

Missouri Center for Public Health Excellence

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The Importance of Protecting the Community: Eliminating or Restricting Non-Medical Exemptions for School-Required Vaccinations

Recommendation: MOCPHE members, representing local health departments covering over 50% of the population residing in Missouri, recommends a change in Missouri's Non-Medical Exemption laws.



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Summary

From 2011 – 2020, it is estimated that vaccinations will have prevented more than 23 million deaths worldwide.¹ Due to effective public health and health care efforts, the impact of diseases such as polio, measles, and hepatitis B have been significantly lessened. Unfortunately, vaccination rates have not remained as high as necessary to fully protect communities and, correspondingly, vaccine-preventable diseases have once again become a problem, both in Missouri and worldwide. Among the contributing factors for this negative trend is non-medical exemptions for school-required vaccines. Missouri can effectively combat vaccine-preventable disease by limiting exemptions for vaccines in children.

Problem Statement

In 1999, a 7-year study revealed that the risk of measles was 35 times higher in children with a non-medical exemption than those who were vaccinated.² Another study conducted over an 18-year period found that states granting easy non-medical exemptions (NME) had 50% higher pertussis incidence rates than states that had either no non-medical exemptions or more stringent processes.³

¹ U.S. Centers for Disease Control and Prevention. Infographic: The Global Impact of Vaccines in Reducing Vaccine-Preventable Disease Morbidity and Mortality, https://www.cdc.gov/globalhealth/infographics/immunization/global_impact_of_vaccines.htm. Updated July 19, 2017.

² Salmon DA, Haber M, Gangarosa EJ, et al. Health consequences of religious and philosophical exemptions from immunization laws: individual and societal risk of measles. *JAMA*.1999;282:47-53.

³ Omer SB, Pan WK, Halsey NA, et al. Nonmedical exemptions to school immunization requirements: secular trends and association of state policies with pertussis incidence, *JAMA*.2006; vol. 296 14(pg. 1757-1763).

Missouri had a higher incidence rate of pertussis per 100,000 population than the U.S. (6.74 compared to 5.83 in 2017). Missouri had the 18th highest rate of all 50 states and the District of Columbia.⁴ Pertussis can be a serious illness, especially for infants. Just over 50% of all babies who contract pertussis under the age of 1 require hospitalization.⁵ During the first two months of life, infants depend on everyone around them having been vaccinated for pertussis since they are too young to be vaccinated. Pertussis is one of several diseases that can be avoided through routine vaccinations. In fact, data has demonstrated that compulsory immunization programs have contributed to a reduced incidence rate of 98-99% for most vaccine-preventable diseases.⁶ The resulting reduction of disease and death due to vaccinations is nothing short of astounding. Unfortunately, communities have lost some of these significant gains due to individuals choosing not to vaccinate themselves and/or their family. Their decision against vaccination is not just an individual decision, however, as the consequences of a lack of immunity also affects the community in which they live. When people do not vaccinate, they are more susceptible to contracting infectious diseases and spreading those diseases to others without the necessary immune protection. This includes such at-risk populations as infants, the elderly, and immune-compromised individuals, some of whom cannot be vaccinated and others who are not able to build full immunity from vaccinations. Developing a more comprehensive and community-prioritized response is needed to ensure high levels of protection from infectious diseases for all Missouri residents.

Background

Vaccine-preventable diseases had, until the 20th century, been the leading causes of death. With the introduction and expanded use of vaccines, many of these diseases have largely been eliminated or controlled within the United States and much of the world. Within recent years, as the anti-vaccination movement has spread, there has been an increasing frequency of vaccine-preventable disease outbreaks.

- Smallpox killed 300 million people globally in the 20th century. In 1980, the World Health Organization declared the disease eradicated due to the success of the smallpox vaccine.⁷
- In 1920, there were just under 470,000 cases of measles reported in the US, 7,575 resulted in death. The measles vaccine was licensed in 1963 and by 1998, there were only 98 cases reported.⁸ However, between 2010 and 2018, the average number of cases in the U.S. increased by 113%.⁹ Between November 2017 and

⁴ U.S. Centers for Disease Control and Prevention. 2017 Final Pertussis Surveillance Report. <https://www.cdc.gov/pertussis/downloads/pertuss-surv-report-2017.pdf>. Updated December 2018.

