

COMMENTARY**Contrasting the anti-vaccine prejudice:
a public health perspective****Paola Stefanelli and Giovanni Rezza***Dipartimento di Malattie Infettive, Parassitarie ed Immunomediate, Istituto Superiore di Sanità, Rome, Italy***Abstract**

Although immunization is one of the most successful and cost-effective health interventions, there has been always opposition to vaccines. This may be due to several factors, some of which are : 1) the vaccines are given to healthy individuals to prevent disease; 2) the perception of the vaccine value paradoxically declines when the use of a vaccine reduces or eliminates the risk of a disease. Contrasting anti-vaccine movements/feelings is important in order to keep vaccinated coverage rates high. Specific training of health care workers and other vaccine providers is needed in order to understand the reasons of reluctant parents, and to deal with prejudice and misinformation.

Key words

- vaccines
- vaccination
- anti-vaccine movements

BACKGROUND

Immunization is widely recognized as one of the most successful and cost-effective health investments in history; nevertheless, there has been always opposition to vaccination. This may be explained by the fact that vaccines are given to healthy individuals to prevent disease. Thus, compared with most pharmaceutical products, which are administered to ill persons for curative purposes, tolerance of adverse events of vaccines is substantially lower [1]. Moreover, as the widespread use of a vaccine diminishes or eliminates the risk of a disease, the public's perception of the vaccines value paradoxically diminishes, because the disease is no longer observed; thus, benefits perception becomes low [2], resulting in decreasing vaccine uptake and disease resurgence. In fact, since vaccines provide some "indirect" protection to non-vaccinated individuals (so called "herd immunity") and it is unlikely that vaccination procedures will be absolutely safe, a community optimal vaccination policy does not necessarily coincide with individual interest. This may promote selfish individual strategies (*i.e.*, anyone could encourage everyone else to be vaccinated, save his child or himself) [3]. However, when each "rational" individual seeks to maximize his gains taking advantage from the rest of the community the final result is what has been defined as "the tragedy of the commons" (*i.e.*, freedom in a commons may bring ruin to all) [4].

For the above mentioned reasons, risks associated to vaccination have been always overemphasized, inspiring mistrust and anti-vaccine movements, whose arguments are often disseminated through unbalanced news media accounts of vaccine risks [5].

WHO ARE THE ANTI-VACCINATIONISTS AND WHAT ARE THEIR THEMES?

Opposition to vaccines started with the introduction of the first vaccine [6]. Despite clear evidence of benefits, immunization campaigns against smallpox in the 19th century were hindered by anti-vaccination movements, resulting in ongoing outbreaks and excess of preventable deaths.

The impact of anti-vaccine thinking (*i.e.*, a combination of fear and mistrust) tended to oscillate over the time, declining in the 1940s, but then flourishing again in the 1970s. However, in accordance with Wolfe and Sharp [7], who compared arguments of present-day vaccine opposition with those of 19th century counterparts, "beliefs have remained remarkably constant over most part of two centuries, suggesting that such beliefs are deeply held" [7].

According to Butler [8], the composition of vaccine opponents is rather diversified. They may be alternative medicine advocates, such as herbalists and naturalists, conspiracy theorists, pseudoscientists, people with a political agenda, or belonging to anthroposophist communities or religious groups. In Europe, all Member States have a vaccine opposition in one form or another, but there is no uniform anti-vaccine lobby, since they have diverse agendas, they are more individualistic than organized, and they are neither powerful nor well-funded as in the US [8].

Innovation in communication methods, such as the availability of "Internet", has facilitated the dissemination of anti-vaccination arguments that question the safety of vaccines. Vaccine opponents now have a great ability to use cyber interaction to

share views, and a Google search led to vaccine-critical sites in about 1 of 5 hits on immunization [9].

