



History of vaccinology

## Childhood vaccination requirements: Lessons from history, Mississippi, and a path forward

Philip B. Cawkwell<sup>a,\*</sup>, David Oshinsky<sup>a,b</sup><sup>a</sup> New York University School of Medicine, New York, NY, USA<sup>b</sup> Division of Medical Humanities, Department of Medicine, New York University School of Medicine, New York, NY, USA

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## ABSTRACT

Mississippi consistently leads the United States in childhood vaccination with a greater than 99% measles–mumps–rubella vaccination rate for children entering kindergarten. The story of how this came to pass in a state that lags behind on nearly every other public health measure is pertinent given the recent outbreaks of measles in the United States, especially in pockets of the country where there is strong resistance to vaccination. The fight against compulsory vaccination law is centuries old and the enduring success of Mississippi at repelling challenges to their vaccination requirements is a testament to the public health infrastructure and legal framework established in the state. Herein we trace the anti-vaccination movement from its origins in England up until the present time in the United States and explore how Mississippi has established a model vaccination system. Seminal court cases and legislation are evaluated for their impact. Finally, contemporary battles over vaccination legislation are examined and the feasibility of national-level change is considered.

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There is outrage among some citizens in Mississippi regarding public health in the state. This has arisen not because Mississippi is among the unhealthiest states in the country by many metrics: a 35% obesity rate [1], a 25% smoking rate with no indoor smoking ban [2], or because it has the highest rate of infant mortality of any state [3]. The outrage has been expressed by individuals opposed to Mississippi's requirement that all children receive five vaccination series before beginning kindergarten [4]. It is unique from 47 other states (excluding West Virginia and California) in that parents cannot elect to have their children forego the vaccinations for religious or philosophical reasons and have them attend a public or private school in the state. As a result, 99.7% of children enrolled in kindergarten in Mississippi have received the measles, mumps, and rubella (MMR) vaccine compared to 94.7% nationally [5]. This state, which lags behind others in many areas of public health, is the consistent national leader in vaccination and has important lessons to teach other states regarding vaccination and dealing with opposition.

Although the anti-vaccination movement has seemingly inserted itself into the national conscience within the past decade, it is critical to realize that the history of individuals opposed to compulsory vaccinations is centuries old. In order to be certain

that children, especially those of “the poorer classes” who “needed to be compelled to vaccinate, as they [had] apathetic, indifferent, and neglectful parents,” received the smallpox vaccine, the Parliament in England passed the Compulsory Vaccination Act of 1853 [6]. The first anti-compulsory-vaccination propaganda soon followed. *Our Medical Liberties*, a 64 page pamphlet written by John Gibbs and published in 1854 is replete with many of the arguments still articulated today, with the author stating he does “not believe that [the smallpox vaccine] affords an efficient and assured protection against the invasion of small-pox” and that the new law was written “to steal away our medical liberties one by one” [7]. It would be a few years before these individuals, angered over compulsory vaccination, coalesced into groups in order to strengthen their message. The first such group was founded by Richard Gibbs, cousin of John Gibbs: the Anti-Compulsory Vaccination League, formed in 1866, claimed 10,000 members by 1870 [6]. Many pamphlets and periodicals were written by various groups during this time, such as *The Story of a Great Delusion* (1885), which makes it clear that the group felt marginalized by those who “will tell you [the smallpox vaccine] has stopped smallpox and does no harm, and if you venture to question either assertion you are set down as an abettor of ‘those ignorant and fanatical anti-vaccinators’” [8].

Although there was no such national compulsory vaccination law in America, many states and local school boards took it upon themselves to implement immunization requirements. The first

\* Corresponding author. Tel.: +1 914 980 7086.

