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Vaccinations and Public Health: For the Greater Good

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I. INTRODUCTION

Americans are, among other things, a decidedly independent group of individuals inhabiting the same vast land. Citizens of this country take pride in their ability to choose, whether it be where they work, where they live, who they marry, their future aspirations, all justified by the simple phrase "it's a free country." No decision, big or small, is taken lightly or overlooked, and impositions of government mandates, no matter how beneficial, are often viewed as an imposition on an American's freedom. Such is the case for vaccinations. For example, most people accept the government's immunization requirements, but there is a small and growing group of citizens displeased with the large number of childhood vaccines and their uncertain safety records.[1] These groups bemoan the 'one size fits all' vaccination schedule, and argue instead for the ability to 'pick and choose' their own schedule which contradicts the Centers for Disease Control and Prevention's (CDC) recommendations.[2] However, this individual-centric attitude ignores the utilitarian purpose of vaccines: greater good of the group, not the individual, is the paramount concern.

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[1] *See generally* GenerationRescue.org, http://generationrescue.org/index.html (last visited Apr. 13, 2009).

[2] *See* GenerationRescue.org, Vaccine Safety, http://generationrescue.org/vaccines.html (last visited Apr. 13, 2009).

While vaccines are imperfect and perceived as dangerous by a limited few, the standards in place should not necessarily be changed. Rather, the public needs a workable standard, such as that in place in Illinois, which is not subject to change and flux based upon the misplaced fears of various groups.

II. VACCINE DEVELOPMENT AND IMPACT ON COMMUNICABLE DISEASES

Edward Jenner first developed vaccines in 1796[3] after hearing that dairymaids who contracted cowpox were naturally protected against smallpox.[4] In May of 1796, Jenner took material from cowpox lesions and inoculated an eight-year year old boy with it.[5] The boy initially developed a fever, discomfort, loss of appetite and coldness.[6] After the boy felt better, Jenner then inoculated the boy again, but this time with material from a smallpox lesion, and no disease developed.[7] From this experiment, modern vaccines developed and smallpox was eventually eradicated in 1977.[8]

Although the vaccination process today is different than that developed by Edward Jenner, the result is the same. For instance, while vaccinations no longer involve taking matter directly from an ill person and introducing it to a healthy person, vaccination still involves the introduction of a virus. Currently, there are two types of vaccinations: "live attenuated" and "inactivated."[9] Live attenuated viruses are made by modifying a "wild" virus or bacterium in a laboratory.[10] The modified virus reproduces and provides immunity from the disease rather than causing illness.[11] The resulting immunity is identical to that produced by a

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[3] Stefan Riedel, *Edward Jenner and the History of Smallpox and Vaccination*, 18 BUMC PROC. 21, 24 (2005).
[4] *Id.* at 24.
[5] *Id.*
[6] *Id.*
[7] *Id.*
[8] *Id.* at 25.
[9] CTRS. FOR DISEASE CONTROL & PREVENTION, EPIDEMIOLOGY AND PREVENTION OF VACCINE-PREVENTABLE DISEASES 4 (2008), http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/prinvac-508.pdf [hereinafter EPIDEMIOLOGY].
[10] *Id.* at 4.
[11] *Id.*

natural infection.[12] However, adverse reactions to live attenuated vaccines sometimes occur, and while the disease produced is usually milder than the natural one, the immune response is identical to that produced by a natural infection.[13] Inactivated vaccines are bacteria or viruses grown in a culture and inactivated with heat and/or chemicals.[14] Unlike live attenuated vaccines, inactivated vaccines are not alive, cannot replicate, and cannot cause infection even in an immunodeficient person. [15] Additionally, inactivated vaccines require multiple doses, whereas live attenuated vaccines are usually effective with one dose.[16]

The success of vaccines is irrefutable. A recent *Journal of the American Medical Association* article analyzed morbidity and mortality rates before and after widespread implementation of national vaccine recommendations for thirteen vaccine-preventable diseases.[17] The authors concluded that since the introduction of national vaccine recommendations in 1980, the number of cases of most vaccine-preventable diseases and deaths related to these diseases has decreased strikingly.[18] Specifically, the study showed a greater than ninety-nine percent decline in the number of cases for diphtheria, measles, paralytic poliomyelitis, rubella, congenital rubella syndrome, and smallpox.[19] Thus, vaccines have substantially decreased the incidence of morbidity and mortality related to several life-threatening diseases.

