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Variation in exemptions to school immunization requirements among New York State private and public schools

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ABSTRACT

Background and objectives: School immunization requirements have ensured high vaccination rates and have helped to control vaccine-preventable diseases. However, vaccine exemptions have increased in the last decade. This study compared New York State private versus public schools with respect to medical and religious exemption rates.
Methods: This retrospective study utilizes New York State Department of Health Immunization Survey data from the 2003 through 2012 academic years. Schools were categorized as private or public, the former further categorized by religious affiliation. Rates of medical and religious vaccine exemptions were compared by school category.
Results: From 2003 to 2012, religious exemptions increased in private and public schools from 0.63% to 1.35% and 0.17% to 0.29% (Spearman's *R*: 0.89 and 0.81), respectively. Among private schools, increases in religious exemption rates during the study period were observed in Catholic/Eastern Orthodox, Protestant/Other Christian, Jewish, and secular schools (Spearman's $R = 0.66$, 0.99, 0.89, and 0.93), respectively. Exemption rate ratios in private schools compared to public schools were 1.39 (95% CI 1.15–1.68) for medical and 3.94 (95% CI: 3.20–4.86) for religious exemptions. Among private school students, all school types except for Catholic/Eastern Orthodox and Episcopal affiliates were more likely to report religious exemptions compared to children in public schools.
Conclusions: Medical and religious exemption rates increased over time and higher rates were observed among New York State private schools compared to public schools. Low exemption rates are critical to minimize disease outbreaks in the schools and their community.

1. Introduction

In the United States (US), state-mandated school immunization requirements have been credited with maintaining high vaccination rates and reducing the incidence of vaccine-preventable diseases (VPDs) [1]. In spite of improved access to vaccines through the funding of vaccination programs [2] and scientific evidence that vaccines are safe [3], exemptions to state-mandated immunizations have increased [4–10]. Resurgence of both pertussis and measles has been connected to children with non-medical exemptions to school immunization requirements [7,11–14].

Parents in the US seek exemptions to school immunization requirements for a number of reasons, including: concerns about vaccine safety and efficacy, a lack of knowledge about vaccine benefits, concerns about overwhelming the immune system, lack of confidence in government oversight of the vaccine industry, medical contrainicatons and religious objections [15–17].

School-related factors, including private school attendance and higher socioeconomic status of students have been associated with higher non-medical exemption rates, both religious and philosophical [18]. Although the immunization coverage rate is higher in private schools than public schools [18], the proportion of non-medical exemptions is higher in private schools [10,18,19].

According to New York State (NYS) law, exemptions to school immunization requirements are permitted for both medical and religious reasons but not philosophical or personal beliefs. A recent report from NYS shows that the religious exemption rate has nearly doubled from 0.23% in 2000 to 0.45% in 2011 [11].

Published data on exemptions in US schools are limited to the general public and private schools categories, thus it is unclear whether certain types of private schools are disproportionately affected and whether specific religious beliefs are related to the

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rise in non-medical exemptions [10,19,20]. An estimated 13% of NYS school-aged children attend private schools [21]. Thus, profiling immunization coverage in private schools will help public health professionals better anticipate potential outbreaks among children attending these schools and the community at large.

This study describes two facets of the school immunization issue by comparing: (1) religious and medical exemption rates among NYS private and public schools, and (2) trends in medical and religious exemption rates by type of private school from 2003 through 2012.

2. Methods

All New York schools, both private and public, are required to annually report their total student enrollment and the number of students with medical and religious exemptions to the New York State Department of Health (NYSDOH). According to New York State law, a request for *religious* exemption must be accepted by the school if the parents/guardians or the student hold genuine and sincere religious beliefs that are contrary to the practice of immunization, regardless of membership in an established religious organization [22]. Requests for exemption to immunization requirements are reviewed by the school's principal or his or her designee. The New York State Education Department (NYSED) issued guidelines in 2006 to help schools implement the religious exemption process [22]. Each public school district, board of education, or other governing body develops an immunization policy based on the NYSED guidelines. To obtain a *medical* exemption, all schools in NY state, both public and non-public, are subject to Public Health Law Section 2164 and 10NYCRR 66-1, which require that a medical exemption is written documentation from a physician licensed to practice in NYS, specifying the immunization that was medically contraindicated, the reason for the exemption and the duration of the exemption [22].

