Addressing Parent Concerns about Risks and Benefits of Vaccinations

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the project of CHAD M. LEWIS find it satisfactory and recommend that it be accepted.

Chair

[Signatures]
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ADDRESSING PARENT CONCERNS ABOUT RISKS AND BENEFITS OF VACCINATIONS

Abstract

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Purpose: To identify the primary concerns that parents face when vaccinating their children and ways to address these concerns for increased vaccine compliance through an examination of current peer-reviewed literature.

Data Sources: Cited sources were obtained through the Cumulative Index to Nursing and Allied Health Literature (CINAHL), GALE CENGAGE learning, PubMed (a service of the United States National Library of Medicine and the National Institutes of health), Academic Search Premier, Google Scholar, and Up to Date (Uptodate.com).

Conclusions: Education is the primary barrier to parents understanding the risks and benefits of vaccination to both their children and of the public at large. Increased efforts by all Pediatric Providers to educate parents will be the key to increasing vaccination compliance in the future.

Implications for Practice: Because education is the primary deficit in those who do not vaccinate, health care providers can set goals to expand education to parents, which will increase vaccine compliance and decrease preventable disease.
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Introduction

Failure to vaccinate increases the likelihood of children and other people becoming seriously ill or dying due to preventable diseases (Burns & Zimmerman 2005). In 2005, only 76.1% of United States (US) children, aged 19 to 35 months, had received all of the recommended doses of Diptheria, Tetanus, and Pertusis (DTaP); Haemophilus influenzae type b (Hib); Hepatitis B; Measles, Mumps, and Rubella (MMR); Polio; and Varicella vaccines, although rates of those who received the majority of particular vaccines were higher (Kimmel, Burns, Wolfe, & Zimmerman, 2007). Even though it is a parents’ right to decide if their child will receive vaccinations, when it comes to choosing whether to vaccinate, many factors may play a role in a parent’s decision-making process.

The most common reasons for not vaccinating were lack of knowledge about vaccines availability, effectiveness, and safety (Burns & Zimmerman, 2005). Other barriers to vaccination compliance included fragmented medical records, religious, cultural, transportation, and economic barriers (Burns & Zimmerman, 2005). Conflicting beliefs concerning the Human Papillomavirus (HPV) vaccine (Gardasil) have evolved due to some authorities believing that this could promote sexual behavior in teens (Vamos, McDermott, & Daley, 2008). Cunliffe (2004) points out that some parents are concerned that the quantity of vaccines administered to children could be unsafe.

The United States government has a dual role when it comes to vaccine compliance. It has to protect the public first, and the individual parents’ rights second. Herd immunity is a term used to describe a point at which enough people or children are vaccinated that the remainder who are not should stay safe, when in proximity to the rest. This is thought to be between 90-
95% compliance. The exact compliance for different vaccinations varies from vaccine to vaccine and from year to year. As long as vaccine compliance is at herd immunity levels (or close to) and there is no regional epidemic, the government protects the rights of parents to refuse vaccinations. It is important to note that there are group and religious exemptions to the rule that can be overridden, if the level of exemption threatens loss of herd immunity. On these moral grounds, United States government policy, to protect public health, will forgo individual rights to refuse vaccinations (May & Silverman, 2005).

Education about vaccinations has typically fallen to pediatric providers and/or nurses when a parent brings their child in for routine exams or illness. Informational vaccine handouts are typically given to parents about the vaccines; this is part of a requirement set forth by the National Childhood Vaccine Injury Act of 1986 (NCVIA) (1986). These CDC handouts, called Vaccination Information Statements (VIS) are designed to answer questions about the vaccines. The NCVIA requires that parents receive complete and accurate information regarding vaccine risks and benefits, but often the CDC VIS Handouts are the only information provided to parents at the point of service (1986). The provider and/or nurses will also answer questions and give advice as time permits (Tenreiro, 2005).

