

**EVIDENCE-BASED PUBLIC HEALTH IS THE ANSWER TO
INCREASING AMERICAN CHILDHOOD VACCINATION RATES,
NOT LEGISLATIVE FORTITUDE**

ABSTRACT

After recent outbreaks of vaccine-preventable disease across the United States, some states have responded by removing non-medical exemptions. State legislatures that remove non-medical exemptions do so with the hope of increasing vaccination rates. However, there are serious concerns about this knee-jerk legislative reaction. Removing non-medical exemptions can lead to anti-vaccination sentiment and interference with parental autonomy.

This article argues that instead of removing non-medical exemptions, states should implement evidence-based public health solutions in order to increase vaccination rates. One example of an evidence-based solution is the Community Guide, a resource that contains reviews by a Task Force on a wide array of health interventions. Policymakers should consult these health interventions in order to understand what programs have been scientifically proven to be effective. In order to successfully implement health interventions, policymakers should follow the framework suggested in this article. First, it is important to determine the target population. The two target populations explored include clustered and low-income communities, as they are the most common to have lower vaccination rates. The type of intervention policymakers choose to implement will take into consideration the resources available and the characteristics of the target population. The article focuses on three Task Force recommendations: vaccination programs, client reminder and recall systems, and client or family incentive rewards. Each implementation is analyzed as applied to the two target populations to demonstrate these implementations are more effective than legislative action.

I. INTRODUCTION

On January 5, 2015, the California Department of Public Health (CDPH) was informed of a potential measles outbreak; an unvaccinated eleven-year-old child contracted the disease while visiting the Disneyland theme park.¹ Two days later, seven California residents had contracted measles, all of which attributed their exposure period to time spent in the park.² Between December 28, 2014 and February 8, 2015, CDPH identified 125 United States (U.S.) residents as having contracted measles.³ All of these cases were connected to the Disneyland outbreak.⁴ One hundred and ten of these people were from California, and thirty-five percent of them had been exposed after visiting the Disney theme park during this time period.⁵ As the outbreak progressed, fifteen other cases related to the Disneyland theme park exposure were reported in seven other states, specifically those bordering California, including Arizona and Oregon.⁶ Out of the 110 California residents who were confirmed with measles, forty-nine people were unvaccinated, several others had only initial doses of some vaccines, and forty-seven people had unknown or undocumented vaccination status.⁷ Twenty-eight people were unvaccinated due to personal belief exemptions, eighteen of which were children.⁸

The California measles outbreak is representative of a broader trend currently plaguing the United States. Fewer people are getting vaccinated, which has led to an increase in disease outbreaks across the country.⁹ Health care officials indicate in the last decade, vaccine-preventable diseases have re-emerged due to lower vaccination rates, despite significant evidence supporting their effectiveness.¹⁰ By 2000, the United States nearly eradicated the existence of measles through the use of the vaccination.¹¹ However, during the January 4, 2015 through April 2, 2015 research period, the Centers for Disease Control and Prevention (CDC) noted 159 measles cases in U.S.

1. Jennifer Zipprich et al., *Measles Outbreak – California, December 2014-February 2015*, 64 MORBIDITY & MORTALITY WKLY. REP. 139, 153 (2015).

2. *Id.*

3. *Id.*

4. *Id.*

5. *Id.*

6. Zipprich et al., *supra* note 1, at 137, 153.

7. *Id.*

8. *Id.* (noting that twelve of the patients were too young to be vaccinated, so the seventy-six percent was determined by the twenty-eight out of thirty-seven).

9. See generally W. David Bradford & Anne Mandich, *Some State Vaccination Laws Contribute to Greater Exemption Rates and Disease Outbreaks in the United States*, 34 HEALTH AFF. 1383, 1383 (2015) (stating that vaccination exemption rates have risen along with the rise of preventable diseases).

10. *Id.* (noting that examples of vaccine-preventable diseases are measles, mumps, and pertussis (whooping cough)).

11. *Id.*

residents.¹² Over eighty percent of the people were either unvaccinated or had an unknown vaccination status.¹³ Nearly forty-five percent of the unvaccinated persons refused the measles vaccine, citing philosophical or religious beliefs against vaccination.¹⁴ This suggests the resurrection of vaccine-preventable diseases is due to a number of parents who, instead of vaccinating their children, are seeking exemptions.¹⁵ In the past, the proportion of people receiving exemptions in the United States had “not been high enough to pose a [significant] threat [to herd immunity],” yet exemption rates are escalating.¹⁶ If a child does not become vaccinated, his or her health could ultimately compromise the protection afforded by herd immunity. Based on data compiled by the CDC between 2006 and 2011, the percentage of people who received non-medical exemptions (NMEs) has practically doubled.¹⁷ Nearly all of the recent increased rates of vaccination exemptions are attributable to parents requesting NMEs for their children, which include religious, philosophical, and personal belief exemptions.¹⁸

Subsequent to the highly publicized Disneyland measles outbreak in 2015, the California legislature had a knee-jerk reaction—it responded by officially removing both the religious and personal belief exemptions.¹⁹ California law now mandates that before a child can be admitted into any elementary or secondary school or day care center, the child must satisfy the immunization requirements, unless he or she receives a medical exemption.²⁰ One of the reasons the state legislature passed the new bill was the fact that the “rates of

12. Nakia S. Clemmons et al., *Measles – United States, January 4–April 2, 2015*, 64 MORBIDITY & MORTALITY WKLY. REP. 373, 373, (2015).

13. *Id.*

14. *See id.* at 375 fig. 2.

15. Bradford & Mandich, *supra* note 9, at 1384. *See also What is an Exemption and What Does It Mean?*, CTRS. FOR DISEASE CONTROL & PREVENTION (August 26, 2015), <https://www.cdc.gov/vaccines/imz-managers/coverage/schoolvaxview/requirements/exemption.html> (demonstrating that state laws dictate whether a parent may be allowed to refuse to have their child receive a certain vaccine or multiple vaccines based on medical, religious, or philosophical beliefs).

16. Thomas May & Ross D. Silverman, ‘Clustering of Exemptions’ as a Collective Action Threat to Herd Immunity, 21 VACCINE 1048, 1048 (2003) (“Herd immunity” is the phenomenon when “eradication . . . of epidemics relies on the protection provided when a large enough percentage of a given population is immune, so as to prevent potential outbreaks of vaccine-preventable disease from getting started”).

17. Saad B. Omer et al., *Vaccination Policies and Rates of Exemption from Immunization, 2005-2011*, 367 NEW ENG. J. MED. 1170, 1170 fig. 1 (2012) (indicating that in 2006, the rate of NMEs was around one percent and the rate in 2011 was slightly over two percent of the population).

18. Bradford & Mandich, *supra* note 9, at 1384.

19. *See* Michelle M. Mello et al., *Shifting Vaccination Politics—The End of Personal Exemptions in California*, 373 NEW ENG. J. MED. 785, 785 (2015).

20. CA. HEALTH & SAFETY CODE §§ 120335(b), 120338 (2016).

personal-belief exemptions in California have doubled since 2007.”²¹ The measles outbreak highlighted the reality that because of exemptions, vaccination rates in California children were at an all-time low, presenting a serious threat to the public health of the state.²² As a result, California joined Mississippi and West Virginia by its decision to prohibit exemptions rooted in religious and philosophical beliefs.²³

There are persuasive arguments for removing NMEs as an option for parents to avoid vaccinating their children. State legislatures that remove exemptions with fortitude believe it is a “legislative victory” because it protects the population’s herd immunity against vaccine-preventable diseases.²⁴ The main argument behind removing NMEs comes from evidence that when states allow children to receive philosophical exemptions, they not only have higher exemption rates, but also higher rates of disease illness outbreaks.²⁵ Other states observed the responses by state legislatures in Mississippi, West Virginia, and now California and have begun to consider the benefits of stricter policies or allowing only medical exemptions. Immediately following the California legislature’s elimination of NMEs, the Vermont legislature also removed its philosophical exemption in the hopes new legislation would result in increased vaccination rates.²⁶ Additionally, other states like Texas and Washington have proposed legislation and held hearings in order to tighten their state vaccination laws.²⁷

State legislatures that have removed NMEs believe legislative action is a defensible decision. Health officials in both Mississippi and West Virginia report, “overwhelming majorities of the public support their policies and that opposition comes [only] from a very small number of people who are extremely vocal and persistent.”²⁸ The health care profession also supports the elimination of NMEs because non-vaccinated persons unnecessarily increase risks to the community due to the fact vaccines can potentially prevent illness outbreaks in the first place.²⁹ Close relationships between health care officials,

21. Mello et al., *supra* note 19, at 785–86. *See also* Maimuna S. Majumder et al., *Substandard Vaccination Compliance and the 2015 Measles Outbreak*, 169 JAMA PEDIATRICS 494, 494 (2015).