⁵ U.S. Centers for Disease Control and Prevention. Pertussis – Surveillance and Reporting. Retrieved from: <https://www.cdc.gov/pertussis/surv-reporting.html>. Updated August 7, 2017.

⁶ Daniel DA, Saspin JW, Teret S, et al. Public Health and the Politics of School Immunization Requirements. *Am J Pub Health*. 2005;95(5), 778-783.

⁷ Sherman I. Smallpox: The Speckled Monster. *Twelve Diseases that Changed our World*. Washington D.C.: ASM Press, 2007.

⁸ U.S. Centers for Disease Control and Prevention. *Achievements in Public Health, 1900-1999 Impact of Vaccines Universally Recommended for Children—United States, 1990-1998*. MMWR. (4/2/1999). 48(12), 243-248.

⁹ U.S. Centers for Disease Control and Prevention. Measles Cases and Outbreaks, <https://www.cdc.gov/measles/cases-outbreaks.html>. Updated April 29, 2019.

October 2018, Europe reported nearly 65,000 cases of measles.¹⁰ Currently, there are multiple measles outbreaks within the United States.

- Between 1951-1954 in the US, there were 16,316 cases of paralytic polio with 1,879 cases resulting in death. Following the introduction of the vaccine in 1954, polio was eradicated from the Western Hemisphere by 1991.¹¹ However, with worldwide travel and decreased vaccination rates the reintroduction of this disease is a possibility.
- Prior to 1940, pertussis was the leading cause of childhood mortality in the US. By 1976, there were just over 1,000 cases reported for the US, compared to 265,000 cases pre-vaccine.¹² Unfortunately these great strides have not continued. Every year since 2003, there have been more than 10,000 reported pertussis cases in the U.S., with a high of 32,971 cases in 2014.¹³

Between 1900 and 2000, U.S. life expectancy increased 62%, from 47.3 years to 76.8 years and vaccine implementation has played a significant role in this improvement. The 17 diseases targeted in 2011 by U.S. immunization policy is estimated to prevent 20 million cases of disease and 42,000 deaths each year. Beyond human health, the economic savings are estimated to be \$14 billion in direct costs and \$69 billion in societal costs.¹⁴

The positive impact of vaccines on the health of the population is clear; however, the success has not been maintained. While there are a variety of factors, one of significant importance is many parents have been lulled into a false sense of security. With many current parents of young children being unfamiliar with the devastating effects of vaccine-preventable diseases like smallpox, polio, and measles some parents are opting out of vaccines for their children citing concerns over vaccine safety.¹⁵ However, many of these concerns, such as vaccines causing autism, are unfounded and not supported by extensive research.¹⁶ Opting out of vaccines and other factors have resulted in vaccine-preventable disease outbreaks. One does not have to look far to find outbreaks in recent years. In 2015 there were 147 cases of measles that occurred in California. Between 2016-2017 there were 3,000 cases of mumps that occurred in a community in Arkansas, and in 2018 there were 28 cases of confirmed pertussis in Washington.^{17 18 19}

¹⁰ World Health Organization. World Health Organization EpiData, http://www.euro.who.int/_data/assets/pdf_file/0011/388919/epi-data-nov2017-oct2018-eng.pdf?ua=1 . Updated November 2018.

¹¹ U.S. Centers for Disease Control and Prevention. *Achievements in Public Health, 1900-1999 Impact of Vaccines Universally Recommended for Children—United States, 1990-1998*. MMWR. (4/2/1999). 48(12), 243-248.

¹² Atkinson W, Hamborsky J, Stanton A, et al. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 12th ed. Washington, DC: Public Health Foundation; 2012.

¹³ U.S. Centers for Disease Control and Prevention. Pertussis Cases by Year, https://www.cdc.gov/pertussis/surv-reporting/cases-by-year.html#modalIdString_CDCTable_0 . Updated August 7, 2017.

¹⁴ U.S. Centers for Disease Control and Prevention. *Ten Great Achievements – United States, 2001-2010*. MMWR. (5/20/2011). 60(19), 619-623.

¹⁵ Salmon DA, Haber M, Gangarosa EJ et al. Health Consequences of Religious and Philosophical Exemptions from Immunization Laws. *JAMA*.1999;281 (1), 47-53.