A 2007 literature review, (Kimmel et al., 2007), concluded that immunization rates are improved by direct communication about need for immunizations and clear communications of the risks and benefits between providers, recipients, and/or parents of recipients. Unfortunately, time constraints interfere with education and present a moral dilemma. An article published in the Journal of Pediatric Nursing cited that with limited time for vaccine education, providers spent most of the available time educating parents about issues not related to vaccine risks and benefits (Tenreiro, 2005). A historical article regarding a communication survey in a private
practice setting noted physicians citing time as a barrier to adequate vaccine risk/benefit communication in 57% of respondents (Davis et al., 2001). This time constraint was also cited as the greatest barrier to addressing parent’s concerns about vaccine safety, by pediatrician’s in the National Immunization Survey conducted in 2002 (Smith, Kennedy, Wooten, Gust, & Pickering, 2006).

A qualitative study of 66 parents (58 mothers and 8 fathers), that included 6 parents of children who were immunocompromised, found that gaps in knowledge about vaccine preventable disease led to a diminished sense of urgency or need for vaccination. The study involved 18 focus group discussions that were over a five-month period. The authors of the study pointed out that the parents who had first hand experiences with preventable disease either had a reinforced need for vaccination or in some cases the experience had undermined the need for vaccines. The authors also pointed out that the overall success of the immunization programs has reduced the perceived threat of many vaccine preventable infections to almost negligible levels (Hilton, Hunt, & Petticrew 2006).

Decreased vaccination compliance has led to legislation to improve U.S. vaccination rates. In order to protect public health, all 50 states and the District of Columbia have some mandated vaccinations, prior to a child entering public schools. There are exemptions to this and waivers are available to people with religious, philosophical, or other objections as previously noted (Khalili & Caplan, 2007). In order to make an informed decision parents have a right to unbiased disclosure of immunization risks, as well as benefits (Marfè, 2007). When the decision of vaccine refusal is made, providers have no legal option, but to acknowledge parent rights, accept this, and hope they change their minds. Only in a case where a parent is deemed to medically neglect their child could a legal intervention be made to have a child vaccinated. It is
important to note that this would likely only be in an emergency situation (Khalili & Caplan, 2007).

Why do parents say “no” to vaccinations?

Although immunization programs have been successful there has been considerable concern regarding the safety of vaccines (Marfé, 2007). Concern arose first in 1950's when some early lots of Jonas Salk’s inactivated polio virus had been contaminated with live polio virus (Hampton, 2009). Some scholars believe that the beginning of public distrust of vaccines started after the live virus was given to thousands of people with devastating effects. When the program was all over 220,000 people had become infected, 70,000 had developed muscle weakness, 164 were severely paralyzed, and 10 people had died (Parry, 2008). Although controversy about vaccine safety has been maintained for decades a new controversy came to light in the 1990's (Cunliffe, 2004). This was fueled by two main factors: The media being able to exert substantial power over public opinion, the decrease of people who have witnessed the effects of preventable disease, and the unproven association of MMR vaccine, or its preservative Thimerosal with autism and/or inflammatory bowel disease (Marfé, 2007).

First the advent of the internet has created a vehicle for the media and private individuals to express their feelings on nearly any subject and get exposure of these all over the world. This can then be accessed by anyone who has a computer with an internet connection. Often scholarly articles are found by nonacademic people and the precise academic language in scientific writing can lead these people to draw incorrect conclusions about the information being presented (Macdonald & Picard, 2009). Also there are many websites that intentionally mislead or misinform people to further the site developer's cause or to market a product.
The second major reason is due to a scare in the United Kingdom in 1998, when the mainstream media touted a “possible link” between the Measles, Mumps, and Rubella (MMR) vaccine or its mercury-based preservative thimerosal and the pervasive developmental disorder known as autism and/or inflammatory bowel disease (Cunliffe, 2004). Although the study only involved 12 children who had already developed inflammatory bowel disease and autism, the researchers concluded that the onset was associated with the administration of the MMR vaccine, because the parents had stated this in 8 of the 12 cases (Wakefield et al., 1998). Limitations of the study included no control group, small number of study participants, and possible selection bias (Wakefield et al., 1998). As of 2005, 67% of parents in the United Kingdom knew that scientists had linked the MMR vaccine with autism and believed that scientific evidence supported this (Griffith, 2005).