Kata *et al.* [10] reported a list of contents and themes of the antivaccinationists sites which included safety and effectiveness issues (*i.e.*, “vaccine are biological weapons”), alternative medicine (*i.e.*, “The only true antibodies are those you get naturally”), civil liberties (“no one has the moral or ethical right to compel parents to vaccinate their children”), conspiracy theories (“the term sudden infant death was invented to explain away the ‘coincidence’ that babies die when they get vaccinated”), morality, religion, and ideology (“Immunization is against God’s will or it necessitates the belief that it is acceptable to sacrifice a few for the good of the majority”), misinformation and falsehoods (“Attenuated vaccines are infectious”), emotive appeals (“narratives from parents who felt their children were damaged by vaccines”). Some of the above mentioned themes strongly influence the individual decision making process or even the success of vaccination campaigns [10].

Emotive appeal through parents’ narratives may play a role in the decision making process. For example, parents may mistrust official government statements and their doctors and consult Internet, especially when they are unsatisfied with the information at hand and uncertain about their decisions. In these cases, lay narratives authored by other parents from the Internet, reporting severe adverse events, influence risk perception despite concurrently presented, more reliable statistical information [11]. Robb Butler suggests that individuals report that Internet has low importance for health decisions, and that the most important sources are health professionals and conventional media. But Internet may have more influence than reported, particularly when personal narratives are used (often in social media or online forums): narratives are powerful because they cause reader to feel threatened by vaccines [12].

Consideration is needed by religious opposition by fundamentalists, which is a major factor in the failure of immunization programs against polio in Nigeria, Pakistan, and Afghanistan [13]. In tribal areas of Pakistan, local Taliban have issued *fatwas* denouncing vaccination as an Western plot to sterilize Muslim populations, and this has resulted in transmission of wild polio virus from endemic districts in Afghanistan to previously polio-free areas in Pakistan, where several polio vaccination workers have been shot and killed [14]. Furthermore, mistrust of the vaccination campaign arose after it was discovered that a Pakistani doctor had been running a fake hepatitis B campaign as part of the US government’s efforts to track down Osama bin Laden [15]. This series of obstacles encountered by WHO in polio eradication is paradigmatic of the need to not only be socially and culturally but also politically sensitive in the implementation of vaccination campaigns in complex contexts.

MMR, PERTUSSIS, AND PANDEMIC FLU VACCINE: THREE EXAMPLES OF BAD FEELING AND ITS CONSEQUENCES

The first example is about MMR. Years ago, media attention and consequent public concern about vaccine safety followed publication of a small case-series suggesting an association between measles-mumps-rubella (MMR) vaccine and autism [16]. Although the original article was retracted [17], and many well-controlled studies performed subsequently found no evidence that MMR may cause autism, parents remained concerned that MMR vaccine is not safe, raising questions about how vaccine risks and benefits should be communicated [18, 19].

The second example regards pertussis whole-cell vaccines. In some countries, as pertussis became rarer, attention shifted from the disease to adverse events, compromising the success of routine vaccination campaigns; the consequent decline in vaccine coverage was associated with increasing incidence of pertussis in countries such as England, Sweden or Japan in the ‘70s [20]. However, according to Gangarosa, anti-vaccine movements had some beneficial effects, and their call for safer vaccines favoured the development of acellular vaccines, the improvement of adverse events surveillance systems, and the implementation of vaccine-injury compensation programs [20].

The third example concerns the vaccination campaign against the 2009 H1N1 pandemic influenza virus. Despite of preparedness plans estimating the need for a high vaccine coverage in order to control the pandemic waves, the vaccination campaign was unsuccessful in many countries. In Italy, this was in part due to the untimely availability of the vaccine, to poor health care workers’ attitude toward vaccination, and to wild rumors spread through electronic mail chains or Internet, which made false claims about vaccine safety, in particular against squalene, an adjuvant contained in the vaccine. This may explain why vaccine coverage remained as low as 19.6 per 100 in the general population (compared with 19.1 per 100 in the previous flu season) and 65.6 per 100 among the elderly (compared with 66.2 per 100) (Source: Italian Ministry of Health).