22. *See* Mello et al., *supra* note 19, at 785–86.

23. *Id.* at 785.

24. *Id.* at 787.

25. Y. Tony Yang & Ross D. Silverman, *Legislative Prescriptions for Controlling Nonmedical Vaccine Exemptions*, 313 JAMA 247, 247 (2015).

26. James Colgrove & Abigail Lowin, *A Tale of Two States: Mississippi and West Virginia, and Exemptions to Compulsory School Vaccination Laws*, 35 HEALTH AFF. 348, 349 (2016).

27. *Id.*

28. *Id.* at 352.

29. *State Immunization Laws Should Eliminate Non-Medical Exemptions Say Internists*, AM. COLL. PHYSICIANS (July 29, 2015), <https://www.acponline.org/newsroom/immunization-laws.htm>.

legislators, and medical profession organizations ensure legislative decisions for public health are made based on accurate medical knowledge, and they help these states ease any backlash from NME supporters.³⁰ Lastly, and perhaps most importantly, many parents argue against allowing NMEs because non-immunized children put their *own* children at risk of contracting diseases, especially children who have not yet completed all of their vaccinations.³¹

However, there are concerns this strong-arm removal of NMEs will fortify anti-vaccination sentiment, leading to angry parents who try to avoid state-mandated vaccination policies. Some public health representatives strongly support NMEs because they act as a “safety valve,” permitting people who strongly oppose vaccinations to legally avoid government compulsion.³² Enforcing compulsory vaccination could imaginably “erode trust in vaccines and public health more generally.”³³ Another persuasive argument against removing NMEs is that the choice to receive an exemption is politically popular across the nation.³⁴ Some Americans believe parents should have more weight than the government in decisions involving the health and wellness of their children. Adamant defenders of NMEs ultimately contend parental autonomy outweighs the public health consequences resulting from exemptions motivated by personal beliefs.³⁵ Parents feel their individual judgments about how to take care of their own children should be at the forefront, and the most proactive method of affirming their parental rights is through obtaining exemptions.³⁶ From a legal standpoint, NMEs help strike a balance between respect for parental autonomy, the health and well-being of children, and governmental mandates that encourage public health.³⁷

Parents have become incredibly concerned about vaccine safety, which is playing a significant role in their vaccine refusal or delay.³⁸ Prevailing concerns involve the belief that vaccines can harm children or the misconception that there is a causal relationship between vaccines and

30. Colgrove & Lowin, *supra* note 26, at 353.

31. Bradford & Mandich, *supra* note 9, at 1384.

32. Colgrove & Lowin, *supra* note 26, at 352.

33. *Id.*

34. See Omer et al., *supra* note 17, at 1171 (noting that the political popularity is exemplified by the increase in the percentage of parents choosing to exempt rather than vaccinate within the last decade).

35. Eileen Wang et al., *Nonmedical Exemptions from School Immunization Requirements: A Systematic Review*, 104 AM. J. PUB. HEALTH e62, e62 (2014); Nina R. Blank et al., *Exempting Schoolchildren from Immunizations: States with Few Barriers Had Highest Rates of Nonmedical Exemptions*, 32 HEALTH AFF. 1282, 1283 (2013) (revealing important policy implications of limiting parents’ ability to make decisions in the interest of public health).

36. See Karlen E. Luthy et al., *Reasons Parents Exempt Children From Receiving Immunizations*, 28 J. SCH. NURSING 153, 156 (2012).

37. Wang et al., *supra* note 35.

38. *Id.*

autism.³⁹ The Internet and social media have become major avenues for disseminating misinformation about vaccinations, which often leads to anxiety for many parents who have yet to speak with their child's health care provider.⁴⁰ Other concerns identified include "fear of acquiring the disease from the vaccine, dangerous chemicals or preservatives [harming the body, or] . . . overloading the immune system [with too many shots]."⁴¹ While removing the NME option and compelling parents to vaccinate their children would naturally reduce the rates of exemption and vaccine-preventable diseases, it could create serious political animosity.

In the wake of a highly publicized measles outbreak, California's decision to legislatively eliminate NMEs is not necessary in order to improve state childhood vaccination rates. There are effective strategies that have been statistically proven to successfully eliminate low vaccination rates and protect herd immunity.⁴² States need not wait for reactive legislative efforts motivated by dramatic events that generate public support to increase state vaccination rates. Additionally, states need not risk sparking public backlash challenging the lack of exemptions for reasons such as parental autonomy in their children's health care decisions. Swift revocation of a legal right "that people have previously enjoyed presents a different set of political circumstances than maintaining a status quo in which the right has never existed."⁴³ Instead, state policymakers can take smaller administrative actions that are proven effective and are likely to be long lasting from the evidence-based systematic review of the Community Guide Task Force (Task Force).

Section II explains important background information about the significance of NMEs, and some data reflecting state-by-state comparisons of vaccination rates to identify whether states with stricter laws always result in higher vaccination rates. It also describes a policy approach called evidence-based public health and a review board called the Community Guide, which will be two important mechanisms in implementing successful vaccination policies. Section III then enumerates a framework for adopting new policy implementations. The necessary steps before implementation first require locating problematic communities that are refusing or failing to vaccinate their children, then tailoring the implementation to meet their needs. To be most successful, the implementation should focus specifically on these target populations. This section subsequently describes in detail some of the different

39. See Luthy et al., *supra* note 36, at 158.

40. Allison Kennedy et al., *Confidence About Vaccines in the United States: Understanding Parents' Perceptions*, 30 HEALTH AFF. 1151, 1151 (2011).

41. Wang et al., *supra* note 35, at e64.

42. See *generally Vaccination*, CMTY. GUIDE, <https://www.thecommunityguide.org/topic/vaccination>.

43. Colgrove & Lowin, *supra* note 26, at 353.

implementations suggested by the Task Force and how these implementations have been successful. The interventions supported by this comment are only a few of the total Task Force recommendations for increasing vaccination rates. The specific implementations in this comment include vaccination programs in schools and organized child-care centers, client or family reminder and recall systems, and client or family incentives or rewards.

II. NON-MEDICAL EXEMPTIONS AND THEIR RELATIONSHIP TO THE COMMUNITY GUIDE

“Childhood vaccinations are one of the most significant public health interventions of all time” because vaccinations “reduce the risk of contracting dangerous vaccine-preventable childhood diseases on the individual level and, when immunization coverage is high enough, confer herd immunity at the population level for those diseases that are contagious.”⁴⁴ Despite the importance of vaccinations, the United States, interestingly, does not have a federally mandated vaccination requirement.⁴⁵ In order to incentivize people to vaccinate their children, state legislatures implement vaccination requirements within the educational system.⁴⁶ All fifty states require parents to provide documentation of immunization for admission into school and day care, a mandate crucial to achieving widespread vaccination.⁴⁷

State vaccination requirements mandate that all children are vaccinated before entering school, but they allow for children with medical contraindications to obtain an exemption.⁴⁸ Some states also permit NMEs for religious reasons or philosophical beliefs.⁴⁹ Medical exemptions are permissible, for example, for children with “compromised immune systems, prior adverse reactions following vaccination, allergies to vaccine components, and certain types of moderate or severe illness.”⁵⁰ Children who obtain medical exemptions are protected from the dangers of illness due to the “unlikelihood that they will be exposed to the disease.”⁵¹ However, a more common use of an exemption by parents is the religious exemption, or a choice

44. Wang et al., *supra* note 35.

45. Bradford & Mandich, *supra* note 9.

46. *Id.*

47. See Yang & Silverman, *supra* note 25.

48. Rane Seither et al., *Vaccination Coverage Among Children in Kindergarten – United States, 2014–15 School Year*, 64 MORBIDITY & MORTALITY WKLY. REP. 897, 897 (August 28, 2015).