Several studies have been conducted in different parts of the world to find evidence of a link between the MMR vaccine and autism. A retrospective study conducted in Finland was done involving over 535,000 children, aged 1-7 years. The study lasted 4 years and was based on individual MMR records and the Hospital Discharge register. Throughout the study changes in the overall number of hospitalizations for autism after vaccination were searched for. The children who were hospitalized with inflammatory bowel problems were also cross checked with children identified with autism. None of the autistic children were hospitalized for or made hospital visits for inflammatory bowel disease. Notable limitations of the study were: the exact incidence of autism could not be defined, because it develops insidiously over time, and a diagnosis of autism does not always involve hospitalization. A notable strength of the study is that in Finland, it is common to hospitalize a child with a new diagnosis of autism for examination and treatment, so a cluster of hospitalizations after MMR administration could have
been detected. The study concluded without any association identified between autism, the MMR vaccine, or inflammatory bowel disease (Makela, Nuorti, & Peltola, 2002).

One six-year retrospective study conducted in Yokohama, Japan involved approximately 300,000 children up to 7 years old and annual trends. Because Japan used the MMR combination vaccine for only a certain number of years (1988-1994) and then stopped in favor of individual vaccines, the study was able to better isolate post-MMR results and compare them to post-individual vaccine results and the rates of autism. The authors noted that the study had several possible limitations, but they were highly implausible to affect the outcome due to the number of participants, location of the study, duration, and accurate data that was obtained regarding MMR administration rates and diagnosis rates of autism. Results revealed a rate of increased autism over the study period duration and a continued rise annually during the years since MMR was completely discontinued (Honda, Shimizu, & Rutter 2005).

A case control study conducted in the UK looked at people who had been born in 1973 or later and had been diagnosed with a pervasive developmental disorder that was registered with a practice between 1987 and 2001. A control group was matched on age, sex, and general practice. There were a total of 1294 cases and 4469 controls and the number of controls varied per case from 5 to 0. Some strengths of the study included a large size and population based data. The researchers included more than a 1000 cases with a Pervasive Developmental Disorder (PPD), and had 82% MMR coverage among controls. Limitations of the study included children who had joined the study and their vaccination history was recorded retrospectively. The researchers were also unsure about whether the completeness of vaccination recording was at all related to age. Researchers pointed out that there are issues that were beyond their control that could have contributed to varying results, such as birth order and social class. The study results
could not statistically link MMR with a PPD or autism (Smeeth et al., 2004). To date no data has been found to link MMR or any other vaccination to autism, but genetic factors are thought to play a role (Honey, 2008).

Also the preservative thimerosal, a mercury based preservative that was in the MMR vaccine, has been studied extensively to see if a link between it and autism could be established. Thimerosal was added to many routinely administered vaccines from the late 1930's until late 1990's to prevent bacterial and fungal contamination of vaccines per the Food and Drug Administration guidelines. Thimerosal is made up of 49% ethylmercury by weight and thiosalicylate as a metabolized organic compound. Another organic mercury compound, methylmercury, has been found to cause neurological and renal impairments after ingestion of the substance. Methylmercury is the compound that is found in studies of fish and grains. In 1999 it was unclear if thimerosal could cause harmful effects as methylmercury can, due to limited studies. As a “precautionary measure” the Food and Drug Administration and the American Academy of Pediatrics recommended that thimerosal be removed from all childhood vaccines (Verstraeten et al., 2003).