E-mail address: [Philip.Cawkwell@med.nyu.edu](mailto:Philip.Cawkwell@med.nyu.edu) (P.B. Cawkwell).

state to do so was Massachusetts, which implemented a compulsory school vaccination law in 1855. By the 1890s, most of the New England states had passed similar legislation [9]. This resulted in numerous lawsuits, primarily by parents seeking to allow their children into schools without being vaccinated [10]. However, courts repeatedly upheld the validity of these restrictions, declaring it allowable to “adopt reasonable health regulation for the benefit of the pupils and the general public” [11]. Eventually a case reached the Supreme Court of the United States. When the Cambridge, Massachusetts Board of Health saw a surge in smallpox cases it issued an order that required all adults to be vaccinated or face a fine of \$5 (roughly \$145 in 2015) [12] if they refused. Henning Jacobson, a Swedish immigrant, refused, citing a previous bad reaction and was subsequently fined. He appealed the decision which was ultimately heard by the Supreme Court in 1905 [13]. In this seminal case, the Court ruled that “the liberty secured by the Constitution of the United States to every person within its jurisdiction does not import an absolute right in each person to be, at all times and in all circumstances, wholly freed from restraint. There are manifold restraints to which every person is necessarily subject for the common good” [14]. Similar cases challenging compulsory vaccination would be brought to the Supreme Court again in 1922 [15] and 1944 [16], with comparable results: clear precedent was set that compulsory vaccination could be mandated for the good of the public.

It was not until the 1970s that a push was made at the national level to ensure that every state in the country had vaccination requirements for children entering schools. Initially, some states acted on their own accord and enacted vaccination laws in response to numerous measles outbreaks during the 1960s and 1970s [17]. As evidence mounted linking higher prevalence of measles to states without mandatory vaccination requirements [18], Joseph Califano, Secretary of the Department of Health and Human Services, wrote to the governors of every state encouraging them to adopt compulsory vaccination laws; by 1980, all 50 states had laws requiring vaccination for school entrance [19]. However, these laws very often were not pure compulsory vaccination requirements, but instead allowed for exemptions because of the influence of outside groups. In New York State, a 1967 law that required children to receive the polio vaccine included a waiver for “a child whose parent, parents, or guardian are bona fide members of a recognized religious organization whose teachings are contrary to the practices herein”—language added at the request of Christian Scientists [20]. Religious exemptions are now in place in 47 states with an additional 19 also allowing ‘personal belief’ exemptions [21]. These personal belief exemptions are broader—parents can opt out of routine vaccines if they claim moral, philosophical, or simply personal opposition to vaccination [22]. Only West Virginia, California, and Mississippi eschew these exemptions—allowing only for medical exemptions for children who cannot be vaccinated (such as those receiving chemotherapy or otherwise immunosuppressed).

The story of how Mississippi came to lead the nation in vaccinating youth can be traced back to a monumental Mississippi State Supreme Court decision. The case was predicated on a Mississippi State code from 1972, which stated “it shall be unlawful for any child to attend any school, kindergarten or similar type of facility intended for the instruction of children. . . unless they shall first have been vaccinated against those diseases specified by the State Health Officer” [23]. In 1979, Charles Brown sued in order for his six year old son to be admitted to Houston Elementary School in Houston, Mississippi despite the fact that he had not been vaccinated due to “strong and sincere religious beliefs”. The Court ultimately upheld the validity of the state code, noting that “requiring immunization against certain crippling and deadly diseases particularly dangerous to children before they may be admitted to school, serves an overriding and compelling

public interest, and that such interest extends to the exclusion of a child until such immunization has been effected, not only as a protection of that child but as a protection of the large number of other children comprising the school community”. The importance in this decision lies in the fact that the Court went a step further, ruling that religious exemptions discriminated against children whose parents did not have those religious convictions, thus violating the 14th Amendment, which calls for equal protection of the laws [24]. This same line of thinking also applied to philosophical and personal belief exemptions: allowing for these would discriminate against the majority who don’t hold those beliefs. Dr. Thomas Dobbs, the current state epidemiologist in Mississippi has highlighted the importance of this case, stating that the absence of a legal pathway to exemptions is helpful to the immunization program, but also adds that it is only one piece of the puzzle, and the infrastructure built by the Department of Health adds another equally critical layer. There is “unit level accountability” from the school system, support from the pediatricians and family physicians in the community, and a “really comprehensive vaccine registry” [25]. Mississippi allows for medical exemptions, but these are notoriously strict: they must be submitted to the Department of Public Health by a licensed primary care physician in Mississippi—only 121 were approved in 2013–2014 [26]. All of these pieces form the most successful childhood immunization program in the United States and yet it is constantly under attack.

