

# Vaccinations – A State's Call

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## Introduction

There has been a long history of battles between an individual's willingness to receive vaccinations and the government requiring citizens to receive vaccines. Throughout the history of the United States, citizens had been given the freedom to decline vaccinations due to religious and/or personal belief exemptions. The National Center for Immunization and Respiratory Diseases (NCIRD) and the Centers for Disease Control and Prevention (CDC) reported that all 50 states allowed medical exemptions, 48 allowed religious exemptions, 19 allowed philosophical exemptions, and two – Mississippi and West Virginia – allowed neither religious nor philosophical exemptions during the 2015–2016 school year.<sup>1</sup> Have these exemption policies gone too far?

In December 2014, a measles outbreak started in Orange County, California, leading to a record number of 667 measles cases reported in 2014 and 188 cases in 2015 in the United States.<sup>2</sup> Amongst these measles cases, the majority of the people affected were unvaccinated.<sup>2</sup> This recent measles outbreak was the impetus for Californians to reconsider the possibility of mandatory vaccinations in California after the modern MMR (measles, mumps, and rubella) vaccine controversy started when Dr. Andrew Wakefield's study was published in *The Lancet* in 1998, arguing vaccines might cause autism. Although Wakefield's study on vaccinations has been retracted, the impact on how the public perceives the relationship between MMR vaccine and autism is still significant. There has been a long history of anti-vaccination movements from smallpox and the anti-vaccination leagues in England and the United States to the international diphtheria, tetanus, and pertussis vaccine controversy to the recent measles, mumps, and rubella vaccine controversy.<sup>3</sup> Although there has been an anti-vaccination force, Healthy People 2020 aims to achieve a 95% vaccination coverage for MMR vaccine, DTaP (diphtheria, tetanus, and acellular pertussis) vaccine, and varicella vaccine among kindergartners.<sup>4</sup> A recent report from the CDC revealed that during the school year 2015–2016 among the 50 states, the median MMR (2-dose series) vaccination coverage was 94.6%,

DTaP vaccine was 94.2%, and varicella (2-dose series) vaccine was 94.3%.<sup>4</sup> This report further discussed that 22 states reached the vaccination coverage target for MMR vaccine, 20 for DTaP vaccine, and 18 for varicella vaccine.<sup>4</sup> In California, during the school year 2015–2016, the median vaccination coverages among kindergartners were 94.5% for 2-dose MMR vaccine, 94.2% for DTaP vaccine, and 96.3% for first-dose varicella vaccine;<sup>4</sup> thus, California, as a state, is approaching the vaccination coverage goal of 95% set by Healthy People 2020 for the aforementioned vaccines.

Table 1 shows immunization status in California preschoolers, kindergartners, and 7th- graders who did not receive vaccinations due to personal belief exemptions during the 2014–2016 school years. Overall, the numbers of cases that requested exemptions due to personal belief or religious belief trended down from the 2014/2015 to the 2015/2016 school years.<sup>5,6,7</sup>

The numbers of requests for personal belief exemptions in California among preschoolers, kindergartners, and 7th-graders were mostly below 5% during the two school years captured in Table 1. Some parents might have been concerned about the linkage between thimerosal (used in multi-dose-vial vaccines to prevent bacterial and fungal growth) and the development of autism. Data generated by many well-designed and well-executed studies have not confirmed the connection between autism and thimerosal.<sup>8</sup> In addition, many vaccine manufacturers revealed that their vaccines never contained thimerosal, for example, varicella vaccine (Varivax) and MMR vaccine (M-M-R-II) produced by Merck & Co., Inc.<sup>9</sup> There are three brands of DTaP vaccines: two (Infanrix by GlaxoSmithKline Biologicals and Daptacel by Sanofi Pasteur, Ltd.) are free of thimerosal and one (Tripedia by Sanofi Pasteur, Ltd.) contains a trace amount (< 0.3 microgram Hg/0.5 mL dose).<sup>9</sup>

The passing of SB 493 has restructured how California pharmacists provide vaccinations for the public via a uniform, statewide protocol. Pharmacists across the spectrum might face situations where they need to discuss vaccination myths and regulations with whom they serve, so it is essential for

pharmacists to recognize patients' perceptions and to understand regulations pertaining to vaccinations.