A two-phased retrospective cohort study was conducted using computerized health maintenance organization (HMO) databases in the United States. In phase one of the study, screening was done for associations between neurodevelopmental disorders and thimerosal exposure among 124,170 infants born during 1992 and 1999 at two HMOs. In phase two, the most common disorders associated with exposure in phase one were reevaluated. This involved 16,717 children who were born between 1991 and 1997 and were in another HMO. Risk was calculated per increase of 12.5 micrograms of thimerosal at the ages of one month, three months, and seven months of age. The main limitation to the study was the difficulty separating the
effects of thimerosal and the effects of other vaccine constituents. The researchers report that they did do a subanalysis in order to separate this, as well as possible. They concluded that there was no association between thimerosal containing vaccines and neurodevelopmental outcomes (Verstraeten et al., 2003).

More current studies regarding thimerosal exposure and autism have been conducted. One time-trend study conducted in California examined children from 3 to 12 years of age that were enrolled in the Department of Developmental Services (DDS). The study was conducted per a recommendation from the Immunization safety review committee of the Institute of Medicine (IOM). Because it had been suggested that thimerosal exposure could lead to increased cases of autism, researchers wanted to examine the trends of autism, since thimerosal had been removed from childhood vaccines by 2001. Enrollment to the DDS comes from referrals from physicians, clinicians, the education system, families, and friends. The researchers looked at children born from 1989 to 2003, for each age year the prevalence of autism was divided by the total number of live births in the state of California. The prevalence per 1000 live births went from 0.3 for children born in 1993 and recorded in 1996 to 1.3 for children born in 2003 and recorded in 2006. Strengths of the study are that DDS data is population based and that the client reporting was consistent throughout the study. The most notable limitation of the study is that the DDS database does not include all children with autism in the state of California. The researchers concluded that because rates of autism continue to rise, despite the fact that thimerosal has been discontinued in vaccines, that it must not be the primary cause of autism (Schechter & Grether, 2008).

Another cohort study examined whether or not there was a causal relationship between thimerosal and neuropsychological deficits in children. The researchers looked at 42
neuropsychological outcomes in 1047 children between the ages of 7 and 10 years. The researchers examined exposure to thimerosal during the first seven months of life through electronic medical records, paper medical records, personal immunization records, and parent interviews. One major limitation to the study included only being able to enroll 30% of the subjects included for recruitment. The researchers were unable to control for interventions such as speech therapy, which may have ameliorated the potential negative effects of thimerosal exposure. The researchers found that the study did not support a causal link to deficits in neuropsychological functioning at the ages 7 to 10 years (Thompson, Price, Goodson, Shay, Benson, Hinrichsen, et al., 2007). Despite the fact that repeated studies have not been able to identify a causal link between thimerosal exposure and autism or neuropsychiatric deficits, it was discontinued in childhood vaccines by 2001 (Epstein, 2005).

Unfortunately the evidence available about autism is not all positive. There has been a rise in the diagnosis of autism since the 1980’s that science has not been able to explain (Drutz, 2008). In 2006, it was estimated that one child out of every 166 births would eventually display the behavioral impairments in three areas: communication, social interaction, and repetitive or restricted activities (Windham, 2006). It is unclear if the rise in autism is associated with an actual increase in autism or due to improved diagnostic criteria, misclassification or expanded utilization of a generous service system (Drutz, 2008). What is clear is that the rise of autism is not due to the MMR vaccine or the discontinued preservative Thimerosal.