49. *Id.*

50. Yang & Silverman, *supra* note 25.

51. May & Silverman, *supra* note 16 (noting that herd immunity may prevent outbreaks from gaining a “foothold”).

not to be vaccinated because it contradicts family religious beliefs.⁵² Additionally, a few states also permit NMEs, avoiding vaccinations due to philosophical, moral, or personal beliefs.⁵³ California, Mississippi, and West Virginia are the only states that prohibit NMEs altogether.⁵⁴

Theoretically, states in which people are not able to opt out using NMEs should have the highest vaccination rates; but, in reality, it is not the case. Mississippi and West Virginia have the most restrictive laws regarding NMEs but, surprisingly, are not the states with the highest vaccination rates in every vaccine category.⁵⁵ A *Morbidity and Mortality Weekly Report* (MMWR) indicated Mississippi led the nation with the highest vaccination rates with regard to MMR and varicella vaccinations, but not all vaccinations.⁵⁶ West Virginia was below the average U.S. percentage in all categories but one.⁵⁷ This is noteworthy because it would be expected that Mississippi and West Virginia would have the highest rates across the board because of their lack of NMEs.

Furthermore, a 2015 CDC report indicated Maine had some of the highest vaccination rates in different categories of both vaccination types and series.⁵⁸ This data is significant because Maine allows for NMEs, and the exemption process seems to be fairly easy to fulfill. Maine vaccination laws do not require a separate exemption application for each vaccine, parental notarization, or affidavit in the exemption process, and the application does not first have to be approved by the health department.⁵⁹ Another example of a state that has stricter laws associated with lower vaccination rates is Wyoming, which

52. Yang & Silverman, *supra* note 25 (noting that about forty-eight states allow religious exemptions).

53. *Id.*

54. See Mello et al., *supra* note 19 (discussing how some states allow all NMEs, while some states permit certain types of NMEs but not others).

55. Yang & Silverman, *supra* note 25, at 248.

56. Seither et al., *supra* note 48, at 898. MMR vaccination is administered to prevent Measles, Mumps, and Rubella, which are serious diseases that are especially common among children. CTRS. FOR DISEASE CONTROL & PREVENTION, VACCINE INFORMATION STATEMENT: MMR VACCINE (Apr. 20, 2012). Varicella vaccination is administered to prevent “Chickenpox” which is a common childhood disease which is usually mild but can be serious in young infants and adults. CTRS. FOR DISEASE CONTROL & PREVENTION, VACCINE INFORMATION STATEMENT: CHICKENPOX VACCINE (Mar. 13, 2008). See also Holly A. Hill et al., *National, State, and Selected Local Area Vaccination Coverage Among Children Aged 19-35 Months—United States 2014*, 64 MORBIDITY & MORTALITY WKLY. REP. 889, 894 (2015) (indicating Mississippi did not rate highest for DTaP, Hep B, or Hep A).

57. Hill et al., *supra* note 56, at 898 (showing that West Virginia was above the U.S. overall percentage only in HepB).

58. *Id.* at 892 (noting that Maine was above U.S. average in MMR, DTaP, HepA).

59. CTRS. FOR DISEASE CONTROL & PREVENTION, OFFICE FOR STATE, TRIBAL, LOCAL & TERRITORIAL SUPPORT, STATE SCHOOL IMMUNIZATION REQUIREMENTS AND VACCINATION EXEMPTION LAWS 11–14 (Mar. 27, 2015).

revealed some of the lowest vaccination rates in the DTaP and HepA vaccines, even though Wyoming law allows for only medical and religious exemptions.⁶⁰

While evidence reveals removing NMEs does increase vaccination rates statewide, it also indicates there is not a perfect correlation. Contrary to initial belief, states with the highest exemption rates are not always the states with the lowest vaccination rates.⁶¹ Conversely, low exemption rates (particularly in states with stricter laws) do not automatically result in high percentages of vaccinated children within the state.⁶² Another confounding factor is “exemption status does not always reflect vaccination status.”⁶³ A child who qualifies for an exemption might actually have received at least some vaccines.⁶⁴ Additionally, a child may be fully vaccinated, but parents or guardians may have found it easier to obtain an exemption rather than submitting their child’s vaccination information.⁶⁵ The vaccination and exemption status described in the MMWR reflects a “child’s status at the time of assessment or at an earlier point in the school year”, so it is possible a child could later receive the rest of the required vaccines, but his or her status may not reflect the update.⁶⁶ Another issue complicating state vaccination percentages is that there can be concentrated pockets of communities with high exemption rates despite overall high state-level vaccination coverage—later discussed as *clustering*.⁶⁷ The overall state coverage may meet vaccination goals, but there are geographic pockets with unvaccinated children that fall below the average percentage of vaccinated children statewide.⁶⁸ However,

60. Hill et al., *supra* note 56, at 895; CTRS. FOR DISEASE CONTROL & PREVENTION, *supra* note 59, at 12. DTaP vaccination is administered to prevent Diphtheria, Tetanus, and Pertussis. CTRS. FOR DISEASE CONTROL & PREVENTION, VACCINE INFORMATION STATEMENT: DTAP VACCINE (May 17, 2007). HepA vaccination is administered to prevent Hepatitis A (a serious liver disease caused by the Hepatitis A Virus). CTRS. FOR DISEASE CONTROL & PREVENTION, VACCINE INFORMATION STATEMENT: HEPATITIS A VACCINE (Jul. 20, 2016).

61. Seither et al., *supra* note 48, at 899 (for example, if many exemptions are filed for convenience by parents of fully vaccinated children).

62. *Id.* (for example, if school vaccination requirements are not executed according to vaccination laws).

63. *Id.*

64. *Id.* (“An exemption may be given for all vaccines even if a child missed all doses of a single vaccine or a single dose.”).

65. *Id.*

66. Seither et al., *supra* note 48, at 901–02.

67. See Saad B. Omer et al., *Geographic Clustering of Nonmedical Exemptions to School Immunization Requirements and Associations With Geographic Clustering of Pertussis*, 168 AM. J. EPIDEMIOLOGY 1389, 1394 (2008) (describing the situation in the state of Michigan in 2003–04).

68. Seither et al., *supra* note 48, at 897–98 (noting that state goals are set at less than ninety-five percent from the *Healthy People 2020* initiative).

regardless of potential discrepancies in vaccination coverage assessment in states, data clearly indicates stricter exemption laws do not necessarily lead to absolute coverage, and there must exist some other method for incentivizing vaccination without legislative action.⁶⁹

A relatively new approach towards tackling public health policy issues is called evidence-based public health (EBPH) and has been deemed a highly effective means of improving population health.⁷⁰ Evidence-based policy implementation in public health is defined as “the integration of science-based interventions with community preferences to improve population health.”⁷¹ Both practitioners and researchers support the use of evidence-based practices, and there is a growing need for its implementation.⁷² EBPH has various benefits, specifically, “access to more and higher-quality information on what works, [and] a higher likelihood of successful programs and policies being implemented . . .”⁷³ The foundation of EBPH is developed from “epidemiologic, behavioral, and policy research showing the size and scope of a public health problem and which interventions are likely to be effective in addressing the problem.”⁷⁴ Using EBPH in health care decision-making at any level will improve public health policies.⁷⁵

A comprehensive, credible source of review is one of the most effective ways to gain a better understanding of cutting edge research and successful implementation practices in public health issues.⁷⁶ “One of the most useful sets of reviews for public health interventions is the *Guide to Community Preventive Services (the Community Guide)*. . . , which provides an overview of current scientific literature through a well-defined, rigorous method in which available studies themselves are the units of analysis.”⁷⁷ Thus, the Community Guide will play an important role in increasing vaccination rates.

The Community Guide is a highly credible source for policymakers to consult before implementing vaccination programs because it is based strictly on an evidence-based, systematic review process.⁷⁸ The website compiles

69. “Absolute” meaning total coverage of those who are medically capable of receiving vaccinations.

70. Ross C. Brownson et al., *Fostering More-Effective Public Health by Identifying Administrative Evidence-Based Practices*, 43 AM. J. PREVENTIVE MED. 309, 312 (2012).

71. *Id.* at 309.

72. *Id.*

73. Ross C. Brownson et al., *Evidence-Based Public Health: A Fundamental Concept for Public Health Practice*, 30 ANN. REV. PUB. HEALTH 175, 176 (2009).

74. *Id.* at 193.

75. *Id.*

76. *Id.* at 183.