¹⁶ U.S. Centers for Disease Control and Prevention. Vaccine Safety. <https://www.cdc.gov/vaccinesafety/index.html>, (. Updated January 31, 2019.

¹⁷ U.S. Centers for Disease Control and Prevention. Measles Cases and Outbreaks, <https://www.cdc.gov/measles/cases-outbreaks.html>. Updated April 29, 2019.

There are no federal laws mandating immunizations; however, states can and do have immunization laws in place.²⁰ These laws are in effect to help protect communities throughout a state from outbreaks of vaccine-preventable diseases. In 1809, Massachusetts passed the first law mandating the population be vaccinated against smallpox. The Supreme Court upheld the right of states to pass compulsory laws for immunization in 1905 and again in 1922 specifically for school entry.²¹ State laws can also allow for exemptions for school-related immunization, of which there are three types: medical, religious, and personal/philosophical. All 50 states allow medical exemptions to school immunizations for children unable to receive vaccines for medically contraindicated reasons. Three states, California, Mississippi, and West Virginia do not allow either religious or personal exemptions. The remaining 47 states allow for an exemption based on religious tenets. An additional 18 states allow for a philosophical exemption based on personal beliefs.^{22 23} A survey conducted between 2001 – 2004 found states that permitted philosophical exemptions had higher non-medical exemptions (NME) than states that granted religious-only NMEs. States that had non-stringent processes for exemptions had even higher NMEs.²⁴ Research conducted in 2018 also demonstrates that there is an increase in the number of philosophical exemptions in 12 of the 18 states, and that states with higher NME rates also have lower vaccination rates for the common vaccine, measles, mumps, and rubella (MMR).²⁵

One problematic trend of populations choosing NMEs is the characteristic of geographic clustering. Clustering in a general area can lead to the accumulation of a critical mass of susceptible children that may lead to outbreaks of vaccine-preventable diseases. Reasons for geographic clustering include population characteristics (socioeconomic status, cultural issues, etc.), local belief systems and school policies. These clusters can lead to a community risk in the vaccinated population as well. A study conducted in Colorado over an 11-year period demonstrated that at least 11% of all vaccinated (non-exempt) children who acquired measles were infected through contact with a non-vaccinated child.²⁶ One of the largest measles outbreaks in U.S. history occurred in 2005 in Indiana when a case was internationally imported from Romania in an unvaccinated individual. The index case attended a gathering of 500 persons, 50 of which were also unvaccinated. Ultimately, the exposure resulted in 32 cases in the unvaccinated (71% of unvaccinated

¹⁸ U.S. Centers for Disease Control and Prevention. Mumps Cases and Outbreaks, <https://www.cdc.gov/mumps/outbreaks.html>. Updated April 30, 2019.

¹⁹ U.S. Centers for Disease Control and Prevention. National Notifiable Infectious Diseases: Weekly Tables, <https://wonder.cdc.gov/nndss/static/2018/24/2018-24-table2M.html>. Updated June 16, 2018.

²⁰ Salmon DA, Haber M, Gangarosa EJ et al. (1999). Health Consequences of Religious and Philosophical Exemptions from Immunization Laws. *JAMA*.1999;281 (1), 47-53.

²¹ Orenstein WA, Hinman AR. The Immunization System in the United States – The Role of School Immunization Laws. *Vaccine*. 1999;17, S19-S24.

²² National Conference of State Legislatures. States with Religious and Philosophical Exemptions from School Immunization Requirements, <http://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx> . Updated January 30, 2019.

²³ Salmon DA, Teret SP, MacIntyre CR, et al. Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present and Future. *The Lancet*. 2006; 367, 436-442.

²⁴ Omer SB, Pan WK, Halsey NA, et al. Nonmedical Exemptions to School Immunization Requirements. *JAMA*. 2006; 296 (14) 1757-1763.

²⁵ Olive JK, Hotez PJ, Damania A, et al. The state of the antivaccine movement in the United States: A focused examination of nonmedical exemptions in states and counties. *PLoS Med*. 2018; 15(6): e1002578.