Vaccination law in Mississippi has come under siege as recently as the 2015 legislative session, wherein State Senator and Tea Party member Chris McDaniel submitted SB 2800. This bill would have amended the Mississippi code to allow for exemptions to vaccination “on the basis that they are contrary to his or her beliefs” [27]. When McDaniel’s bill died in committee, another sprang up which sought to accomplish the same thing: House Bill 130 [28]. This is clearly a contentious issue in the state, with the issue often being framed in a light that does not value the Health Department’s position, such as one newspaper article with the headline, “Mississippi Last in Vaccine Choice” [29]. The Jackson Free Press, a popular weekly newspaper with a print readership of 37,000 [30] ran a cover story on the issue during the week of February 18–24, 2015. The artwork shows a child in the process of being vaccinated with the overlying headline “The Anti-Vax Paradox—Pitting Parental Freedom Against Children’s Health.” The article is quick to point out the controversy that the issue has raised among parents in Mississippi, some of whom voraciously argue for the freedom to choose whether or not their child is vaccinated [31].

One group in particular that spearheads this effort is the Mississippi Parents for Vaccine Rights (MPVR). With a membership of approximately 2000 and a stated mission to “restore our fundamental parent right to make. . . medical decisions for our own children” the group positions itself as being “not anti-vaccine” but rather “pro parental rights” [32]. This is unique from many of the national groups opposed to vaccination, which place a greater emphasis on enumerating the evils of vaccination. The group sees the “most heavily vaccinated pediatric population in the world” not as an accomplishment, but as an indication of government overstepping its bounds. Ultimately, this group was unsuccessful in accomplishing their goal during this legislative session—SB2800 and HB130 both failed to add exemptions to Mississippi’s vaccination law. This failure may have been due in part to timing, as the measles outbreak in California was becoming national news while the legislature was debating these bills, and in part to the standard set by *Brown v Stone* in 1979 [33]. This defeat has not dampened the outlook of the MPVR followers, who state that they are “making plans to start preparing for next year. . . we’re not quitting” [31].

There is evidence that the national landscape is changing on vaccination law with regards to exemptions. As of March 2015, a

total of 19 states have pending legislation that would either eliminate exemptions or make it more difficult to obtain them [34]. Maryland [35], North Carolina [36], Pennsylvania [37], and Rhode Island [38] have bills pending in state legislature that specifically seek to remove religious exemptions. None of these states allow for philosophical exemptions, meaning that they would join the ranks of Mississippi, California, and West Virginia as states with only legitimate health exemptions if these bills passed. The state of Washington [39] has pending legislation aimed to eliminate philosophical exemptions. A bill in Vermont [40] attempted to roll back both exemptions simultaneously, an effort that was ultimately successful in removing philosophical but not religious exemptions [41]. Other states, including New Jersey [42], Maine [43], Oregon [44], Illinois [45], and Connecticut [46], are not aiming to eliminate exemptions at this time, but are seeking to tighten the rules governing exemptions to make it more difficult to obtain them. For example, instituting stricter documentation guidelines, such as requiring notarized statements be submitted in order for exemptions to be granted. It is clear that many states are attempting to strike while the iron is hot.

Recent outbreaks have provided public health officials with a certain amount of clout that can help with getting legislation passed. There is historical precedent to this idea, starting with the fact that modern childhood vaccination laws were enacted mostly in response to measles outbreaks in the 1960s and 1970s [17]. Outbreaks offer a reminder of the devastating power of certain diseases that may have disappeared from the public consciousness because outbreaks emerge so infrequently. This is true even for diseases that have ravaged other countries; they only become a priority when individuals in our society bear direct witness to their potential for destruction. When Ebola came to the United States in late 2014, it had already caused over 5000 deaths in West Africa [47]. But it was only after a handful of Americans contracted the disease and had the capacity to spread it to others on American soil that the President called for increased NIH spending to focus on the disease [48]. As a result, there was a big push from pharmaceutical companies for a functional vaccine [49]. Outbreaks in the past have also caused significant response from the public, many of whom clamor for a vaccine only in times of crisis [50].