Human Papillomavirus Vaccine

The Human Papillomavirus vaccine (HPV) to prevent cervical cancer was approved in 2006 by the Food and Drug Administration (FDA) to prevent transmission of HPV types 6,
11, 16, and 18 which cause 70% of cervical cancer cases and 90% of genital wart cases (Vamos, McDermott, & Daley, 2008). Controversy has developed with the vaccine due to the thought that it may promote sexual promiscuity at a younger age due to the young age of recommended vaccine delivery at 11-12 years. Another part of the controversy that has developed has surrounded mandates for compliance by individual states for girls of recommended ages (Connor & Collins, 2008). According to the CDC, 2007 data (no current data available), only 11% of women aged 19-26 had been vaccinated with at least 1 of the 3 shot series by March of 2007, despite 80% of women being aware of both the disease and the vaccination (CDC, 2008). In 2008, only 25% of girls, aged 13-18, had been given at least 1 of the 3 shot HPV series (CDC, 2008). The HPV vaccine cost, at $360 dollars for the three shot series, is an economic barrier for many (Beres, 2008). Because the Human Papillomavirus has been implicated in both penile and anal cancers as well as cervical cancer, the FDA is looking into recommending this be administered to males also (Chitale, 2009). Aside from cancer prevention, vaccinated males would decrease HPV transmission rates to females, too. Should this recommendation be made it is predicted there will be similar barriers faced to achieve compliance with the vaccine (Chitale, 2009).

Reasons for not Immunizing

Some parents believe that if their child is exposed to a disease, they will develop immunity naturally, which is true. The danger of this is that exposure to vaccine preventable diseases increase the chance of death or permanent damage to a child. A survey in Texas found that lower immunization rates correlated with parental belief in the superiority of natural immunity (from disease exposure) to vaccine induced immunity, and with parental concerns regarding vaccine safety (Burns et al., 2005). Another reason parents do not vaccinate is due to a
concern that their infant's immune system will not be able to handle the large number of vaccines they receive in the first two years of life (Kimmel, Burns, Wolfe, & Zimmerman, 2007).

Culture is another barrier to vaccination in some parts of country. Review of a historical survey study published in 2001 about a Pennsylvania Amish community after an outbreak of Haemophilus Influenza b (Hib) showed an example of culture as a barrier. The study comprised of two Amish communities, and a comparison community, had a high response rate, 95% and 97% from the Amish communities. Parents in the community most commonly cited reason (51%) for not having their children immunized was that "vaccinating was not a priority" compared to other activities-of-daily-life. Religion was cited by 6% of the parents in the survey who did not vaccinate (Fry et al., 2001). Religion is listed as one of the major reasons parents who home school their children choose not to vaccinate (Khalili & Caplan, 2007).

Influenza Immunization

The flu vaccine is recommended for children 6 months and older. An interview survey study conducted with 153 caregivers or parents about influenza vaccination for infants and toddlers had some interesting results. Researchers wanted to find out about knowledge, attitudes, and beliefs of parents and caregivers about the influenza vaccine in regard to the children they cared for. Participants were given 5-point Likert-scale questions about factors influencing likelihood of immunization. One interesting result was that parents and/or caregivers would be most likely (85%), to vaccinate with the influenza vaccine, if doing so would prevent otitis media. Parents and/or caregivers would be more likely (79%), to have their children vaccinated, if the vaccine was free. "Fewer safety concerns", was third on the list (73%) of more likely reasons to vaccinate. Results to the question "what is your primary concern about having your
child receive the influenza vaccine” were interesting, too. Of the total respondents 45.8% listed “safety”, 20.3% listed “causes flu”, 13.7% listed “number of vaccines”, 7.2% listed “flu not a concern”, 6.5% listed “Cost”, 4.6% listed “number of visits” and 2% had incomplete answers. Study limitations included only U.S. hospital settings, one interviewer, and only English speaking respondents (Humiston, Lerner, Hepworth, Blythe, & Goepp, 2005).