²⁶ Feikin DR, Lezotte DC, Hamman RF, et al. Individual and community risks of measles and pertussis associated with personal exemptions to immunization. *JAMA*. 2000; 284:3145-3150.

home schooled) and 2 cases in the vaccinated. High vaccination levels in the surrounding community prevented widespread vaccine failure and an epidemic.²⁷

Lack of vaccine safety is a common misconception when considering immunization requirements. Because of this and their widespread use, vaccine safety has been extensively studied. The U.S. Department of Health and Human Services has created the National Vaccine Program Office to provide “reliable, easy-to-understand information from the federal government on vaccines, immunizations, and vaccine-preventable diseases.”²⁸ Because of their widespread use, the ongoing safety standards are very high with a multi-step review, approval, and monitoring process by the Federal Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC). The process includes testing the vaccine before use, ongoing testing of vaccine while in production, and monitoring for effectiveness to protect against disease and adverse effects.²⁹ Additionally, the Health and Medicine Division of the National Academies of Science, Engineering and Medicine, formerly the Institute of Medicine (IOM), extensively studied the safety of vaccines and published a report in 2013. The IOM, which is independent from government and is a nonprofit organization, concluded “Vaccines are among the most safe and effective public health interventions to prevent serious disease and death” and recommended adherence to the childhood vaccine schedule.³⁰ With this being said, there is a small risk associated with any vaccine or health intervention. The CDC monitors adverse reactions and deaths from vaccines as well as overall mortality. Between 1990 and 2016 in Missouri, 56 people may have died due to a vaccine (an average of 1.9 a year), and 10,595 adverse reactions were reported. Conversely, between 1999 and 2016 in Missouri, 1,376 people died from vaccine-preventable diseases (an average of 80.9 per year), 381 of which were from non-influenza diseases (an average of 22.4 per year).³¹ Additionally, thousands become sick each year. Each year in Missouri, 42 people die from a vaccine-preventable disease (and 10 people from vaccine preventable disease excluding influenza) for every person we lose from an adverse reaction to a vaccine.³² Additionally, this does not even come close to demonstrating the amount of disease and death that would occur if vaccines were not available.

To better understand the immediate impact of vaccines, further examination is needed for children up through age 5 (when most vaccines are administered). Between birth to 2 years old, there are 25 doses of vaccine that are recommended to be given.³³ With approximate 75,000 babies born each year in Missouri and a vaccination rate of 71% for

²⁷ Parker AA, Staggs W, Dayan GH, et al. Implications of a 2005 Measles Outbreak in Indiana for Sustained Elimination of Measles in the United States. *NEJM*. 2006; 355(5), 477-455.

²⁸ U.S. Health and Human Services. Vaccines.gov, About Us, <https://www.vaccines.gov/about.html>. Updated July 2018.

²⁹ U.S. Health and Human Services. Vaccine Safety, <https://www.vaccines.gov/basics/safety/index.html> . Updated December 2017.

³⁰ The National Academies of Sciences, Engineering, and Medicine. Childhood Immunization Schedule and Safety: Stakeholder Concerns, Scientific Evidence, and Future Studies, <http://nationalacademies.org/HMD/Reports/2013/The-Childhood-Immunization-Schedule-and-Safety.aspx>. Updated January, 2013.

³¹ Centers for Disease Control and Prevention. CDC WONDER, <https://wonder.cdc.gov/>. Updated December 18, 2018.

³² Centers for Disease Control and Prevention. CDC WONDER, <https://wonder.cdc.gov/>. Updated December 18, 2018.

³³ Centers for Disease Control and Prevention. Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, United States, 2018, <https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html> . Updated February 5, 2019.

the infant vaccination schedule: each year there is an estimated 1.3 million doses of vaccine given to children ages 0-2.³⁴ Since 1990, vaccines in this schedule have resulted in 38 deaths (an average of 1.31 per year)³⁵ due to adverse reactions, and an additional 2,300 adverse reactions were recorded. However, these efforts have protected upwards of 1.4 million young children from vaccine-preventable disease and death.

Kindergarten immunization rates in Missouri have been on the decline between the 2009-2010 school year (97.3% immunized) and the 2017-2018 school year (95.2% immunized).³⁶ This downward trend is of concern due to less community-protection from disease. If it continues, the chance of disease outbreak continues to rise. In any given year in Missouri, approximately 70,000 – 80,000 students enter the public-school system. Children entering schools in Missouri have 14 required doses, and in the 2015-2016 school year 95% of students met these requirements.³⁷ Making a conservative estimate of 70,000 new students entering kindergarten with 4% unvaccinated, more than 36,000 students in Missouri, grades K-12 are not fully vaccinated and increase the risk of other students being exposed to vaccine-preventable disease. The diseases covered by vaccines can cause serious health effects, not to mention the potential class time missed from school due to preventable illness. The following outlines diseases that are the focus of school immunization requirements. All are serious, with several commonly leading to possible hospitalization and even death. A child with any of the diseases would miss at least one week of school, and commonly more.