For this study, the NYSDOH provided data from the annual School Immunization Survey (SIS) for fall 2003 through fall 2012. The SIS includes the school's unique identifier coded by the Basic Education Data System (BEDS), annual information on the number of enrolled children, and the number of children with medical and religious exemptions in pre-kindergarten through grade 12. Prior to the 2009 SIS, only pre-K, kindergarten and new enrollees in 1st through 12th grades were included in the enrollment numbers. Starting with the 2010 SIS, all children were included in the enrollment numbers and counted in each year's estimates. New York City public schools reported the survey data aggregated for the entire district.

The BEDS code is a primary, publicly available source to classify schools into types (e.g., private, public); other school designations (e.g., charter and state run special schools) were excluded due to an inability to track these schools consistently over the study period. Schools were excluded from the study if they had one or fewer students, missing enrollment or if they could not be classified.

The authoritative source for BEDS codes in NYS is the State Education Department Reference File (SEDREF) system. We used the 2014 SEDREF system to verify accuracy of our SIS BEDS codes [23]. In addition, schools with inconsistent designations and schools with over a 5% religious exemption rate were manually checked (i.e., we reviewed the school's website and verified with the local health department) to assure appropriate classification. We double-checked schools with high exemption rates because misclassification of these schools would have the greatest impact on comparisons. A random sample of schools with low religious exemption rates was also manually checked to estimate misclassification.

Schools were assigned to the following categories: public, secular private, and private religious schools, including Baptist, Christian Fundamental, Episcopal, Islamic, Greek Orthodox, Jewish, Lutheran, Quakers, Mennonites/Amish, Presbyterian, Quaker, Roman Catholic, Russian Orthodox, and Seventh Day Adventist. To compare exemption rates for different types of private and public schools, we grouped the Christian schools as follows based on similarities in their health and medical philosophies: (1) Roman Catholic, Greek Orthodox, and Russian Orthodox schools were classified as "Catholic/Eastern Orthodox"; (2) Baptist, Christian Fundamental, Episcopal, Lutheran, Presbyterian, and Quaker schools were classified as "Protestant/Other Christian"; (3) Seventh Day Adventist schools remained a separate category because of their unique emphasis on wholeness and health and their use of medical resources; and (4) Mennonite/Amish schools were indistinguishable from each other based on their BEDS codes and were thus classified as one entity.

The medical and religious exemption rates were calculated as the number of students with the respective exemption divided by the total enrollment over the study period. School-years were calculated as the total number of schools represented for all years, (e.g., a school that was open and sent data for all 10 years would contribute 10 school-years). Student-years were calculated by summing the total number of students represented in the category across all years. The weighted averages for exemption rates were calculated with the total student-years as the weight for each school type. The Spearman rank coefficient was used to assess the correlation between year and exemption rates. Poisson regression was used to estimate the rate ratios (RRs) between private and public schools.

Statistical analyses were computed using SAS version 9.2 (SAS Institute, Inc., Cary, NC). A p-value of <0.05 was considered statistically significant. Because the study utilized aggregate data from schools with no student identifiers, the study met the criteria for exempt research.

3. Results

3.1. Number of schools and students

Of the 51,909 surveys included in SIS between 2003 and 2012, 1402 surveys were excluded, including: 868 surveys from charter schools, state schools, or special schools; 518 surveys with enrollments of one student or less or missing enrollment data; and 16 surveys from 4 schools that could not be verified. The remaining 50,507 surveys from 6702 schools were included in these analyses; 2723 schools were private schools (19,968 surveys and 2463,639 student-years) and 3979 were public schools/districts (30,539 surveys and 9968,499 student-years) (Table 1).

The 2012–2013 academic year was utilized to assess validity of the SIS BEDS classification codes. Of the 4871 schools submitting surveys, 4796 schools (98.5%) were correctly classified according to the SEDREF. The BEDS code classification was manually verified for 265 of the 4871 reporting schools. The classifications of 5 private schools and 10 public schools were corrected. Overall, the BEDS code classifications were verified for 4856 schools (99.7%).

3.2. Exemption rates

The *medical* exemption rate for private schools increased from 0.11% (±0.51%) in 2003 to 0.17% (±0.78%) in 2012, Spearman's $R = 0.60$, and declined for public schools from 0.13% (±0.39%) in 2003 to 0.09% (±0.25%) in 2012 (Spearman's $R = -0.62$).