77. *Id.*

78. *See generally About the Community Guide*, CMTY. GUIDE, <https://www.thecommunityguide.org/about/about-community-guide> (last visited Mar. 18, 2017).

publications from all of the official Community Preventive Task Force findings and the systematic reviews on which they are based.⁷⁹ The recommendations include the reasoning behind how the Task Force reached its conclusion and any limitations or potential barriers that could result from implementation.⁸⁰ The Task Force is an expert panel of scientists and subject-matter experts that makes prevention-oriented, evidence-based recommendations based on scientific reviews.⁸¹ The recommendations “[e]valuate the strength and limitations of published scientific studies . . . [a]ssess whether the programs, services, and policies are effective in promoting health and preventing disease, injury, and disability [and] [e]xamine the applicability of these programs, services, and policies to varied populations and settings.”⁸² Thus, the Community Guide offers insight on what interventions have and have not worked and in which populations; how much the interventions could potentially cost; whether there are any other benefits or harms to implementation; or if there is any further research necessary to conduct before implementation.⁸³ This information can assist federal, state, and local health departments, policymakers, health care providers, employers, schools, and research organizations in executing successful health care programs, specifically vaccination programs.⁸⁴ The Task Force has recommended a handful of interventions for vaccinations in three major categories: “enhancing access to [vaccination] services, . . . increasing community demand, . . . [and] using provider- or system-based interventions.”⁸⁵ The most effective strategies the Community Guide found to increase vaccination rates were “enhancing access to [vaccination] services” (e.g. reducing client out-of-pocket costs), in combination with “provider- or system-based interventions” (e.g. reminder systems, standing orders) and interventions to increase client or community demand for vaccinations (e.g. client reminders, education).⁸⁶ The ideal method would be to incorporate all of these implementations to increase both access and demand and integrate

79. *Id.*

80. *Our Methodology*, CMTY. GUIDE, <https://www.thecommunityguide.org/about/our-methodology> (last visited Mar. 18, 2017).

81. *Community Preventative Task Force Members*, CMTY. GUIDE, <https://www.thecommunityguide.org/task-force/communitypreventive-services-task-force-members> (last visited Jan. 10, 2017).

82. *What is the Task Force?*, CMTY. GUIDE, <https://www.thecommunityguide.org/task-force/what-task-force> (last visited Sept. 29, 2016).

83. *About the Community Guide*, *supra* note 78.

84. CMTY. GUIDE, INCREASING APPROPRIATE VACCINATION (May 2013), <https://www.thecommunityguide.org/sites/default/files/assets/What-Works-Vaccines-factsheet-and-insert.pdf>.

85. *Id.*

86. *Id.*

provider involvement; yet if that is not possible, the implementations even individually have proven successful in achieving increased vaccination rates.

The current anti-vaccination sentiment in America could, in part, be due to the fact that vaccine-preventable diseases have essentially become eradicated; people of this generation have not been exposed to the serious consequences of acquiring such diseases. Younger generations of people have not seen a baby with chicken pox or rubella; “[t]hey have never heard a baby gasping for air during a spell of whooping cough, or watched a child lapse into convulsions due to brain swelling as a complication of measles.”⁸⁷ Lack of experience and understanding of the consequences of such diseases has resulted in fewer parents feeling compelled to vaccinate their children.⁸⁸ The answer to increasing vaccination rates in the United States is not by eliminating NMEs, but instead to incentivize vaccination and improve attitudes towards vaccines in general. There are limited resources, especially finite finances and political capital; therefore, policymakers should do what has been proven to be successful. Otherwise, their efforts will only be successful short-term. Considerable weight should be given to the best scientific evidence available as policymakers and health care professionals are “implementing [new] programs, developing policies, and evaluating progress” of programs and policies.⁸⁹ Policy should follow the evidentiary trends because the data reveals what works.

III. THE FRAMEWORK & POLICY IMPLEMENTATIONS

This comment argues for following a framework when applying the Community Guide recommendations in target populations. The framework for implementing new policies to increase vaccination rates must first begin with identifying the characteristics of the target population. Policymakers should initially determine what level they are interested in implementing the policy. For instance, policymakers may desire to address issues at the state level, county level, or an individual school district. To assure the implementation adequately meets the needs of the population, the next element is to understand why this certain community is failing to reach adequate immunization levels.

A phenomenon called *clustering* could be influencing the elevated numbers of exemption rates in certain geographic locations. Clustering is a phenomenon in which a “proportion of people who seek exemption to mandatory vaccination is higher in a particular locality than it is for the broader

87. Jacquielynn Floyd, *Floyd: How Do You Convince Vaccine Deniers? Show the Reality of Disease*, DALL. MORNING NEWS (Jan. 2016), <http://thescoopblog.dallasnews.com/2016/01/floyd-how-do-you-convince-vaccine-deniers-show-the-reality-of-disease.html/>.

88. *See id.*

89. Brownson et al., *supra* note 73.

population.”⁹⁰ A CDC review of the 2014-2015 school year revealed some state exemption rates were more than four percent, likely caused by clusters of unvaccinated children.⁹¹ People within clusters tend to have similar demographic characteristics and cultural beliefs, and, often times, parents who seek exemptions are “[w]hite and college educated and . . . have relatively high incomes compared with parents who did not seek exemptions”⁹² Therefore, there is a strong correlation between exemption rates and socioeconomic status.⁹³ The process of locating the clusters will lead to the next question of why this group of people is choosing to exempt their children.

The people within clusters typically file NMEs for two main reasons: (1) strong refusal based on fears of vaccination safety or (2) the convenience of filing an exemption so their children can enter school on time.⁹⁴ Given that vaccine exemptions are clustered within certain sub-populations of the state, it is necessary for policymakers to first determine what types of people are hesitant and where their communities are located.⁹⁵ The next step is to determine what aspects of vaccinations are causing their concerns.⁹⁶ Most parental concern is some variation of vaccine safety, whether it is particular to one single vaccine or the effects of vaccines generally.⁹⁷ For example, a 2012 study in Utah found the top five reasons for personal exemptions were “(1) issues regarding parental perceptions about vaccine harm. . . , (2) health care systems issues. . . , (3) chronic disease concerns. . . , (4) immune system concerns. . . , [and] (5) adverse reaction concerns.”⁹⁸ Ultimately, the reason most parents choose to fulfill an exemption is based on concerns about potential harmful effects for their children, even though there is evidence supporting the value of vaccinations to improving public health.⁹⁹

The second reason parents obtain NMEs is related to health care system issues.¹⁰⁰ This often occurs when parents submit a NME form because it is easier than obtaining the child’s vaccination documentation. These parents are concerned about getting their children enrolled in school so they file the NME

90. May & Silverman, *supra* note 16.

91. See Hill et al., *supra* note 56 (showing eleven states reported exemption rates of over four percent and six reported rates of less than one percent).

92. Wang et al., *supra* note 35, at e64.

93. *Id.*

94. *Id.* at e62.

95. Heidi J. Larson et al., *Measuring Vaccine Hesitancy: The Development of a Survey Tool*, 33 *VACCINE* 4165, 4165–66 (2015).

96. *Id.* at 4166.

97. Luthy et al., *supra* note 36.

98. *Id.*

99. *Id.*; Larson et al., *supra* note 95, at 4167.

100. Luthy et al., *supra* note 36, at 157.

simply out of convenience.¹⁰¹ Seeking NMEs out of convenience can account for up to twenty-five percent of all NMEs received.¹⁰² Many of these parents filed for an exemption because they were “unable to locate or access the child’s vaccination record in a timely manner.”¹⁰³ Parents who file for exemptions based on health care system issues are not necessarily strongly opposed to childhood vaccination but instead choose to exempt for other reasons, typically just wanting their children to be able to start school on time.¹⁰⁴ The reasons behind why parents file for exemptions are customarily two-fold and should be treated accordingly when introducing a new policy implementation.

In addition to white, college-educated populations, another targeted population worth considering before implementation of new vaccination policies is low-income communities. Historically, there have been indisputable disparities in childhood vaccination coverage.¹⁰⁵ In a MMWR from the 2014-2015 school year, evidence showed “[c]hildren from households classified as below the federal poverty level had lower estimated coverage for almost all of the vaccinations assessed, compared with children living at or above the [federal] poverty level.”¹⁰⁶ Vaccination coverage also varies by demographic characteristics. Over the past twenty years, while disparities in vaccination coverage between racially ethnic children and white children have declined, they still exist.¹⁰⁷ The August 2015 CDC report found lower vaccination coverage for racially ethnic children compared to white children for several vaccinations.¹⁰⁸ The CDC also recommended targeting interventions in areas where there are families and children living below the poverty level.¹⁰⁹ Vaccination interventions will not only help eradicate health care disparities between populations, but it will also increase herd immunity protection.¹¹⁰ The CDC supports evidence-based strategies as a possible method for success.¹¹¹

101. *Id.*

102. Seither et al., *supra* note 48, at 901.

103. Luthy et al., *supra* note 36 at 157.

104. *Id.*

105. *See* Hill et al., *supra* note 56, at 893–94.

