



# Hurdles to herd immunity: Distrust of government and vaccine refusal in the US, 2002–2003



Charlotte Lee<sup>a,\*</sup>, Kathryn Whetten<sup>a</sup>, Saad Omer<sup>b</sup>, William Pan<sup>c</sup>, Daniel Salmon<sup>d</sup>

<sup>a</sup>Sanford School of Public Policy & Duke Global Health Institute, Duke University, Durham, NC, USA

<sup>b</sup>Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA, USA

<sup>c</sup>Duke Global Health Institute, Duke University, Durham, NC, USA

<sup>d</sup>Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

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## ABSTRACT

High rates of nonmedical exemptions (NMEs) from required childhood vaccinations have contributed to outbreaks of vaccine-preventable diseases, such as measles and pertussis. Understanding the parental decision to obtain an NME could help health professionals and public health programs improve vaccination rates in areas with high vaccine refusal. Using a 2002–2003 multi-state survey of parents of school age children ( $n = 2445$ ), this study found that parental distrust of the government and of healthcare providers is a significant factor related to a number of vaccine-related beliefs and behaviors. The odds that parents who distrust the government have seen a complementary/alternative medicine (CAM) provider were 2.11 times greater than those of parents who trust the government (70.1% vs 52.6%; OR, 2.11; 95% CI, 1.59–2.84;  $P < 0.01$ ). Parents who distrust the government had increased odds of trusting vaccine information from CAM providers compared to trusting parents (57.9% vs 46.3%; OR, 1.53; 95% CI, 1.16–2.01;  $P < 0.01$ ). Parents who distrust the government also had increased odds of distrusting vaccine information acquired at their healthcare providers' offices (12.6% vs 4.7%; OR, 2.64; 95% CI, 1.64–4.24;  $P < 0.01$ ). Distrustful parents had increased odds of thinking government sources of information about vaccines were unreliable, categorizing the CDC, the Food and Drug Administration (FDA), or local and state health departments as poor or very poor sources (distrust government vs trust government: 25.2% vs 11.7%; OR, 2.39; 95% CI, 1.70–3.36;  $P < 0.01$ ; distrust healthcare providers vs trust healthcare providers: 24.4% vs 11.4%; OR, 2.44; 95% CI, 1.75–3.38;  $P < 0.01$ ). These findings indicate that distrustful parent populations may need to be reached through modalities outside of traditional government and healthcare provider communications. Research into new and more effective techniques for delivering pro-vaccine messages is warranted.

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## 1. Introduction

National vaccination programs have successfully reduced the prevalence of many preventable infectious diseases in the United States. Smallpox has been eradicated, polio is on the verge of eradication, and many once common childhood diseases have been effectively controlled through vaccines [1]. All 50 states have legislation requiring immunizations for school entry, which has contributed to these successes in controlling childhood infectious diseases. However, more children have been granted nonmedical exemptions (NMEs) from required vaccinations for school entry

in recent years, and exemption clusters contribute to outbreaks of vaccine-preventable diseases like measles and pertussis [2–7].

Among the 47 states that allow NMEs, the requirements vary between and within states, with some schools requiring only a guardian's signature and others that involve a notarized form or a letter from a religious official. The level of complexity in obtaining an NME is inversely related to the proportion of exemptions claimed between states and within a state [8,9]. The median kindergarten NME rate in the US for the 2014–2015 school year was 1.5%, with rates above 5% in some states [10]. However, these state-level rates do not capture the geographic clustering of large groups of exemptions in certain communities and schools, which contributes to outbreaks of diseases such as measles and pertussis [6]. For example, in 2014–2015, the Washington State Department of Health reported that the average rate of NMEs for children in kindergarten through 12th grade on a county level was 5.1%, while

\* Corresponding author.

E-mail address: [charlotte.m.lee@gmail.com](mailto:charlotte.m.lee@gmail.com) (C. Lee).

some individual counties reported rates as high as 13.0%. Similarly, the average NME rate for Washington's school districts was 6.0% overall, but there were individual districts that reported NME rates as high as 71.4% [11]. The public health consequences of high NME rates coupled with waning vaccine immunity were seen in the 2010 California pertussis outbreak, which infected more than 9000 people and resulted in 808 hospitalizations and 10 deaths [6,12]. High NME rates have also been linked to recent measles outbreaks, including the widely covered 2015 Disneyland outbreak, in which 125 individuals contracted the virus over a period of three months [7,13,14].