**Table 1. Personal Belief and Religious Belief Exemptions Requested (presented in %) in California, 2014–2016 School Years<sup>5,6,7</sup>**

	2014 - 2015			2015 - 2016		
	Public	Private	All	Public	Private	All
<b>Preschoolers</b>						
Number of Children	129,636	283,310	486,634	131,751	282,986	484,979
Personal Belief Exemptions	1.62%	3.68%	2.67%	1.27%	3.23%	2.31%
Health Practitioner Counseled	0.71%	1.47%	1.11%	0.77%	2.06%	1.47%
Religious	0.25%	0.47%	0.35%	0.23%	0.38%	0.30%
<b>Kindergarteners</b>						
Number of Children	494,636	40,598	535,234	508,458	42,665	551,123
Personal Belief Exemptions	2.31%	5.33%	2.54%	2.16%	4.93%	2.37%
Health Practitioner Counseled	1.54%	2.85%	1.64%	1.64%	3.93%	1.81%
Religious	0.50%	0.81%	0.52%	0.52%	1.00%	0.56%
<b>7th-Graders</b>						
Number of Children	453,832	35,811	489,643	460,148	36,657	496,805
Personal Belief Exemptions	1.90%	4.53%	2.09%	1.52%	3.38%	1.66%
Health Practitioner Counseled	-	-	-	0.92%	2.42%	1.03%
Religious	-	-	-	0.60%	0.96%	0.63%

A misconception has been that the federal government has total control over vaccinations, mandating citizens to receive vaccines. In fact, each state has the authority to require vaccinations, hence following recommendations published by the Centers for Disease Control and Prevention.<sup>10</sup> In all 50 states, children are required to receive specific vaccinations; therefore, completing these vaccinations has become a condition for them before entering schools. Children with an immune disorder or cancer, however, can be exempted from such requirements. Some parents, who are concerned that vaccines are harmful, might choose to decline vaccinating their children, thereby requesting exemptions, e.g., religious exemption or personal belief exemption. Many of these vaccination exemptions started during the Nixon administration, when many Christian Scientists advocated for people who believed in faith healing, thus asking for exemptions via the religious route.<sup>1</sup> Little did they know that these requests could potentially lead to the return of childhood infectious diseases that had been previously eradicated.

## Epidemiological Aspects of the Issue

A 2006 study revealed that “states with easy procedures for granting nonmedical exemptions had approximately 50% higher rates of whooping cough.”<sup>10</sup> The design of this study focused on collecting data on state-level rates of nonmedical exemptions at school entry (from 1991 to 2004) and pertussis incidence data from those who were 18 years or younger (from 1984 to 2004).<sup>11</sup>

The degree of ease in obtaining a nonmedical exemption was grouped into three categories: easy, medium, and difficult.<sup>11</sup> An unpaired t-test was used to compare states with religious only exemptions against personal belief exemptions. Comparisons were also made between easy and medium exemption-granting processes as well as between easy and difficult exemption-granting processes via unpaired t-tests. Data were then reported as incidence rate ratios (IRRs) to reveal the associations between pertussis incidence and state policies (religious only exemptions vs. personal belief exemptions as well as the degree of ease in obtaining a non-medical exemption – easy, medium, and difficult).<sup>11</sup>

Geographically clustered, nonmedical exemptions were identified as a pattern in some cities (Ashland, Oregon; Vashon, Washington), leading to much higher individual and community risks.<sup>11</sup> State-level vaccine refusal rates had not been fully captured, thus the risks of disease outbreaks were increased by social clustering of exemptions.<sup>11</sup> Biases could have come from data collection processes; for example, self-reported exemption rates by schools as well as various methodologies to collect and report exemption data in different states.<sup>11</sup>

## Management of the Issue

Some public health experts have suggested the removal of personal and philosophical exemptions, allowing religious exemptions.<sup>10</sup> To address the potential outbreaks of vaccine-preventable diseases, California Governor Jerry Brown signed Senate Bill (SB) 277 into law on June 30, 2015, and this new law went into effect on July 1, 2016. SB 277 removes the personal belief exemptions for 10 school-required vaccinations, requiring immunizing children in public or private schools and child care centers.<sup>12</sup> All students must meet the vaccination requirements, with the exceptions of a medical exemption, home-schooled students, or students receiving independent studies with no classroom instruction.<sup>12</sup> Since this new law has become effective, parents can either make plans to have their children vaccinated or choose an alternative option for children to continue their education. This new legislation has created a powerful incentive for parents to immunize their school-aged children, thus reducing the incidence of many vaccine-preventable diseases.

## Summary

As the most accessible healthcare providers, pharmacists have both the opportunity and the responsibility to advocate for immunizations.<sup>13</sup> With the implementation of SB 493, California pharmacists have been granted the authority to initiate and administer immunizations independently, making the pharmacist's role of educator even more crucial on a multidisciplinary healthcare team. As educators, facilitators, and immunizers, pharmacists reach out to not only healthy adults but also school-aged children, vulnerable geriatric patients, and immunocompromised patients, aiming to maximize immunization rates. Surely, every citizen has the right to refuse vaccinations; however, if many of us refuse to receive immunizations, the public is then more prone to vaccine-preventable diseases, increasing the risk of outbreaks. As members of our own community, we should all consider receiving vaccines to protect the less fortunate – those who cannot receive vaccines due to medical reasons – so that we might be able to avoid future outbreaks such as the measles outbreak during late 2014 to early 2015 in Orange County, California. Receiving vaccinations, after all, is not only an individual's choice but also a public health matter.

## About the Author

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