A new issue that is likely to arise is compliance with the influenza A H1N1 vaccine. Influenza A H1N1, commonly called “the swine flu” or “Novel H1N1 flu” originated in pigs, spread to humans, has become a pandemic problem that circled the globe in 2009, and is still growing in the number of infections. The World Health Organization (WHO) has called for universal vaccination against the H1N1 strain. The H1N1 strain is thought to have caused the 1918 pandemic that killed up to 100 million people worldwide (Page, 2009). As of August 2009, there were over 50,000 cases of Influenza A H1N1 reported confirmed and approximately 280 deaths attributed to the virus. Also there is fear that the H1N1 virus could reassort (the mixing of the genetic material of a species into new combinations in different individuals), possibly with the H5N1 virus (avian flu) by spring of 2010, making a more dangerous virus and making the H1N1 vaccine obsolete. Vaccines against the Influenza H1N1 virus are expected as soon as November 2009, but there is no way to know how much compliance there will be yet (Webster, 2009).

A study conducted in Colorado, examined whether parental attitudes or predictors of influenza immunization changed during the 2003-2004 influenza season. Eight hundred and thirty-nine parents with healthy children, aged 6-21 months, were randomly selected. Only 472 of the parents completed a preseason survey and 316 of those completed the postseason survey. All the respondents were from the Denver, Colorado area and utilized one of five large pediatric
clinics for pediatric care. All the practices involved participated in the federal vaccines for children program. Positive results of the study were that more people after the season agreed that it was recommended to get their child a flu shot, more people knew people who immunized for the flu, and more people believed that important people felt they should get a flu shot for their child. Although 31% of people who did not vaccinate would not comment, the majority who did, reported a laundry list of reasons including financial, safety, time, and an ill child as barriers to vaccination. Limitations of the study included a well-educated population, most were privately insured, had a high household income, and only 67% of preseason respondents responded postseason (Daley et al., 2006).

Pertussis Immunization

A case control study, conducted in Colorado between 1996 and 2007, consisting of children enrolled in Kaiser Permanente, investigated parents who do not vaccinate their children against pertussis. Findings revealed that herd immunity is not enough to prevent infection. The study methods consisted of matching each case of pertussis to four randomly assigned controls. There were 156 laboratory-confirmed cases in the study and 595 matched controls. There were 18 (12%) pertussis vaccine refusers among the cases and 3 (0.5%) pertussis vaccine refusers among the controls. A secondary case-control analysis of all children, ages 2 to 20 months, showed that vaccine refusal was associated with 11% of all pertussis cases. Study limitations included the population being drawn from the same health plan, the same geographic area, and the researchers found that providers were more than 3 times more likely to obtain pertussis laboratory tests on children who had not been vaccinated and presented with URI symptoms. Strengths of the study were that the Kaiser Permanente plan was state wide, and a broad representation of the states population (Glanz et al., 2009).
In some cases the parents who have decided that they will not vaccinate are very fervent about this. Often feelings have been fueled by misinformation about reports of alleged vaccine reactions instead of by the knowledge of devastation that vaccine-preventable diseases once caused (Kimmel, Burns, Wolfe, & Zimmerman 2007). Overall acceptability of vaccines has been shown to be influenced by specific attitudes and beliefs regarding disease processes (Dempsey, Zimet, Davis, & Koutsky, 2006).

Possible Solutions

Education of parents is seen as the key to increasing the immunization uptake rate to the required 95%, to achieve herd immunity (Griffith 2005). An interview study of 124 parents who had reported adverse events to the Vaccine Adverse Event Reporting System (VAERS) found that the risks of not immunizing should be discussed in the context of infection (Woo et al., 2004). By making the public aware of outbreaks, and the role that vaccine refusal plays in the outbreaks, this will help the public become educated about the role of vaccines in preventing the outbreaks (Mancuso, 2008). Hilton, Hunt, and Petticrew found that the challenge was to communicate the symptoms and potential complications of vaccine preventable diseases (Hilton, Hunt, & Petticrew, 2006).