- Diphtheria: transmitted through respiratory droplets (e.g. coughing, sneezing). Commonly requires hospitalization and isolation for at least 48 hours after antibiotics. Even with treatment, 10% of all patients die.³⁸
- Tetanus: transmitted through environmental exposure. Requires aggressive treatment and even then, 10% of all patients die.³⁹
- Pertussis: transmitted through respiratory droplets (e.g. coughing, sneezing) and can remain contagious for 21 days. May require hospitalization, especially in infants. Fatality rate approximately 1%.⁴⁰
- Mumps: transmitted through saliva (e.g. coughing, sharing items such as cups) and individual is contagious for approximately 7 to 10 days. No treatment exists, and disease can lead to long-lasting health problems.⁴¹
- Measles: highly contagious, transmitted through respiratory droplets (e.g. coughing, sneezing) and individuals are typically contagious for 8 to 10 days.

³⁴ Centers for Disease Control and Prevention. Child Vax View- 2017, <https://www.cdc.gov/vaccines/imz-managers/coverage/childvaxview/index.html>. Updated November 3, 2017.

³⁵ Centers for Disease Control and Prevention. CDC WONDER, <https://wonder.cdc.gov/>. Updated December 18, 2018.

³⁶ Centers for Disease Control and Prevention. SchoolVaxView, <https://www.cdc.gov/vaccines/imz-managers/coverage/schoolvaxview/data-reports/coverage-trend/index.html>. Updated October 11, 2018.

³⁷ Missouri Department of Health and Senior Services. 2018-2019 Missouri School Immunization Requirements, <https://health.mo.gov/living/wellness/immunizations/pdf/1819schoolrequirements.pdf>. Updated November 2017.

³⁸ Centers for Disease Control and Prevention. Diphtheria, <https://www.cdc.gov/diphtheria/index.html>. Updated December 17, 2018.

³⁹ Centers for Disease Control and Prevention. Tetanus, <https://www.cdc.gov/tetanus/index.html>. Updated February 28, 2019.

⁴⁰ Centers for Disease Control and Prevention. Pertussis, <https://www.cdc.gov/pertussis/index.html>. Updated August 7, 2017.

⁴¹ Centers for Disease Control and Prevention. Mumps, <https://www.cdc.gov/mumps/index.html>. Updated March 8, 2019.

Virus able to live for 2 hours on environmental surfaces. Disease may require hospitalization (25% of all patients) and 1 or 2 out of 1,000 will die.⁴²

- Rubella: highly contagious, transmitted through respiratory droplets (e.g. coughing, sneezing) and individuals remain contagious up to 14 days. Illness typically mild in children and does not require hospitalization.⁴³
- Hepatitis B: transmitted through blood or body fluids and symptoms may last from several weeks to 6 months. A proportion of cases will lead to chronic hepatitis B, and 25% of those individuals will die prematurely. Possible symptoms range from mild to more severe requiring hospitalization.⁴⁴
- Varicella: transmitted through close contact with case of chickenpox or shingles and an individual is contagious from 1-2 days before the rash develops until no new lesions appear. Disease typically does not lead to hospitalization, but it may be required with complications. Death is rare.⁴⁵
- Meningococcal: transmitted through respiratory and throat secretions (saliva) exchanged through close contact. Typically requires hospitalization. Antibiotics are needed immediately to reduce the risk of dying; although even with treatment, 10 – 15% will still die or have long-term disabilities.⁴⁶

These diseases, if not controlled through vaccination and other preventive measures, present a serious risk to the health of individuals and communities.