III. VILIFICATION IN THE FACE OF SUCCESS: MISPLACED FEARS ABOUT VACCINATIONS

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[12] *Id.* at 5.
[13] *Id.*
[14] *Id.* at 6.
[15] EPIDEMIOLOGY, *supra* note 9, at 6.
[16] *Id.* at 5-6.
[17] Sandra W. Roush & Trudy V. Murphy, *Historical Comparisons of Morbidity and Mortality for Vaccine-Preventable Diseases in the United States*, 298 JAMA 2155, 2155 (2007). The study analyzed the following diseases: diphtheria, pertussis, tetanus, poliomyelitis, measles, mumps, rubella, *haemophilus influenzae* type b, acute hepatitis B, hepatitis A, varicella, *streptococcus pneumoniae*, and smallpox.
[18] *Id.* at 2160.
[19] *Id.*

Despite the success of vaccines in eliminating deadly diseases such as smallpox and polio, vaccines are not lauded by all. Some parents argue that the recommended vaccine schedule for children causes vaccine overload and results in overwhelming or weakening a child's immune system.[20] However, no scientific evidence indicates combined vaccines overload a child's immune system.[21]

Why, then, in the face of scientific evidence, do people shun that which has saved so many? Perhaps it is because over the past decade, the focus on individual health, emphasizing exercise, diet, and natural living, has increased. Along with the greater focus on what goes in one's body has come increased attention on vaccines and increased public distrust even though vaccines are proven methods of health preservation. Further, heart disease, which kills the greatest number of Americans,[22] is not caused by or related to vaccinations.[23] Given the absence of scientific proof of danger or evidence of ineffectiveness, the main reason for this misguided focus on vaccines is fear.

IV. AUTISM AND VACCINATIONS: IS THERE A CONNECTION?

No anti-vaccine group has been more successful at engendering fear than a small faction of those in the autistic community. Parent-run websites such as GenerationRescue.org are staunchly critical of the current recommended vaccination schedule, the substances in some vaccinations, and the supposed lack of evidence to support the claimed safety of vaccines.[24] Indeed, sometimes

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[20] Shona Hilton et al., *'Combined Vaccines Are Like a Sudden Onslaught to the Body's Immune System': Parental Concerns About Vaccine 'Overload' and "Immune-Vulnerability,'* 24 VACCINE 4321, 4324 (2006).
[21] *Id.* at 4322.
[22] HSIANG-CHING KUNG ET AL., DEATHS: FINAL DATA FOR 2005, 56 NAT'L VITAL STAT. REP. 1, 7-8. As of the date of publishing of this article, the most recent year with complete and final data was 2005.
[23] *See generally* Mayo Clinic, Heart Disease: Causes, http://www.mayoclinic.com/health/heart-disease/DS01120/DSECTION=causes (last visited Apr. 13, 2009).
[24] *See generally* GenerationRescue.org, Vaccine Safety, http://generationrescue.org/vaccines.html (last visited Apr. 13, 2009).

vaccines do harm people.[25] In those instances, injured persons can file claims with the National Vaccine Injury Compensation Program (VICP), a federal program.[26] The VICP is a no-fault system for resolving claims, and claims are adjudicated before the United States Court of Federal Claims.[27] The Vaccine Injury Compensation Trust Fund funds the VICP through a $0.75 excise tax on each dose of vaccine purchased.[28] .[29]

