1. Blumenthal D, Morone JA. The heart of power: health and politics in the Oval Office. Berkeley, CA: University of California Press, 2009.

2. Congressional Budget Office. Selected CBO publications related to health care legislation, 2009–2010 (https://www.cbo.gov/sites/default/files/111th-congress-2009-2010/reports/12-23-selectedhealthcarepublications.pdf).

DOI: 10.1056/NEJMp1610717

Vaccine Refusal Revisited — The Limits of Public Health Persuasion and Coercion

James Colgrove, Ph.D., M.P.H.

In recent years, vaccine refusal and associated declines in herd immunity have contributed to numerous outbreaks of infectious diseases, consumed public health resources, and provoked increasingly polarized debates between supporters and opponents of vaccines. Although the prominence of the Internet as a forum for information and misinformation has given these conflicts a distinctly 21st-century character, they have deep historical roots. Many of the scientific, ethical, and political challenges that physicians and public health officials face today in dealing with vaccine refusal would be recognizable to their counterparts of previous eras. The heart of their task entails balancing the use of coercive and persuasive approaches.

Coercion is the older tradition in public health. During the 19th century, many states and localities passed compulsory-smallpox-vaccination laws covering both children and adults. These laws were of a piece with an expansive network of public health regulations that arose in that era concerning practices such as quarantine, sanitation, and tenement construction. Vaccination laws imposed various penalties, including exclusion from school for unvaccinated children and fines or quarantine for adults who refused vaccination. The effectiveness of the laws was soon demonstrated — jurisdictions with them consistently had fewer disease outbreaks than those without — and their constitutionality was upheld in numerous court challenges that culminated in the 1905 Supreme Court case of *Jacobson v. Massachusetts*.

The use of coercion has always raised concerns about state intrusions on individual liberty and the scope of parental control over child-rearing. Compulsory vaccination laws in the 19th century typically contained no explicit opt-out provisions. Today, all states offer medical exemptions, and almost all offer religious or philosophical exemptions. Nevertheless, even a law with an opt-out provision may exert a coercive effect, to the extent that the availability of the exemption may be limited and conditional and the consequence of the law is to make the choice to withhold vaccination more difficult (if only marginally so) for the parent. These laws continue to be the target of antivaccination activism.

Persuasion became an important part of the public health tool kit in the 1920s, with the rise of modern forms of mass media. Health professionals began to draw on techniques from the emerging fields of advertising and public relations to sell people on the importance of childhood immunization against diphtheria and pertussis. Such appeals began to acquire a more scientific basis in the 1950s, after the development of the polio vaccine, when sociologists, psychologists, and other social scientists began to identify the attitudes, beliefs, and social contexts that predicted vaccine-related behaviors. Their efforts brought increasing theoretical and empirical rigor to the study of why people accepted or declined vaccination for themselves and their children, and health professionals used these insights to develop approaches to increase uptake of vaccines, such as enlisting community opinion leaders as allies.[1] Persuasive approaches, because they are less restrictive, are ethically preferable and more politically acceptable, but they are also time consuming and labor-intensive, and evidence indicates that by themselves they are ineffective.

Vaccine refusal has been a heterogeneous phenomenon reflecting a diverse and complex array of attitudes and beliefs, including mistrust of medical and scientific elites, resistance to government authority, and adherence to "natural" or alternative health belief systems. Although religion-

based objections have made up a relatively small part of the overall picture of vaccine refusal, Christian Scientists have been very vocal in their opposition, and some of the most severe disease outbreaks in the United States in recent decades have occurred among isolated or tightly knit religious communities that have spurned vaccination (see the report by Gastañaduy et al. in this issue of the *Journal* on measles in an Amish community in Ohio [pages 1343–54]). The prominence of antivaccination views in public discourse has waxed and waned since the 19th century; eras in which vaccine critics remained on the fringe have alternated with eras in which their ideas enjoyed wide exposure. Our current era is one of the latter.

Today, immunization proponents are attacking the problem of refusal by honing the effectiveness of both persuasive and coercive approaches. Continuing the work begun by social scientists in the 1950s, they are seeking to develop a more nuanced understanding of the phenomenon of vaccine hesitancy — the term given to the spectrum of behaviors that include reluctant, selective, or delayed vaccination as well as refusal of all vaccines — in order to more precisely identify its underlying motivations. A better understanding of these beliefs is a critical step in crafting more effective messages that can be delivered through media channels or in one-on-one encounters with health care workers.

Progress on this front has been mixed. One study demonstrated that relatively subtle alterations in provider communication styles could produce considerably more acceptance among vaccine-hesitant parents during pediatric visits.[2] In contrast, another study testing a variety of fact- and emotion-based messages to counter hesitancy found that all were ineffective and could even be counterproductive.[3] Because of the complexity of vaccine hesitancy and the many biases and heuristics (cognitive shortcuts) that people use to assess and make decisions about risk, it's challenging to use persuasive approaches, and few such interventions have been clearly demonstrated to be effective.[4]

A more promising way forward can be found in the tools of the law. Many immunization proponents also advocate for strengthening compulsory-vaccination laws to narrow the circumstances under which parents may refuse to have their children vaccinated and to make it difficult or impossible for them to claim exemptions on religious or philosophical grounds. In what may prove to be an important bellwether, California eliminated nonmedical-exemption provisions in 2015, becoming only the third state in the country without them.[5] Various health professional groups have recommended that other states follow suit.

Some immunization proponents have argued convincingly that states should retain nonmedical exemptions to avoid inflaming the resistance of antivaccination activists and that legislators and health officials should proceed carefully as they press for change. Nevertheless, vaccination laws have a proven track record over more than two centuries, and strengthening them will probably be the most effective means of achieving higher immunization rates in both the short and long terms. Even the most well-crafted persuasive appeals cannot achieve the nearly universal vaccine uptake needed to maintain herd immunity for highly contagious diseases such as measles.

Both persuasion and coercion are necessary, and neither is sufficient. Laws serve as a critical safety net as well as a powerful symbolic statement of proimmunization social norms. Education and persuasion are needed to maintain public understanding of the value of vaccines and trust in health professionals, both of which are essential to securing compliance with laws. The melding of the two approaches — along with ensuring a stable, accessible, and affordable supply of vaccines for everyone who needs them — is the central challenge for vaccine policymakers. As has been the case since the 19th century, effectiveness, efficiency, ethics, and political acceptability all need to be balanced in a careful calculus.

Disclosure forms provided by the author are available at NEJM.org.

From the Department of Sociomedical Sciences, Columbia University Mailman School of Public Health, New York.

1. Colgrove J. State of immunity: the politics of vaccination in twentieth-century America. Berkeley: University of California Press, 2006.
2. Opel DJ, Heritage J, Taylor JA, et al. The architecture of provider-parent vaccine discussions at health supervision visits. Pediatrics 2013;132:1037-46.
3. Nyhan B, Reifler J, Richey S, Freed GL. Effective messages in vaccine promotion: a randomized trial. Pediatrics 2014;133(4):e835-42.
4. Salmon DA, Dudley MZ, Glanz JM, Omer SB. Vaccine hesitancy: causes, consequences, and a call to action. Am J Prev Med 2015;49:Suppl 4:S391-8.
5. Mello MM, Studdert DM, Parmet WE. Shifting vaccination politics — the end of personal-belief exemptions in California. N Engl J Med 2015;373:785-7.

DOI: 10.1056/NEJMp1608967