Solution

If communities are to prevent the spread of vaccine-preventable diseases, they must vaccinate the vast majority of individuals. One of the largest challenges to accomplish this are exemptions to school-required vaccines. Not only the allowance of exemptions makes an impact, but also the thoroughness of the exemption process affects immunization rates. The complexity of the exemption process has been shown to be directly associated with the number of exemptions within a state.⁴⁷ Stricter exemption policies tend to identify whether the choice to exempt is due to convenience or conviction.⁴⁸ If Missouri lawmakers seek to further protect children from unnecessary exposure to vaccine-preventable diseases within schools and child care facilities, stricter requirements for exemptions and documentation, and the elimination of religious and personal exemptions are recommended.

Medical exemptions are necessary as some individuals may have allergies or medical conditions that contraindicate the administration of vaccine. With these exemptions,

⁴² Centers for Disease Control and Prevention. Measles, <https://www.cdc.gov/measles/index.html>. Updated April 29, 2019.

⁴³ Centers for Disease Control and Prevention. Rubella, <https://www.cdc.gov/rubella/index.html>. Updated September 15, 2019.

⁴⁴ Centers for Disease Control and Prevention. Hepatitis B, <https://www.cdc.gov/hepatitis/hbv/bfaq.htm#overview>. Updated May 22, 2018.

⁴⁵ Centers for Disease Control and Prevention. Varicella, <https://www.cdc.gov/chickenpox/index.html>. Updated December 31, 2018.

⁴⁶ Centers for Disease Control. Meningococcal Disease, <https://www.cdc.gov/meningococcal/>. Updated March 13, 2019.

⁴⁷ Omer SB, Salmon DA, Orenstein WA, et al. Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases. *NEJM*. 2009; 360 (19), 1981-1988.

⁴⁸ Wang E, Clymer J, Davis-Hayes C, et al. Nonmedical Exemptions from School Immunizations Requirements: A Systematic Review. *Am J Pub Health*. 2014;104 (11), e62-e84.

there can be increased requirements. The letter from the licensed physician should include the medical rationale that contraindicates vaccine administration. The letter from the licensed physician should be required annually, in case the child's medical conditions have changed that may no longer contraindicate the care. The letter from the licensed physician should be included in the state's immunization registry, ShowMeVax.⁴⁹ Storage of the letter on ShowMeVax will provide universal access to medical exemptions and allow public health individuals who may have a medical justification to review the information. Experience in other parts of the country have shown that these requirements are necessary to prevent unscrupulous doctors from making money by giving exemptions to anyone willing to pay for them.

Regarding the State's current religious exemption, removal of the religious exemption is recommended. Between 2009 and 2013, there was a 19% national increase in the number of parents making the choice of a non-medical exemption (NME) for their child.⁵⁰ This is a disturbing trend. Both the American Medical Association and the American College of Physicians have publicly endorsed the removal of existing NMEs from all State's immunization laws.⁵⁰ Currently, three states- California, Mississippi, and West Virginia do not allow for religious exemptions.⁵¹ If the elimination of religious exemptions were passed, only medical exemptions for school-required vaccinations would be allowed. There are concerns whether the removal of this exemption infringes on an individual's religious freedom. This very point has been challenged in California, and the California Court of Appeals upheld the law, allowing for the removal of personal beliefs (which includes religious beliefs in California).⁵² An examination of religious positions on vaccinations can be somewhat murky. Of the major religions of the world (>5 million followers), it appears that only the Church of Christ (Scientist) prohibits the use of vaccinations.⁵³ Christian Scientists have beliefs that followers are to avoid all medical intervention.⁵⁴ Several religions have expressed concerns over certain elements of vaccinations, such as Judaism and Islam, and the use of animal derivatives, but have deemed their use as acceptable. Multiple religions have also issued position statements that encourage the use of vaccines among believers. Most world religions view vaccinations as an effective measure to preserve life and protect communities. Research has also found that resistance to vaccinations is often based on individual beliefs, rather than clear religious direction.^{55 56} With these considerations, it is possible to remove the

⁴⁹Missouri Department of Health and Senior Services. ShowMeVax, <https://health.mo.gov/living/wellness/immunizations/showmevax/>.

⁵⁰ Goldstein ND, Suder JS, Purtle J. Trends and Characteristics of Proposed and Enacted State Legislation on Childhood Vaccination Exemption, 2011-2017. *AJPH*. 2018; 109 (1), 102-107.

⁵¹ National Conference of State Legislatures. States with Religious and Philosophical Exemptions from School Immunization Requirements, <http://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx>. Updated January 30, 2019.