Considering the role of outbreaks in influencing legislative process and public opinion is especially timely. Between January 4 and April 2, 2015, 159 cases of measles were reported to the Centers for Disease Control and Prevention (CDC), of which 111 (70%) were directly linked to an outbreak in December 2014 at Disneyland in Orange County, California [51]. Of the affected, 7% had received two or more MMR vaccinations, 45% were unvaccinated, and 43% had unknown vaccination status [52]. In response, California State Senators Pan and Allen sponsored SB 277, introduced on February 19, 2015 and passed into law on June 30, 2015. The bill eliminated all non-medical vaccine exemptions in California. Both senators involved understand the importance of the issue on a personal level—Senator Richard Pan is a pediatrician and Senator Allen is the son of the polio survivor [53]. In his remarks to the California Senate Judiciary Committee, Dr. Pan directly referenced the Disneyland outbreak, stating, “the measles outbreak that began in Disneyland last December, has proved that our community immunity is waning to dangerously low levels due to an over three-fold increase use of the personal belief exemption in way too many schools” [54]. It is clear that with the impetus from recent outbreaks that has captured national attention [55] now is the appropriate time for public health departments and legislators to make a push for repealing exemptions.

There is not unanimous agreement among scientists and policy experts that removal of all non-medical exemptions is the most prudent path forward. One recent commentary notes that while new laws rolling back exemptions are well intentioned, the

approach is imprudent because of possible backlash from the public and the possibility that this may drive hesitant parents to accept anti-vaccination [56].

It is important to consider the potential pitfalls and difficulties that can be encountered when trying to repeal religious and personal belief exemptions. As Mississippi State Epidemiologist Dobbs says, “It’s easier to maintain [an exemption free state] than it is to add [one]” [25]. The argument that is continuously raised whenever a bill is introduced to limit exemptions is that of liberty. Although bills that restrict exemptions do not explicitly mandate vaccination, they are often framed in this light. Barbara Loe Fisher, a critic of compulsory vaccination policy has stated that, “Our natural right to ‘life, liberty and the pursuit of happiness’ is being violated when government health officials enlist doctors and politicians to track down and coerce us into injecting ourselves and our children with biological products that carry significant health risks” [57]. This may be more difficult for scientists to counter than a debate framed around whether vaccines cause autism, since it is not one that can be directly answered by scientific studies or statistics. However, there is very strong legal footing as discussed above that recognizes the validity of law that protects the health of the public at large. The debate can be similar with regard to religious exemptions—these groups assert that their freedom to practice their own religion is impinged when they must vaccinate their children. It is critical to point out that no one is forcing them to vaccinate, but if they refuse, these children must be kept out of the public sphere in order to protect the health of the public at large. However, outbreaks like the one seen at Disneyland prove that this is an impossibility. Additionally, there is research that has found that “decline [in] immunization actually reflected concerns about vaccine safety or personal beliefs among a social network of people organized around a faith community, rather than theologically based objections *per se*” and that passages can be identified in most religious scriptures that could be used as evidence to support vaccination [58].

Another important difficulty in rolling back exemptions that needs to be considered is that while the theory behind repealing exemptions may be straightforward, the implementation is exceedingly complex. Passing legislation requires not only political power, but also the will, time, energy, and skills to navigate the legislative arena [59]. However, even if state legislators do not feel like they have the political clout to pass a law eliminating exemptions, there are still important steps to take to improve vaccination rates. Research has shown that just making exemptions more difficult to obtain results in lower rates of vaccine refusers [60]. So if a state like Wisconsin, which only requires the parent to check a box “for religious reasons” or “for personal conviction reasons” in order to exempt the child, [61] changed their law to be more like Georgia’s, which requires a notarized statement affirming that immunization is in conflict with the religious beliefs of the parents [62], this would likely result in a greater proportion of vaccinated individuals.

Change in childhood immunization exemption laws is an important public health goal for this decade. Vaccination has succeeded in eliminating smallpox and minimizing the impact of many potentially fatal infections. There is legal precedent demonstrating the right of states to mandate vaccination for school entry in order to protect the public at large. There is a strong argument to be made for vaccination as a social obligation to provide herd immunity and protect those who cannot be vaccinated [63]; it is safer to be unvaccinated living in highly vaccinated community than to be vaccinated but living in an unvaccinated community [64]. It is clear that the path to a nation of states without religious or personal-belief exemptions would be a difficult one as this is a very polarizing issue. However, now is the time for this debate. Public health departments and state legislatures need to take up the issue, as recent outbreaks have brought vaccination back into the national conversation. Mississippi leads the nation in childhood vaccination because of their

strict exemption policy and other states would be wise to follow suit.

### Conflict of interest statement

None.

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