A nationwide study conducted in the US of over 150,000 children looked at who and where children without vaccinations lived. The study was a national representative probability sample of children, aged 19-35 months. The data was collected between 1995 and 2001 by the National Immunization Program (NIP) using the National Immunization Survey (NIS). Children who were under-vaccinated tended to be black, have single mothers with no college, lived in a
household near poverty level, and lived in a central city. Unvaccinated children tended to be white (82%), have a married mother with a college education, live in a household with greater than $75,000 income, and have parents who express concern about vaccines and claim a medical doctor cannot influence them to vaccinate their children. Limitations to the study included the possibility that there were errors in ascertaining whether children were unvaccinated, and there is the possibility that some counties not mentioned in the study had large numbers of unvaccinated children and were simply missed. Strengths of the study were that the sample was large and nationally representative. Researchers determined that the children were typically clustered in areas which made it easier to spread vaccine preventable disease and that interventions should target the parents of these children, more than parents of under-vaccinated children (Smith, Chu, & Barker, 2004).

A retrospective, matching, birth-cohort designed study was conducted after an outreach, education, and reminder system was implemented in one neighborhood in New York City, the study was done to increase vaccination rates and found an 11.1% increase of immunization coverage. They attributed the success to community ownership of the program, integration of immunization promotion into social service and educational programs, training of a large cadre of peer educators, and intense parental education and empowerment. The major study limitation reported by researchers was incomplete data reporting (Findley et al., 2008).

A qualitative study published in 2007, pointed out that many parents want to be active participants in the health-care decision making process. The study, with a total of 129 mothers, was aimed at four objectives, used a mixed methods approach. The primary objectives were to: identify worried and 'fence-sitter' mothers through questionnaires, obtain information about attitudes, beliefs, provider interactions, and availability of immunization information to the
fence-sitter mothers. Secondary goals were to get comments on draft educational materials, and get comments on revised educational materials. Focus groups were conducted in three cities in the United States and in two phases. Phase one found that attitudes and beliefs were due to perceived necessity of vaccines and safety of vaccines. Phase two found that vaccine acceptance among certain types of mothers may be improved with tailored immunization materials that address unique information needs. The researchers admitted that the worried, fence-sitter mothers may not be representative of all mothers in the country who feel the same way (Gust, et al., 2007).

A randomized, controlled, practical, clinical trial with 811 infants was conducted in an urban safety-net hospital between 2004 and 2005. The goal was to see if a reminder/recall/case management interventions would increase well-child visits and immunization rates during the first 15 months of life. The study involved three steps: reminder postcards, if missed then telephone reminders, if still missed, intensive case management and home visitation. Results of the study were significant. The intervention group had only 109 days of under immunization compared to the control group of 192 days of under immunization. The limitations of the study were significant also. The major limitation was external generalizability due to the fact that the researchers intervened on such a large scale. Also certain maternal risk factors resulted in more intensive intervention that would in turn make the outcomes be biased towards a null hypothesis. Another limitation is that only 7% of the intervention group did not require at least one phone call reminder. This suggests that a future study intervention should forgo the post cards and start with phone calls. Last the cost of the intervention was extremely high suggesting that it may not be cost-efficient to employ on a large scale. The total for the intervention was $142,596 dollars (Hambidge, Phibbs, Chandramouli, Fairclough, & Steiner, 2009).
A survey study published in 2006 that involved the parents of 7695 children, aged 19-35 months, and looked at health care providers influence on parents concerns about vaccine safety. The study was conducted with the National Immunization Survey Parental Knowledge Module which was included as part of the National Immunization Survey in the third quarter of 2001. The study results showed that the influence on a parent by a provider to vaccinate increased vaccine compliance by 24.1% over those whose decision to vaccinate was not influenced by a provider. The researchers pointed out that because parents most commonly seek vaccine information from a provider, providers are in the position to influence many parents’ decisions and ultimately increase vaccine compliance. Also the researchers pointed out that because we live in an era where the prevalence of childhood disease is low; many parents have begun to question the necessity for and the safety of vaccines. Strengths of the study were that it was spread out over the whole country, and that the data can be used to monitor the number and percentage of children who may be susceptible to childhood diseases. A limitation of the study is that it only measured parents’ attitudes and beliefs at one point and not throughout the period that children receive vaccines to monitor for changes. Another potential limitation is the 28% response rate of the National Immunization Survey may not fully represent the target population (Smith, Kennedy, Wooten, Gust, & Pickering, 2006).