⁵² Reiss, D. California Court of Appeal Rejects Challenge to Vaccine Law. *Harvard Law*. July 30, 2018. <http://blog.petrieflom.law.harvard.edu/2018/07/30/california-court-of-appeal-rejects-challenge-to-vaccine-law/>.

⁵³ Grabenstein, JD. What the world's religions teach, applied to vaccines and immune globulins. *Vaccine*. 2013; 31(16):2011-23. <https://www.ncbi.nlm.nih.gov/pubmed/23499565>.

⁵⁴ Grabenstein, JD. What the world's religions teach, applied to vaccines and immune globulins. *Vaccine*. 2013; 31(16):2011-23. <https://www.ncbi.nlm.nih.gov/pubmed/23499565>.

⁵⁵ Grabenstein, JD. What the world's religions teach, applied to vaccines and immune globulins. *Vaccine*. 2013; 31(16):2011-23. <https://www.ncbi.nlm.nih.gov/pubmed/23499565>.

⁵⁶ Pelčić G, Karačić S, Mikirtichan GL, et al. (Religious exception for vaccination or religious excuses for avoiding vaccination. *Croatian Medical Journal*. 2016; 57(5): 516-521, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5141457/>.

religious exemption, resulting in high immunization rates in children, providing for increased protection against disease spread within schools.

The removal of personal exemptions, which allows for parents/guardians to have their child be exempt from recommended vaccinations for personal reasons prior to attending child care and preschools is also recommended. This exemption is not supported from a health or religious consideration. Exemptions for this purpose are unnecessarily reducing the child's and community's protection from vaccine-preventable diseases without just cause. Additionally, this exemption is only in place for daycare facilities, and is not a part of the school-required vaccination process. With a large number of children attending day care it is necessary to encourage improved immunization coverage to protect the population.

Current statutes allow for medical, religious (167.181), and personal (210.003) exemptions for children to avoid the required vaccines to attend public school and day care.⁵⁷ The recommended amendments revise these to only allow medical exemptions.

Current Missouri statute (167.181), paragraph three, which addresses children attending school states:

This section shall not apply to any child if one parent or guardian objects in writing to his school administrator against the immunization of the child, because of religious beliefs or medical contraindications. In cases where any such objection is for reasons of medical contraindications, a statement from a duly licensed physician must also be provided to the school administrator.

Recommended amended Missouri statute (167.181), paragraph three:

This section shall not apply to any child if one parent or guardian objects in writing to his school administrator against the immunization of the child, because of medical contraindications. In cases where an exemption for medical contraindications is requested, a letter from the child's duly licensed physician must be provided annually giving the medical rationale that contraindicates the administration of required vaccines.

Current Missouri statute (210.003), paragraph two, which addresses children attending child care or preschool states:

The parent or guardian has signed and placed on file with the day care administrator a statement of exemption which may be either of the following: (a) A medical exemption, by which a child shall be exempted from the requirements of this section upon certification by a licensed physician that such immunization would seriously endanger the child's health or life; or (b) A parent or guardian exemption, by which a child shall be exempted from the requirements

⁵⁷ Missouri Department of Health and Senior Services. Laws and Regulations, <https://health.mo.gov/living/wellness/immunizations/laws.php>.

of this section if one parent or guardian files a written objection to immunization with the day care administrator.

Recommended amended Missouri statute (210.003), paragraph two:

The parent or guardian has signed and placed on file with the day care administrator a statement of exemption against the immunization of the child, because of medical contraindications. In cases where an exemption for medical contraindications is requested, a letter from the child's duly licensed physician must be provided annually giving the medical rationale that contraindicates the administration of the required vaccine.

Conclusion

If vaccine-preventable diseases were non-communicable, the decision to vaccinate would remain an individual decision. However, this is not the case. Vaccine-preventable diseases are a risk to both the individual contracting the disease and the entire community, especially when you have portions of the population with compromised immune systems. Vaccines have been proven safe and effective through years of scientific research. Vaccines, as in any effort to improve health does have some inherent risk, but that risk is far less than the alternative of taking a passive stance, allowing for the increased incidence of vaccine-preventable disease. Removing the allowance of religious and personal belief exemptions is an effective strategy to increase vaccination rates and protect the health of a community, and its vulnerable populations.