106. *Id.* at 890.

107. *See* Allison T. Walker et al., *Reduction of Racial/Ethnic Disparities in Vaccination Coverage, 1995-2011*, 63 MORBIDITY & MORTALITY WKLY. REP. 7, 12 (2014) (showing how Congress passed legislation that authorized the creation of the “Vaccines for Children” program, which concentrated efforts towards making sure there were no longer disparities among children).

108. Hill et al., *supra* note 56, at 891 (the vaccinations were DTaP, Hib, PCV, rotavirus, and a combined series); *id.* at 894 (“Children living below poverty the level had rotavirus coverage that was 14.1 percentage points lower than that of children at or above the poverty level.”).

109. *Id.* at 895.

110. *Id.*

111. *Id.*

Once the target population characteristics are identified, policymakers must then determine the implementation(s) they are going to effectuate. The decision whether or not to implement any of the Task Force recommendations may depend on the characteristics of the target population and any restrictions that may make those problems difficult to overcome.¹¹² Not every single recommendation will be successful in every single population in which it is introduced. The following policy implementations are just a few of those recommended by the Task Force. Each selected implementation will be explained in detail, supported by effectiveness data, and then followed by an explanation of their success in cluster and low-income populations.

A. *Vaccination Programs in Schools*

1. The Community Guide Recommendation

One implementation reviewed by the Task Force was vaccination programs in schools and organized child care centers using on-site vaccination delivery.¹¹³ The studies concluded this intervention was effective at increasing vaccination rates, thus the Task Force recommended implementation.¹¹⁴ School-based vaccination programs have the advantage of widening access to vaccination services and increasing the demand for treatment.¹¹⁵ To be considered empirically effective at increasing vaccination rates, vaccination programs included at least two of the following: “(1) immunization and education promotion, (2) assessment and tracking of vaccination status, (3) referral of under-immunized school or child care attendees to vaccination providers, and (4) provision of vaccinations.”¹¹⁶ In order to reduce costs for the schools and day care centers, vaccination programs are often established by

112. CMTY. PREVENTIVE SERVS. TASK FORCE, *Recommendation for Use of Immunization Information Systems to Increase Vaccination Rates*, 21 J. PUB. HEALTH MGMT. PRAC. 249, 249 (2015).

113. CMTY. PREVENTIVE SERVS. TASK FORCE, INCREASING APPROPRIATE VACCINATION: VACCINATION PROGRAMS IN SCHOOLS AND ORGANIZED CHILD CARE CENTERS 1, <https://www.thecommunityguide.org/sites/default/files/assets/Vaccination-Programs-at-Schools-Childcare-Centers.pdf> (last updated Oct. 25, 2010).

114. *Id.* See also TASK FORCE ON CMTY. PREVENTIVE SERVS., DISEASES, THE GUIDE TO COMMUNITY PREVENTATIVE SERVICES: WHAT WORKS TO PROMOTE HEALTH? 250–51 (2005) (showing that the systematic review was based on nine studies “conducted to assess the acceptance of hepatitis B vaccine at a time when the vast majority of students were unvaccinated.” A baseline coverage was first established then targeted towards the entire student population).

115. *Id.* at 249 (noting that demand is increased by educating students and families and school staff about the importance of vaccinations and providing information about when children should be receiving them. Access is increased by providing convenient vaccine locations, incentives, and special hours).

116. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 113.

partnerships with health departments, health care providers, or community health care services.¹¹⁷ The programs studied by the Task Force provided the children with services such as vaccinations on-site, delivery of one or a range of vaccines, and providing families health care information and/or vaccine education.¹¹⁸

The Task Force determined school and organized child care center vaccination programs are effective at increasing vaccination coverage among children and adolescents, especially new vaccines that tend to have lower uptake among children.¹¹⁹ Providing vaccines in school or child care settings enables children to receive coverage when they may not have another opportunity to be vaccinated.¹²⁰ The Task Force found the statistics showed the vaccination programs in schools increased coverage significantly—by roughly fifty-eight percent.¹²¹ This intervention also is successful in getting children vaccinated for annual immunizations such as the seasonal flu.¹²²

There are multiple benefits of school-based vaccination programs. They are less expensive and more convenient than vaccines provided in other health care settings, making this implementation effective.¹²³ Vaccinating children at school eliminates issues of lost time, cost of transportation, and waiting at the office often associated with visits to primary care providers. These constraints disproportionately affect low-income parents who cannot afford to lose time and money, likely resulting in the reduced coverage in their children.¹²⁴ School vaccination programs provide children with the vaccinations they need without forcing parents to adjust their schedules in order to take their children to the doctor.¹²⁵ Two interests are served: the children get the necessary immunizations, and the parents avoid financial loss. Children spend between eight to ten hours a day at school, so it makes logical sense to “bring[] the vaccines to where the kids are” and minimize resources exhausted by parents.¹²⁶ Cost savings is an additional benefit to this implementation. One representative study reviewed by the Task Force found the cost differential of

117. *Id.*

118. *Id.*

119. *Id.*

120. Judith Shlay et al., *Implementing a School-Located Vaccination Program in Denver Public Schools*, 85 J. SCH. HEALTH 536, 537 (2015) (for example, if they are uninsured or have yet to see a primary care provider).

121. TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 250.

122. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 113.

123. TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114.

124. John Cawley et al., *Strategies for Implementing School-Located Influenza Vaccination of Children: A Systematic Literature Review*, 80 J. SCH. HEALTH 167, 168 (2010).

125. Shlay et al., *supra* note 120.

126. Cawley et al., *supra* note 124. See also Mary McCauley et al., *Introduction: Strengthening the Delivery of New Vaccines for Adolescents*, 121 AM. ACAD. PEDIATRICS S1, S3 (2008).

implementing the school program to be \$2,316.00 per life-year saved.¹²⁷ Not only can school-based programs result in lower vaccine costs, but also vaccinating more children per year can reduce costs resulting from illnesses and costs associated with children's clinic visits.¹²⁸ One minimal constraint is obtaining consent from the parents. Therefore, the school's clinic must be organized and communicative about the vaccination status of each enrolled child.¹²⁹ Depending on the location of the school, consent could be difficult to obtain. If the school is located in a clustered community of disgruntled anti-vaccination parents, this implementation may require a more tailored approach to persuade these parents of the importance of vaccinations.

The Community Guide identifies recognizable barriers to the vaccination programs, which will be necessary for policymakers to take into consideration when determining if they will use this policy implementation. A potential harm is the possibility that families may begin to rely on the school program as their main source of health care, and children will lose contact with their primary health care providers for routine care.¹³⁰ Additionally, some schools and child care centers lack the necessary resources to implement the programs.¹³¹ The components of school vaccination programs have been outlined by the Community Guide recommendations, and the following section applies the effectiveness data to the identified targeted populations.

2. *Implementation of Vaccination Programs in the Target Populations*

Vaccination programs will be successful in both clustered and low-income communities. The underlying advantages of school-based vaccination programs and the reasons the Community Guide found a significant increase in vaccination rates are the convenience and lower cost to parents.¹³² These factors are what will make vaccination programs highly successful in schools within communities where many of the children and families are below the poverty line and may not be able to afford the costs included in getting vaccinated.

Before giving the vaccinations, school health care clinics must obtain consent from parents, which can be challenging in clustered populations with

127. TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 251 (analyzing the cost-effectiveness of a school vaccination program in British Columbia). *See also* Murry Krahn et al., *Costs and Cost-Effectiveness of a Universal, School-Based Hepatitis B Vaccination Program*, 88 AM. J. PUB. HEALTH 1638, 1640 (1998) (indicating that in 1998, large-scale vaccine costs could be delivered at around twenty-four dollars per person).

128. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 113, at 2.

129. Cawley et al., *supra* note 124.

130. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 113, at 2.

131. *Id.* *See also* Shlay et al., *supra* note 120, at 542.

132. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 113, at 2.

strongly held beliefs against vaccinations.¹³³ If the school is located in the midst of a clustered community, which likely contains parents who share similar concerns about vaccine safety, personnel in the vaccination programs should be prepared to have conversations with parents regarding their beliefs.¹³⁴ School nurses and personnel at child care centers often have frequent interactions with parents and children, thus they play a crucial role in the goal of obtaining parental consent for vaccinations.¹³⁵ In a study of Denver public schools, the school-located vaccine programs saw success in participation from parents when school staff “promote[d] program visibility and facilitated informational interactions with parents.”¹³⁶ Interactions with trusted school staff will provide opportunities for parents to ask questions, and parents can complete consent forms while on-site.¹³⁷ It would be extremely beneficial for school nurses to familiarize themselves with the common questions about vaccines as well as individualized issues each family may experience.¹³⁸ As previously discussed, since many parents file for exemptions based on convenience purposes of enrolling their children in school, school nurses can also help emphasize the necessity of receiving vaccinations and can assist with organizing future appointments with children’s health care providers.¹³⁹

School-based events provide ideal opportunities for school nurses to interact with parents in more comfortable situations in order to successfully disseminate vaccine information.¹⁴⁰ Some of those events include back-to-school nights, parent-teacher conferences, kindergarten enrollment, or utilization of already established communication methods such as email lists.¹⁴¹ Getting all parties—school staff, health care staff, parents, and children—involved will increase acceptance of the vaccination program overall.¹⁴² These venues are also opportunities for school nurses to put on vaccination educational programs to parents in order to address any initial hesitancy before it leads to outright refusal.¹⁴³

An alternative to a strictly school-located program is the creation of extramural programs. Implementing vaccination programs on-campus can be costly, so not all schools can realistically support this program in their health

133. See Schlay et al., *supra* note 120, at 541.

134. See Wang et al., *supra* note 35, at e82.

135. Luthy et al., *supra* note 36, at 159.

136. Shlay et al., *supra* note 120, at 541.

137. *Id.*

138. Luthy et al., *supra* note 36, at 158.

139. *Id.*

140. *Id.*

141. *Id.*

142. Shlay et al., *supra* note 120, at 541.

143. Luthy et al., *supra* note 36, at 158.

centers. Extramural programs provide resources to schools that either do not have adequate health centers to support a vaccination program or are limited in available resources.¹⁴⁴ Ultimately, extramural programs are successful because they “increase uptake of vaccines and decrease absenteeism due to noncompliance with vaccine requirements for school entry.”¹⁴⁵ The extramural clinics often engage in a partnership with the schools, but allow the schools to make major decisions about implementation since they are responsible for maintaining the programs.¹⁴⁶ The partnership proved incredibly vital to the success of the vaccination rates, emphasizing open, honest communication in a collaborative manner.¹⁴⁷ The teamwork approach of bringing together different health care organizations will help increase access to and quality of vaccinations.

In conclusion, the roles of school nurses or health care personnel in school-based vaccination programs will help increase parental consent for vaccinations, especially within clustered communities that are hesitant to vaccinate their children. School-based vaccination programs are also advantageous for low-income communities because time and financial concerns weighing against taking children to their health care providers are eliminated by the ease and convenience of only having to drop children off at school where they will be vaccinated.

B. Client Reminder and Recall Systems

1. The Community Guide Recommendation

Another intervention the Community Guide recommends is client reminder and recall interventions, both alone and in combination with other intervention systems. There is evidence this implementation is effective at increasing childhood vaccination rates in a variety of populations.¹⁴⁸ The effectiveness data revealed client reminder and recall systems alone increased coverage by almost eight percentage points, and when combined with other activities, coverage increased by about sixteen percentage points.¹⁴⁹ Client reminders

144. Kim A. Hayes et al., *Early Lessons Learned from Extramural School Programs that Offer HPV Vaccine*, 83 J. SCH. HEALTH 119, 119 (2013).

145. *Id.*

146. *Id.* at 122.

147. *Id.* at 123.

148. CMTY. PREVENTIVE SERVS. TASK FORCE, INCREASING APPROPRIATE VACCINATION: CLIENT REMINDER AND RECALL SYSTEMS (2008 ARCHIVED REVIEW) 3 (2015), <https://www.thecommunityguide.org/sites/default/files/Vaccination-Client-Reminders-Archive.pdf>. See also TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 232 (explaining the findings “are based on [forty-two] studies . . . [and n]ine additional reports provided information on studies already included in the review”).

149. TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 231.

notify families when vaccinations are due; while recalls remind parents their children are late receiving their vaccinations.¹⁵⁰ They can effectively prompt parents to schedule immunization visits, especially when parents are pro-vaccination but simply are unfamiliar with updates to vaccine recommendations.¹⁵¹ Reminder and recall notifications are typically delivered by letter, postcard, telephone call, or text messages.¹⁵² The messages are designated as either specific or general.¹⁵³ In some studies, the messages contained educational information about the importance of vaccination in order to nudge parents to schedule appointments more efficiently.¹⁵⁴

Providing numerous reminders is more effective than single reminders. The Community Guide's review found parents were more likely to schedule visits when they received numerous reminders and when their reminders were personalized or signed by the physician.¹⁵⁵ Multiple, specific reminders are especially influential since child immunization rates in certain populations continue to be problematic due to parents forgetting or being unable to take their child to get vaccinated.¹⁵⁶ One factor behind missed vaccinations is a result of recently developed immunization schedules that can be complex and often require strict, timely injections.¹⁵⁷ New additions to routine vaccination schedules may leave parents unaware their child is not fully immunized, but reminders relieve problems related to lack of parental knowledge in order to ensure children are getting appropriate vaccinations.¹⁵⁸

The advantage of using client reminders and recalls is that notifications can reach a significant amount of people without expending many provider

150. *Id.*

151. See Melissa S. Stockwell et al., *Text4Health: Impact of Text Message Reminder-Recalls for Pediatric and Adolescent Immunizations*, 102 AM. J. PUB. HEALTH e15, e15 (2012).

152. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 148.

153. TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 231 (*specific* means "telling the client to come in by a certain date to receive a specific vaccination" and *general* means "telling the client to get in touch with the provider or healthcare system to make an appointment for needed vaccinations").

154. *Id.* at 233–34.

155. Hannah Harvey et al., *Patient Reminder, Recall, and Educational Interventions to Improve Early Childhood Immunization Uptake: A Systematic Review and Meta-Analysis*, 33 VACCINE 1862, 2878 (2015) (indicating postal and telephone reminders in combination are especially effective for parents whose children are at risk for non-attendance at vaccination visits).

156. Victoria Niederhauser et al., *Vaccine4Kids: Assessing the Impact of Text Message Reminders on Immunization Rates in Infants*, 33 VACCINE 2984, 2984 (2015).

157. Julie C. Jacobson Vann & Peter Szilagyi, *Patient Reminder and Recall Systems to Improve Immunization Rates (Review)*, COCHRANE DATABASE SYSTEMATIC REV. (2005).

158. Stockwell et al., *supra* note 151.

resources.¹⁵⁹ To cut costs and to make the best of use of their time, providers often use automated telephone systems to deliver vaccination reminders and recalls.¹⁶⁰ One study represented in the Community Guide review conducted a computer-generated call to the parents and reminded them their child had an upcoming visit.¹⁶¹ If the parent canceled the appointment, the computer would call back within a few days in order to get them to reschedule promptly, which resulted in keeping more parents accountable for bringing their children in for a visit to the health care provider.¹⁶²

Potential barriers to implementing this program include the difficulty of maintaining accurate client contact information and administrative burdens in organizing and conducting the delivery.¹⁶³ The Community Guide has not specifically proven these barriers are statistically problematic, but the barriers are listed as a consideration for policymakers to weigh when making decisions whether to implement this program.¹⁶⁴ Thus, if a targeted community has a higher tendency to move frequently, mail or telephone communications likely are not the best means to apply this communication-based program. The Community Guide recommends this policy implementation for all populations;¹⁶⁵ however, the next section will explain its influence on clustered and low-income communities.

2. Implementation of Reminders and Recalls in Target Populations

With the advances in technology and the emphasis on minimizing barriers to childhood immunizations, methods that increase access and affordability for both providers and patients are crucial.¹⁶⁶ “[T]he burden [predominantly] falls on primary care providers to ensure that their patients receive [all] immunizations on a timely basis.”¹⁶⁷ Therefore, health care providers would benefit in terms of expended effort and financial resources by incorporating the reminder and recall implementations.

The use of text message reminders has recently become a common method of communication, and there is a body of evidence supporting the success of

159. CMTY. PREVENTIVE SERVS. TASK FORCE, INCREASING APPROPRIATE VACCINATION: CLIENT OR FAMILY INCENTIVE REWARDS 2 (May 2015), <http://www.thecommunityguide.org/vaccines/RRclientreminder.html>.

160. *Id.*

161. Farrokh Alemi et al., *Computer Reminders Improve On-Time Immunization Rates*, 34 MED. CARE OS45, OS46 (1996).

162. *Id.*

163. *See* TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 233.

164. *See id.*

165. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 159, at 1.