Using the time that parents and patients are in the office is critical, Tenreiro, suggested layering materials in her 2005 article Time-Efficient Strategies to Ensure Vaccine Risk/Benefit Communication. This entailed providing a steady stream of information to educate parents from the time they get checked in to when they walk out the door. Tenreiro (2005) proposed doing this with a variety of methods that included handouts, videos, and discussions (Tenreiro 2005). Nurse Practitioners who employ different methods may help parents feel like they received a
better education about vaccination risks and benefits that would hopefully lead to improved compliance in the time available. Because the current health care delivery system does not allow extra time for education, future system changes must be made to prioritize education for increased vaccinations as well as all preventative care.

It is important to point out that what a parent sees happen to their child at the time of immunization could affect future immunizations just as ideas of harm from an immunization(s) can affect this. To a parent vaccine administration may appear to be nothing but a painful assault on their child. The manner that providers and health care professionals address parents concerns is crucial to maintaining a mutually trusting, respectful relationship. If providers behave as though parents concerns are their concerns also they will be more willing to accept feedback. By using this approach a provider and/or nurse may be able to discuss these issues again in the future (Marfè, 2007). Respecting a parent no matter what their decision is thought to facilitate future educational opportunities and hopefully improved vaccine compliance (Diekema & the Committee on Bioethics, 2005).

Summary

Parent's perceived threat of many vaccine preventable diseases has reduced to negligible levels over decades of reduced prevalence of disease (Hilton, Hunt, & Petticrew, 2006). This has been replaced by the perceived threats of adverse reactions of vaccines by parents who have received misleading or confusing information (Harper, 2005). As of June 2008, 31 U.S. states had an un-vaccinated or under-vaccinated percentage of less than or equal to 69% coverage on CDC recommended vaccinations for children aged 19-35 months (CDC, 2008). This falls well below the recommended 90-95 percent coverage needed for adequate herd immunity.
With proper time utilization and employment of different teaching methods, Nurse Practitioners can assist with the education of parents who are just not sure what is best regarding vaccinations. Nurse Practitioners and all healthcare professionals will have to fit more in to the time allotted, which is commonly thought of as the most common barrier to education (Tenreiro 2005). Current recommended preventative services require an unreasonable amount of time for both pediatric and adult providers. System changes that could provide adequate time for education would include collaboration with other providers, delivery of education changes, and reimbursement changes for preventative care (Yarnall et al., 2003)

Also the efficacy of these methods should be studied by researchers in order to determine the best vaccination outcomes for future practice. Nurse Practitioners working as a team with Nurses and Physicians can increase vaccination compliance, and in turn decrease the preventable disease. Hopefully, with time and diligence, the controversy that surrounds vaccinations will be forgotten about and once again vaccinations will be looked upon with high esteem as they were in the days soon after the rates of smallpox, polio, and diptheria, were first decreased.
Reference:


Downloaded from www.pediatrics.org, provided by Washington State University on August 10, 2009.


Vaccination coverage estimates from the National Health Interview Survey: United States, 2008
Retrieved from: http://www.cdc.gov/nchs/data/hestat/vaccine_coverage.htm


4:3:1:3:3:1:4* Series Coverage:
Children 19-35 Months, July 2007 - June 2008

National Coverage = 68%

- ≤ 69% (31)
- 70-74% (15)
- 75-79% (5)
- ≥ 80% (0)

Note 1: 4+DTaP, 3+Poli, 1+MMR, 3+Hib, 3+HepB, 1+Varicella, 4+PCV.
Note 2: Includes Children Born Between July 2004 and January 2007
Source: National Immunization Survey (NIS)