Since 2001, over 5,000 claims filed with the VICP have alleged autism resulted from the Measles-Mumps-Rubella (MMR) vaccine and/or the thimerosal ingredient in certain other vaccines.[30] Indeed, autism prevalence has increased since the 1980s.[31] For example, in Olmsted County, MN, autism prevalence increased from four to ten per 10,000 children in the 1980s and early 1990s to thirty to fifty per 10,000 children in 2005.[32] The increase spiked after 1987, coinciding with the publication of the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition* (DSM-III-R), which introduced a broader autism spectrum and provided formal diagnostic criteria.[33] The fourth edition of that publication further broadened the autism diagnostic criteria in 1994.[34] Before the dissemination of such criteria, children with autism may have been less precisely

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[25] *See* National ChildhoodVaccine Injury Act, Vaccine Injury Table, Health Resources and Services Administration, ftp://ftp.hrsa.gov/vaccinecompensation/vaccineinjurytable.pdf (last visited Apr. 13, 2009).
[26] *See* National Vaccine Injury Compensation Program, http://www.hrsa.gov/ vaccinecompensation/ (last visited Apr. 13, 2009) [hereinafter VICP]. Currently, the VICP is limited to the following vaccines: diphtheria, tetanus, pertussis (commonly known as DTP, DTaP, Tdap, DT, Td, or TT), *haemophilus influenzae* type b, hepatitis A, hepatitis B, human papillomavirus (HPV), influenza, measles, mumps, rubella (MMR), meningococcal. *See also* Vaccine Injury Table, *supra* note 25, at 1.
[27] *Id.*
[28] *See* Vaccine Injury Compensation Trust Fund, http://www.hrsa.gov/vaccinecompensation/VIC_Trust_Fund.htm (last visited Apr. 13, 2009) [hereinafter Trust Fund].
[29] Vaccine Injury Table, *supra* note 25, at 1.
[30] *See* Omnibus Autism Proceeding, Health Resources and Services Administration, http://www.hrsa.gov/vaccinecompensation/omnibusproceeding.htm (last visited Apr. 13, 2009).
[31] William J. Barbaresi et al., *The Incidence of Autism in Olmsted County, Minnesota, 1976-1997*, 159 ARCH. PEDIATR. ADOLESC. MED. 37, 37 (2005).
[32] *Id.*
[33] Barbaresi et al., *supra* note 31, at 38, 42.
[34] *Id.* at 42.

diagnosed, and classified as developmentally delayed or mentally retarded.[35] The Olmsted study ultimately concluded that the increase in the incidence of autism coincided with the publication of broader, less restrictive diagnostic criteria, increased availability of special education services, and increased awareness of autism.[36] Further, no link connected the MMR vaccine to the increase in autism, because MMR vaccine use began years before the spike in autism diagnoses.[37]

In a landmark decision on February 12, 2009, the Court of Federal Claims held in three test cases that no scientific proof indicates vaccines cause autism.[38] Therefore, those persons who filed a claim with the VICP alleging autism as a result of vaccination will not receive compensation. The decision is being appealed.

V. WHERE DO WE GO FROM HERE?

Although loathed by many and injurious to some, vaccines have worked for over two centuries, saved innumerable lives from previously deadly diseases, and have contributed to longer life expectancies. If left up to each individual, there is no guarantee that society will continue this protection. One argument against further vaccination is that because so many people are already vaccinated, "herd immunity" exists and therefore it is not necessary that everyone immunize. Herd immunity occurs where there are a sufficient number of immunized individuals to prevent disease transmission to the non-immunized.[39] Therefore, some non-vaccinated individuals have immunity to certain diseases by virtue of their presence in a mostly-vaccinated community.[40] However, as more people

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[35] *Id.* at 38.
[36] *Id.* at 42.
[37] *Id.*
[38] *Cedillo v. Sec'y of Health & Human Servs.*, No. 98-916V (Fed. Cl. Feb. 12, 2009); *Hazlehurst v. Sec'y of Health & Human Servs.*, No. 03-654V (Fed. Cl. Feb. 12, 2009); *Snyder v. Sec'y of Health & Human Servs.*, No. 01-162V (Fed. Cl. Feb. 12, 2009).
[39] Emma S. McBryde, Letter to the Editor, *Network Structure Can Play a Role in Vaccination Thresholds and Herd Immunity: A Simulation Using a Network Mathematical Model*, 48 CLIN. INFECT. DIS. 685, 685 (2009).
[40] *Id.*

refuse vaccination and attempt to "freeload" off of the rest of the community, fewer remain in the vaccinated "herd," thereby increasing the risk of infection both among the unvaccinated and vaccinated.[41] Thus, claiming herd immunity should not exempt an individual from the requirements imposed upon all.