HOW TO CONTRAST ANTI-VACCINE FEELINGS?

To deal with vaccine opponents we should stop to provide them with the building blocks for their arguments, using a transparent and clear, plain language [8]. All issues which may improve vaccine services or to increase vaccine acceptability should be taken into account in the planning of vaccination campaigns.

Firstly, There is a need to translate uncertainty and to make evidence accessible. At the end, the scientific method should inform evidence-based decision making in order to help consumers and parents to balance risks and benefits of vaccination [6]. Personalized follow-up with more detailed knowledge on adverse events and their possible causal relation with vaccination is essential [1], as well as continued monitoring and assistance for those experiencing events which are

chronologically related to vaccine administration. To this regard, adequate knowledge of vaccine structure is required. In fact, vaccine composition is complex (*i.e.*, vaccines are composed by antigens, growth medium residuals, inactivators *i.e.* formaldehyde, adjuvants *i.e.* alum, preservatives, and stabilizers *i.e.* gelatin), and each component may be a target for possible claims about its safety [8].

Secondly, vaccination failure may be influenced by the ambivalence of physicians and other vaccine providers rather than parental concerns about vaccine safety [21]; sometimes, prominent figures in medicine and science may even act as anti-vaccine advocates [20]. To be credible in vaccination campaigns, health care workers should be well adequately trained on vaccine benefits and risks [22- 23]. Although we are in the Internet era, we should focus more on the vaccine encounter between the caregiver and the parent who is reluctant or influenced by vaccine opponents, favoring the understanding and acceptance of immunization programs through professional communication. Addressing vaccine hesitancy and refusal is a significant challenge for many practicing physicians. To this purpose, parents can be categorized in at least three groups: vaccine refusers, vaccine acceptors, and vaccine hesitant. With those hesitant to vaccinate, the healthcare encounter is critical in favoring a decision to vaccinate [24]. distinguish between anti-vaccine arguments and the right to be informed; thus reasonable complains of parents who feel abandoned in their decision making process should not be ignored. Engaging and addressing both persistent myths and thoughtful questions regarding the safety and efficacy of vaccines in the context of a busy practice requires skills and resources, while exploring in depth attitudes and vaccination behaviors of parents with varying levels of concern about vaccination is essential. Developing specific counseling addressed to favor a good

relationship between parents and doctors or other vaccine providers should be also considered.

Thirdly, it is important to inform the public about why most typical objections of anti-vaccination activists are false, as done by a collaborative Internet publication of two German federal institutes (Robert Koch and Paul Erlich). However, it should be taken into account that stronger risk negations paradoxically lead to higher risk perceptions, and this effect also depends on how trustworthy the source of information is [9-25]. In Italy, a web-site called "VaccinarSi" has been realized by the SITI (the Italian Society of Hygiene, Preventive Medicine and Public Health) to contrast information from antivaccination sites. Conspiracy theories are hard to refuse if all decisions taken by government and committees are made behind closed doors. Even when meetings are open to public, it may not be clear how decisions are arrived at. Finally, transparency and clarity on conflicts of interest (history of drug safety issues ignored/denied). Moreover, a shift from traditional paternalistic to a shared decision model may be useful.

Finally, in countries or regions where some vaccinations are mandatory, allowing for philosophical exemptions may provide a "relief valve"; however, the effectiveness of this strategy should be carefully evaluated in the local context.

CONCLUSIONS

Contrasting anti-vaccine feelings and activists is a difficult public health challenge. Rejecting vaccine opponents arguments is essential but understanding the reason of mistrust may help creating a favoring atmosphere for the success of vaccination campaign. For this reason, it could be helpful to develop training programs on evidence-based vaccinology, promoting adequate knowledge of adverse events, and strengthening communication skills.

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