166. Niederhauser et al., *supra* note 156.

167. Jacobson Vann & Szilagyi, *supra* note 157.

text messaging, specifically for health-related communications.¹⁶⁸ The use of text messaging in health care settings in the United States is a relatively new technique.¹⁶⁹ The ability to link electronic health record systems to text message alerts helps providers notify children who are due for immunizations as identified in their records.¹⁷⁰ Another benefit of text messages is they allow the recipient to have a record of important information like the “clinic addresses, phone numbers, and hours of operation.”¹⁷¹ Reminders, specifically in the form of text messages, are a convenient method of impacting public health by providing families with the necessary tools for getting their children vaccinated.¹⁷²

In addition to the ease and speed of text message reminders, the cost is fairly minimal. Providers are able to send messages to “hundreds or thousands of patients with minimal additional costs or personnel time, particularly compared with paper mailings.”¹⁷³ It typically costs providers no more than thirty cents per message.¹⁷⁴ Health care providers typically absorb the costs of these text messages, which greatly benefit families who are limited in financial resources.¹⁷⁵ Ultimately, text messages are one of the most effective methods for local health departments or health care organizations to inform large numbers of families when and where to be vaccinated.¹⁷⁶

A study representative of the Community Guide’s findings tested the impact of text message reminders, specifically on childhood immunization rates in the first six months of life, and found even despite other barriers like access to care and concern about potential issues following vaccination, the reminders were critical in achieving increased vaccination rates.¹⁷⁷ Another study focused on the use of text messages relating to the MMR vaccine.¹⁷⁸ The study revealed the reminders were greatly beneficial for children who were not previously scheduled for their one-year check up.¹⁷⁹ This is worth noting because it “illustrate[s] a potential target population that may benefit most

168. Stockwell et al., *supra* note 151, at e18.

169. *Id.* at e19.

170. *Id.*

171. *Id.*

172. *Id.*

173. Stockwell et al., *supra* note 151, at e19.

174. *Id.*

175. Charles W. LeBaron et al., *The Impact of Reminder-Recall Interventions on Low Vaccination Coverage in an Inner-City Population*, 158 ARCHIVES PEDIATRICS & ADOLESCENT MED. 255, 259 (2004). *See also generally* Jacobson Vann & Szilagyi, *supra* note 157.

176. *See* Stockwell et al., *supra* note 151, at e19.

177. Niederhauser et al., *supra* note 156, at 2987–88.

178. *See* Annika Hofstetter et al., *Text Message Reminders for Timely Routine MMR Vaccination: A Randomized Controlled Trial*, 33 VACCINE 5741, 5742 (2015).

179. *Id.* at 5744.

from [such] reminders.”¹⁸⁰ Since some vaccinations like MMR have the best results when received within strict time frames, text messages can instantaneously send information to parents to avoid missing the time frame and losing the vaccine’s protection.¹⁸¹

Text message reminders are influential in target populations of low-income communities with children who are at a “high risk for limited health literacy.”¹⁸² In the past, sending reminders by mail or home telephone call were not as effective in low-income, urban populations because of the tendency for people in these communities to frequently move and change contact information.¹⁸³ As cell phones become more universal, people who were initially hard to track down will be more accessible by text message and, therefore, more receptive to vaccination reminder messages.¹⁸⁴ In a study representative of the Community Guide findings, the researchers sent one group of families both a letter and text message while the other group received only a letter reminder.¹⁸⁵ The study found more children whose families received both a letter and text message attended the special immunization session, as opposed to just the letter.¹⁸⁶ As providers begin to adopt text message reminders, it will likely become the most common method of keeping parents accountable for their children’s health and preventing children from slipping through the cracks by not becoming completely vaccinated.

While client reminder and recalls could be highly effective in low-income communities, this implementation alone may not be as effective in clustered communities of higher socioeconomic status. This is because the purpose behind reminders and recalls is to provoke parents to get their children vaccinated through repetitive nudges.¹⁸⁷ In clustered communities, parents who would be receiving these reminders and recalls typically hold strong anti-vaccination opinions.¹⁸⁸ The reminders and recalls do not focus directly on vaccine education or in-depth communications with parents to make them understand the consequences of failing to vaccinate their children.¹⁸⁹ This does not indicate reminders and recalls will not work in these communities because, in fact, the data proves otherwise; it simply suggests policymakers may want to consider this implementation in combination with another method if introduced

180. *Id.*

181. *Id.*

182. Stockwell et al., *supra* note 151.

183. *Id.*

184. *Id.*

185. *Id.* at e18.

186. *Id.* (noting twenty-two percent received the text message and letter, while nine percent just received a letter).

187. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 148, at 2.

188. *See* Seither et al., *supra* note 48, at 901

189. *See* TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 231.

into a clustered community in order to achieve goals of increased vaccination rates.

C. Client or Family Incentive Rewards

1. The Community Guide Recommendation

The Task Force recommends using client or family incentive rewards because the evidence shows they are successful means of improving vaccination rates in children.¹⁹⁰ The Task Force based its recommendation on a combination of studies from a Community Guide systematic review in 2011 and another study conducted during a research period from 2009 to 2012, which determined the percentage of vaccination increase was close to eight percentage points.¹⁹¹ The use of incentives is based on the notion that parents are more likely to seek vaccinations for their children if they receive rewards in return or if they are penalized for failure to do so.¹⁹² Programs typically offer either positive or negative incentives.¹⁹³ Additionally, the “[r]ewards may be monetary or non-monetary, and they may be given to [parents] or families in exchange for keeping an appointment, receiving a vaccination, returning for a vaccination series, or producing documentation of vaccination status.”¹⁹⁴ Rewards are typically small in monetary value. Examples of rewards include “food vouchers, gift cards, lottery prizes, [or] baby products.”¹⁹⁵ The typical gifts that were highly effective included fifty-dollar grocery vouchers, \$175.00 in monetary prizes, or ten-dollar gift cards for baby products.¹⁹⁶ One study, reviewed in the Community Guide findings, was conducted in a Medicaid managed care group and was targeted specifically towards families with low socioeconomic status and young children.¹⁹⁷ Participants received ten-dollar gift certificates whenever vaccinations were obtained.¹⁹⁸ For the MMR vaccination, the study resulted in a seven percent increase in the experimental group that was incentivized with the reward compared to the control group that

190. *Vaccination Programs: Client or Family Incentive Rewards*, CMTY. GUIDE, <https://www.thecommunityguide.org/findings/vaccination-programs-client-or-family-incentive-rewards-archive> (last visited Jan. 27, 2017).

191. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 159, at 1.

192. Peter A. Briss et al., *Reviews of Evidence Regarding Interventions to Improve Vaccination Coverage in Children, Adolescents, and Adults*, 18 AM. J. PREVENTIVE MED. 97, 105 (Supp. 2000).

193. TASK FORCE ON CMTY. PREVENTIVE SERVS., *supra* note 114, at 240 (citing examples of positive incentives as “money, baby toys, discount coupons for retailers,” whereas negative incentives could include “exclusion from a particular program”).

194. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 159, at 1.

195. *Id.*

196. *See id.*

197. Briss et al., *supra* note 192, at 136 tbl. B-2.

198. *Id.* at 106.

did not receive any reward.¹⁹⁹ Incentive rewards lead to developed relationships between clients and providers, which are beneficial in the short term because it increases opportunities for receiving vaccinations and in the long term because it increases the likelihood patients will receive preventive health care.²⁰⁰

Many public health programs use financial incentives in order to encourage healthy lifestyle choices, particularly through the use of preventive services;²⁰¹ however, there are concerns incentives can be coercive and costly. While financial incentives have been successful in promoting the uptake of vaccinations, critics argue incentives have the potential to impede the patient's informed decision-making process.²⁰² However, financial incentives are more ethically responsible if "the problems addressed are perceived to be serious, other interventions are ineffective, and the necessary behaviors [would otherwise be] particularly difficult to achieve."²⁰³

There may also be economic concerns about how viable this intervention program may be for certain populations. The Community Guide conducted an economic review and found the average cost of providing incentives was \$372.00 per person per year.²⁰⁴ For some communities, the financial resources involved in effectuating this implementation may be limited, and this may not be a sustainable method. Policymakers should do an in-depth financial assessment to determine if this implementation is possible given community or state resources. The Community Guide explains the basic process of using rewards to change behavior by both hesitant parents and those who may not see the benefits of vaccination. The next section analyzes the use of incentive rewards in vaccination uptake of clustered and low-income communities.