Vaccinations have proven to be a challenging issue, and for that reason, the public needs a clear and workable standard to deal with the long standing conflict. The Illinois model meets this standard and provides vaccination exemptions for those with conflicting religious beliefs or where the child's physician believes the vaccination is medically contraindicated for the child.[42] Parents who believe vaccinating is morally or philosophically wrong or possibly dangerous are not exempted.[43] This standard ensures each community has maximum immunity to infectious diseases while still allowing exemptions to a select few. Also, this standard avoids increased incidences of vaccine-preventable diseases which have been documented in other states where parents can easily obtain non-medical exemptions from vaccinations.[44] In addition, this standard provides guidance to doctors, who at times find themselves in the difficult situation of balancing legal vaccination requirements, the patient's best interests, and reconciling those two things with parental fears and wishes.

Conversely, the federal government already has vaccine recommendations and guidelines that could be implemented nationwide.[45] Under the CDC's guidelines, exemptions exist for medical reasons, but no exemptions exist for religious, moral, or philosophical reasons.[46] Currently, states are responsible for

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[41] Daniel S. Rubin & Sophie Kasimow, *The Problem of Vaccination Noncompliance: Public Health Goals and the Limitations of Tort Law*, 107 MICH. L. REV. FIRST IMPRESSIONS 114, 115 (2009). http://www.michiganlawreview.org/firstimpressions/vol107/rubinkasimow.pdf.
[42] ILL. ADMIN. CODE tit. 77, § 695.30 (2008).
[43] VaccineSafty.edu, Vaccine Exemption Issues, http://www.vaccinesafety.edu/cc-exem.htm (last visited Apr. 13, 2009). Currently, 21 states allow personal belief exemptions to vaccinations.
[44] Saaed B. Omer et al., *Nonmedical Exemptions to School Immunization Requirements: Secular Trends and Association of State Policies with Pertussis Incidence*, 296 JAMA 1757, 1761 (2006).
[45] CTRS. FOR DISEASE CONTROL & PREVENTION, EPIDEMIOLOGY AND PREVENTION OF VACCINE-PREVENTABLE DISEASES APP. A (Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds., 10th ed. 2008.), *available at* http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/A/age-interval-table.pdf.
[46] VaccineSafety.edu, *supra* note 43.

the development and enforcement of vaccination laws, and there is great divergence between states as to vaccination requirements.[47] Guidelines of universal application, such as the CDC's, are a preferable alternative because they can better protect the general population.

VI. CONCLUSION

While in rare instances vaccines may cause deleterious effects, most people's fears and misgivings about vaccinations are misguided and unsupported by the research. Vaccines successfully eliminated smallpox, and decreased the morbidity rates associated with seven other diseases by nearly 100%.[48] Universal acceptance and application of vaccine guidelines could perhaps make today's common illnesses—such as influenza—a disease of the past, much like smallpox. While some individuals are injured as a result of vaccines, the reality of vaccines is such that some must suffer so many may survive. Although vaccines are an imperfect answer to a serious problem, they are paramount to the continued health of society, and for that reason the standards in place should be strengthened.

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[47] FOOD & DRUG ADMIN., VACCINE FREQUENTLY ASKED QUESTIONS, http://www.fda.gov/CBER/faq/vacfaq.htm (last visited Apr. 13, 2009).

[48] CTR. FOR DISEASE CONTROL & PREVENTION, IMPACT OF VACCINES UNIVERSALLY RECOMMENDED FOR CHILDREN, 48 MORBIDITY & MORTALITY WKLY. REP. 243, 245-6 (1999). As a result of vaccine use, the morbidity rates associated with diphtheria, polio, measles, mumps, rubella, congenital rubella syndrome, and *haemophilus influenza type b* have decreased by nearly 100%.