDA) ordered the removal of thiomersal (a compound

used in the process of vaccine manufacturing and as a preservative to prevent microbial growth) from vaccines as a result of reports alleging potential links between the accumulation of mercury compounds in the body and the development of autism and attention deficit hyperactivity disorder (ADHD). Intriguingly, the FDA’s measures were motivated purely by a willingness to allay the public’s concerns until all doubts were clarified, or, colloquially speaking, the move was taken “just in case.” Thiomersal is an ethylmercury compound, which is eliminated from the body (chiefly through fecal excretion) within four to nine days from administration (unlike methylmercury, which accumulates in the body). Studies conducted in Europe (by the European Agency for the Evaluation of Medicinal Products) and in the United States (by the FDA, the University of Rochester, and the National Naval Medical Center in Bethesda) revealed that blood levels of mercury in two- and six-month-old infants who had received immunizations with thiomersal-containing vaccines did not exceed safety levels. Studies revealed no harmful effect of thiomersal on the development of children, aside from possibly causing mild local reactions.

We could list many more such incidents based on allegations, as opposed to scientific facts. For instance, a report authored by Alan Phillips (not a doctor) claimed that antibiotics and vaccines have done nothing to improve the health situation of human beings in recent years (a claim so drastically unsubstantiated that no further comment is needed). Another alleged that there were links between the influenza vaccine and Guillain-Barré syndrome (GBS) – although it is clear that the risk of developing Guillain-Barré syndrome in temporal association with vaccine administration is comparable to that in the general population, whereas the risk of developing GBS as a potential complication of influenza is much higher. In recent years, suspicions have also spread about an alleged causal link between the HPV vaccine and infertility (in Romania, such rumors led to the fiasco of a program of free vaccinations for girls), postural orthostatic tachycardia syndrome (POTS), and complex regional pain syndrome (CRPS), also known as Sudeck’s atrophy. However, no scientific studies have ever confirmed any causal links between the HPV vaccine and any of the aforementioned syndromes or symptoms.

Dramatic consequences

Parents and patients who deliberately opt out of mandatory vaccinations expose themselves and their children to the risk of infection and also thereby reduce the “herd immunity” of society. For most

A young victim of a poorly administered smallpox vaccine. Stipple engraving, French, 1807.



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ANETA NITSCH-OSUCH



JAKUB OSTAŁOWSKI

Aneta Nitsch-Osuch, MD, PhD

is an epidemiologist and pediatrician. She is an assistant professor at the Department of Social Medicine and Public Health at the Medical University of Warsaw.

infectious diseases, the herd immunity threshold is 95% (exceptions include *Haemophilus influenzae*, for which the threshold is substantially lower, at 30–40%). This means that lowering the proportion of vaccinated individuals among the general population may lead to the outbreak of epidemics. A good example is offered by cases of measles, which continue to be reported in developed countries, in particular among unvaccinated enclaves of members of religious or ethnic minorities or other groups. In this context, despite the WHO's efforts and recommendations, the measles elimination program in Europe has again ended in fiasco. Measles epidemics among children who were not vaccinated, reported in the United States and Germany in 2014, have also caused widely-publicized deaths. Such epidemics are a consequence of unreasonable decisions not to have children vaccinated, made by parents who fear the allegedly dangerous adverse reactions to vaccination. Other outbreaks related to the lowering of the herd immunity threshold have been seen for such diseases as whooping cough (Wales, the Scandinavian countries, the United States) – although in this case the fact that the vaccine-acquired immunity wears off after 5–10 years also plays a role, a fact that therefore urges correct and timely administration of whooping cough vaccines in infants and also booster doses in adolescents, adults, and pregnant women.

Studies of the perception of vaccination in developed countries show that vaccination supporters account for 60–80% of the population, outspoken opponents represent 1–2% (these proportions remain steady), whereas 10–20% are hesitant – these are the people who do not take vaccines on time, intentionally delay them for no significant medical reasons, opt out of some vaccines while choosing to take others, and have numerous questions and doubts. Trying to change the minds of outspoken opponents is very difficult and such efforts often end in fiasco, even when all the rational arguments are invoked. Representatives of the medical profession should perhaps instead focus their educational activities on those who support vaccinations in order

to sustain this conviction and, in particular, on those who are hesitant in order to clarify their doubts and encourage them to follow vaccination schedules. Each country needs to carry out its own epidemiological diagnosis as well as social diagnosis in the context of vaccine refusals.

The differing reasons behind vaccine refusals, well-described in the medical literature, include: being afraid of vaccinations, usually as a result of exaggerated and untrue beliefs about adverse reactions to vaccines, playing down the danger posed by infectious diseases and perceiving them as harmless or non-existent, doubting the effectiveness of vaccinations, coming up against organizational problems (for example difficult access to vaccination; this factor does not pertain to Poland) as well as financial constraints (which may pertain to recommended vaccinations), and believing in various “conspiracy theories.”

Logos, ethos, and pathos

Keeping the number of children who are not getting vaccinated as low as possible requires doctors as well as nurses and midwives to promote vaccinations more effectively and to more actively and thoroughly clarify any related doubts. Any and all vaccine-adverse events must likewise be reported in order to ensure that vaccination safety data remain complete and transparent.

Vaccination discussions with parents who voice doubts should be based on all the principles of rhetoric: not only *logos*, meaning science, education, and information, but also *ethos* and *pathos*, which means communication and empathy. In other words, doctors should use plain language, avoid medical jargon, and show understanding for the concerns felt by parents, presenting examples that relate to their own experiences. Likewise, it is necessary to ensure easy access to information about vaccinations written by professionals. In Poland, these include the website www.szczepienia.pzh.gov.pl and the immunization campaign entitled “Zaszczep w sobie chęć szczepienia” (which might be loosely translated as “Give vaccines a shot”).

All in all, vaccinations represent one of the greatest achievements of modern medicine and their benefits for public health are comparable only to those stemming from water purification. Infectious diseases still pose a grave threat and remain the number-two cause of death on a global scale, after cardiovascular diseases. Continued efforts to implement and gradually extend the vaccination program are quite simply crucial for maintaining population health and public well-being.

ANETA NITSCH-OSUCH

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