2. Implementation of Incentive Rewards in Target Populations

A financial- and resource-based rewards intervention is very effective for low coverage pockets where families need the most assistance in achieving quality health care, and the incentives are tailored to the needs of the population. People with low levels of "health literacy" may need a push in the right direction because they often are unable to understand benefits of a

199. *Id.* at 136 tbl. B-2 (noting that the increase in the number of MMR vaccinations obtained was statistically significant; however, the rates of Hib vaccination in the control group showed no statistically significant changes).

200. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 159.

201. Kim Sutherland et al., *Impact of Targeted Financial Incentives on Personal Health Behavior: A Review of the Literature*, 65 MED. CARE RES. & REV. 36S, 37S (Supp. 2008).

202. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 159.

203. Sarah Wigham et al., *Parental Financial Incentives for Increasing Preschool Vaccination Uptake: Systematic Review*, 134 PEDIATRICS e1117, e1118 (2014).

204. CMTY. PREVENTIVE SERVS. TASK FORCE, *supra* note 159.

healthy lifestyle.²⁰⁵ Incentives more easily promote vaccination without taking the time to get families into health care settings and explaining the importance of vaccination for the health of their children. The level of family “[i]ncome has the potential to influence the response [rate] of individuals to financial incentives.”²⁰⁶ A small cash payment, for example, could mean enough to someone with low income that he or she would be willing to get his or her child vaccinated.²⁰⁷ Amount of income can also be reflected in a parent’s willingness “to incur the costs of responding to financial incentives.”²⁰⁸ In order to receive the reward, parents exhaust time and transportation costs, which are the biggest constraints on low-income persons.²⁰⁹ To be effective, the value of the reward must outweigh the losses forfeited in obtaining it.

Low-income communities tend to rely on Women, Infant, and Children (WIC) services, thus WIC benefits from providers in return for vaccinations would be motivational in low-income communities.²¹⁰ WIC services have been linked to vaccination uptake since 1996, when the Advisory Committee on Immunization Practices (ACIP) implemented WIC service incentives to increase vaccination rates among preschool-aged children.²¹¹ The ACIP and CDC recommended, “state and local vaccination and WIC programs collaborate [with incentives] to ensure that young children receive [both vaccination and WIC services.]”²¹² The incentive program required that in order to continue in the WIC program, families had to comply with immunization requirements.²¹³

Many WIC programs use voucher restrictions or monthly voucher pickups for children who are behind on immunizations, which require families to return on-site monthly until the child is up to date on vaccinations.²¹⁴ The WIC

205. Sutherland et al., *supra* note 201, at 40S–41S.

206. *Id.* at 41S.

207. *Id.*

208. *Id.*

209. *Id.*

210. Abigail Shefer et al., *Improving Immunization Coverage Rates: An Evidence-based Review of the Literature*, 21 EPIDEMIOLOGICAL REV. 96, 115 (indicating in 2001 WIC was the largest point of access to health-related services for low-income preschool children). *See also* THE GUIDE TO COMMUNITY PREVENTIVE SERVICES 247 (Stephanie Zaza et al. eds., 2005) (WIC services are the “single largest point of access to health-related services for low-income preschool children” and “in some cities, up to eighty percent of all infants participate in WIC”).

211. CTRS. FOR DISEASE CONTROL & PREVENTION, *Recommendations of the ACIP: Programmatic Strategies to Increase Vaccination Coverage by Ages 2 Years—Linkage of Vaccination and WIC Services*, 49 MORBIDITY & MORTALITY WKLY. REP. 205, 217 (1996).

212. *Id.* at 218.

213. Sam S. Kim et al., *Effects of Maternal and Provider Characteristics on Up-to-Date Immunization Status of Children 19 to 35 Months*, 97 AM. J. PUB. HEALTH 259, 264 (2007).

214. Shefer et al., *supra* note 210 (since generally participants only visit WIC sites every couple of months).

program staff will either refer families to clinical providers or deliver vaccinations on-site.²¹⁵ Strengthening a partnership with the WIC program, especially in minority communities, has been proven to be successful in increasing immunization coverage among children in those communities.²¹⁶ WIC-setting interventions will be more effective if implemented in low-income communities because of the significant number of children who receive health care services through WIC.

There are also incentives for vaccination in school-implemented vaccination programs. Typical incentives in school programs include extra credit, school supplies, or class coupons in exchange for students who return parental consent forms.²¹⁷ These studies found that “peer incentives” such as class pizza or ice cream parties for all students who turn in parental consent forms to the program center are also highly effective.²¹⁸ The school-based programs will be influential in both low-income and clustered communities because children of both socioeconomic statuses would enjoy these incentives. The use of financial rewards to incentivize parents to vaccinate their children has proven successful in increasing vaccination rates because it motivates parents, especially those who otherwise may not have been inclined to take their children in to be vaccinated.

While financial rewards and incentives have been statistically proven to positively change behavior in low-income communities, the application in clustered communities will need to be adjusted, specifically the type of reward. A twenty-five-dollar lottery ticket likely does not mean the same thing to a family living under the poverty level as it does to a family living comfortably in a suburban, gated community.²¹⁹ As mentioned previously, the clusters of people requesting NMEs tend to be higher in education and socioeconomic status; therefore, if this type of incentive is incorporated in those populations, the rewards would need to appropriately reflect interests of that targeted population to be most effective. The combination of school-based vaccination programs and incentives in clustered communities would result in an increase in vaccination attitudes and uptake.

IV. CONCLUSION

Public health policy should always be based on evidentiary findings. Due to all of the finite financial and human capital involved in political decisions, policymakers should do what has been scientifically proven to work instead of using an iron-fisted approach of eliminating a privilege many Americans

215. *Id.* at 115.

216. *Id.*

217. Cawley et al., *supra* note 124, at 170.

218. *Id.*

219. *See* Sutherland et al., *supra* note 201, at 41S.

exercise. Parents are responsible for their children's health and want to feel that their beliefs are being taken into consideration when making decisions.²²⁰ The methods proven to be successful are rooted in EBPH.²²¹ The Community Guide is the gold standard of EBPH in practice because the members of the Task Force panel are unbiased third party researchers with nothing at stake in the results.²²² The Task Force results should be given the highest credence in a state's health care policy decisions instead of purely legislative action or political agendas.

Communities that obtain exemptions due to anti-vaccination beliefs or fear of vaccine safety may be best targeted with communication-based interventions, like school vaccination programs and school programs in combination with either reminders and recalls or client rewards. Educating clinic providers, school staff, and nurses at school vaccination programs about how to conduct these conversations with parents will be monumental. Some parents may need the data broken down into ideas they can understand and then logically come to the conclusion that vaccination is a better decision than a potential outbreak. Fostering communication and dispelling myths associated with vaccination between parents and representatives of vaccination programs will help convince these parents about the necessity of vaccination. In addition to the educational information, a combination of providers sending reminders and recalls and the use of incentives will be a strong, successful approach towards getting parents on board with vaccinating their children since they will concurrently be exposed to the importance of vaccinating their children.

Low-income communities, with limited access and resources to quality health care systems, will benefit from all policy implementations explored: vaccination programs, reminder and recall systems, and incentive rewards. Due to expenses of vaccination, including travel and time off from work, vaccinating children at school alleviates constraints on parents and, most importantly, gets children vaccinated, preventing the likelihood of serious illness later in life. As for reminders and recalls, cell phones have become widespread in society today, and the efficiency of text messages proves to be the most effective way to get in contact with parents to remind them of upcoming vaccination dates or any missed opportunities.²²³ When providers frequently reach out to parents until they schedule an appointment, it will reduce the chances of simply forgetting about when children need certain vaccines; or with notice, parents can plan for necessary transportation. Incentives for low-income areas must be practical and tailored towards the

220. See Luthy et al., *supra* note 36.

221. See Brownson et al., *supra* note 70.

222. As opposed to a panel of political figures, state legislatures, or health care officials who may base program recommendations on beliefs or findings not supported by credible evidence.

223. Stockwell et al., *supra* note 151.

community's needs, like WIC services or baby products. Most parents in these communities must take time off work and organize transportation in order to take their children to vaccination appointments; in other words, the incentive must be worthwhile.

Policymakers should use the information provided by the Community Guide once they have determined which target populations are problematic, where they are located, and why they have failed to reach appropriate vaccination rates. Each recommendation by the Community Guide is proven successful on its own; thus, if a community has sufficient resources, a combination of programs will be most effective. Ultimately, instead of removing NMEs, making parents question governmental action and encouraging public backlash, states should implement these interventions along with the others recommended by the Task Force to successfully increase childhood vaccination rates.

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