This research team conducted a case-control study in 2002–2003 to identify factors associated with vaccine refusal in school-aged children and found that parents of children with NMEs perceived vaccine-preventable diseases to be less common and severe, thought vaccines were less effective and safe, and were more likely to have low levels of trust in the government and healthcare providers, compared with parents of fully vaccinated children [15]. This case-control study measured trust of government with 6 carefully tailored questions to address issues of beneficence, equity, and openness of information [16]. Trust of healthcare providers was measured using an established trust scale based on a series of 11 questions [17]. Other recent studies have also found an association between lack of trust in the government and/or healthcare providers to the parental choice to obtain a vaccine exemption [18–20]. The current analysis builds on this work, returning to historic baseline data from 2002 to 2003 to explore distrust more fully, examining exactly which vaccine-related parental beliefs and behaviors are associated with distrust of government and healthcare providers to identify areas for potential intervention.

To date, no other study the authors are aware of has examined government distrust with a robust measurement scale to determine its relationship with beliefs and behaviors related to vaccine hesitancy, vaccine information sources, and the parental decision to obtain a NME. These data offer the potential to illuminate how distrust contributes to vaccine hesitancy and vaccine refusal in parents of school-aged children by looking at questions including where parents get their vaccine information, whether they use complementary/alternative medicine (CAM) practitioners, and how they feel about immunization requirement laws. Better understanding distrustful parents who are prone to vaccine hesitancy is essential to inform effective vaccine-positive healthcare communications and policies.

## 2. Methods

Surveys were sent to 2445 parents from 112 private and public elementary schools in Colorado ( $n = 25$ ), Massachusetts ( $n = 23$ ), Missouri ( $n = 34$ ), and Washington ( $n = 30$ ) from 2002 to 2003. Parents of 815 children who, according to school records, had NMEs were selected as cases with parents of 1630 vaccinated children selected as controls. For each case, two fully vaccinated students in the same grade and school as the case student were randomly selected as controls. A more detailed description of the survey methods is available [15].

The two main constructs of interest were trust in the government and trust in healthcare providers (Fig. 1). A 5-point Likert scale (“strongly disagree” to “strongly agree”) was used to indicate parents’ agreement or disagreement with a series of 11 statements to measure trust in healthcare professionals [17]. The same Likert scale was used with a series of 6 questions to measure trust in government by addressing issues of beneficence, equity, and openness of information [16]. General construct scores were computed for trust of healthcare providers and trust of the government by taking a mean for the 11 questions and 6 questions respectively. Construct scores were dichotomized into distrust and trust categories by the lowest quartile to ease interpretation of results. Cronbach’s alpha was used to measure internal consistency of the trust scales.

The behaviors and beliefs (Table 1) of parents who distrust the government and/or healthcare providers were compared with those of parents who trust these entities. Eight behaviors were analyzed to assess parental actions related to health and safety, including where parents get their vaccine information, whether they have seen a chiropractor, acupuncturist, or any other complementary/alternative medicine (CAM) practitioners, what kind of safety decisions they make for their children, and whether they vaccinate their children fully. For the second part of the analysis, 13 different beliefs were analyzed. These belief constructs addressed viewpoints surrounding the safety of vaccines, immunization legislation, and the reliability of vaccine information from a variety of sources.

Analyses considered education, income, age, race, and religiousness. Education was dichotomized into two categories: higher than the median (college graduate or more) or the median and lower. Income was dichotomized as higher than the median (over \$70,000 in total gross household income) or the median and lower. Age was dichotomized as higher than the median (parents 41 and older) or the median and lower. Race was dichotomized as white or

<p><b>Trust in Healthcare Providers</b></p> <ul style="list-style-type: none"> <li>• My child’s health-care provider does not really care about my child as a person</li> <li>• My child’s health-care provider is usually considerate of my child’s needs and puts them first</li> <li>• I trust my child’s health-care provider so much that I always try to follow his/her advice</li> <li>• If my child’s health-care provider tells me something is so, then it must be true</li> <li>• I sometimes distrust my child’s health-care provider’s opinion and would like another opinion (second opinion)</li> <li>• I trust my child’s health-care provider’s judgments about my child’s medical care</li> <li>• I feel my child’s health-care provider does not do everything he/she should for my child’s medical care</li> <li>• I trust my child’s health-care providers to put my child’s medical needs first when treating my child’s health problems</li> <li>• I trust my child’s health-care provider to tell me if a mistake was made about my child’s treatment</li> <li>• I sometimes worry that my child’s health-care provider may not keep the information we discuss totally private</li> <li>• My child’s health-care provider is a real expert in taking care of medical problems</li> </ul> <p><b>Trust in Government</b></p> <p>The United States Government:</p> <ul style="list-style-type: none"> <li>• Does everything it should to protect the things that are important to me</li> <li>• Is partly responsible for the illegal drug problems in this country</li> <li>• Was responsible for creating HIV and AIDS</li> <li>• Is more concerned about people who are rich than those with less money</li> <li>• Is more concerned about some racial and ethnic groups than other groups</li> </ul>
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Fig. 1. Statements used to measure trust.

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