

Preventing Illness in the Public Schools

By

Christina R. L. Sweet

A Master's Paper submitted to the faculty of
the University of North Carolina at Chapel Hill
In partial fulfillment of the requirements for
the degree of Master of Public Health in
the Public Health Leadership Program.

Chapel Hill

2009

Advisor signature/printed name

Second Reader signature/printed name

Date

Abstract

Since I started working in the public school system in the fall of 2003, the place I call work sometimes feels like a big box infested with germs. I had never washed my hands so much in my life. Bacteria is crawling everywhere with these little people coughing, sneezing, picking their nose, and using the bathroom and not washing their hands. They touch everything – from their desk, pencils, crayons, papers, books, other students, doorknobs, and the staff. It's understandable why parents have concerns when H1N1 enters their child's school and they respond by keeping their perfectly healthy child home when they're not sick.

Many parents have concerns about their children attending school and possibly contracting H1N1 or some other disease. It is interesting to think that some of these parents send their children to school with a cold, or worse, when they had vomited the night before and then they themselves may go to work when they are sick with a cold or a minor case of the flu. It's not only important for the adults to know how to protect themselves from getting sick, but their children and the people who work with them and support them daily in the schools. Besides the simple information that anyone can use to stay healthy, programs that can be implemented into the schools, like any program, need staff and money. Whether the challenges can be addressed may be too broad to be answered in a paper, but we can still educate everyone in the importance of disease prevention by simply washing your hands and following the recommended vaccination schedule to help prevent keeping healthy children home from school or having school systems close schools because of illness.

Children in the US typically receive their schooling from the age of 5 to 18, with some starting as early as age 3 in preschool programs at the school. Schools are able to access these students in ways that their family doctors can't and usually have professional personnel such as nurses that can provide links to resources in the community to educate children about the importance of staying healthy and how to prevent illness. (Hayman & Reineke, 2003)

Children are typically the main source of spreading disease. They tend to 'share' the most amount of the virus and have the biggest risk for transmission. The school setting is the best way to transmit disease by having all of these children from different communities in one tiny building. ("NASN H1N1 Influenza Media Talking Points", 2009) The Centers for Disease Control and Prevention (CDC) says that for approximately every 100 children between the ages of 5 and 7, 33.8 will catch a cold, 44.3 will get the flu, 15.0 will have other respiratory illness and 10.4 will have an intestinal virus over the course of one year. (Rodriquez, 2009) At their young age, their immune system hasn't finished developing and they are more susceptible to disease. Diseases are also very easily spread from one child to the next. One student who has contracted an illness may rub his nose or cough in his hand while holding scissors and then will pass them to his friend sitting next to him and then the friend infects themselves when they rub their eye. (Babinchak, 2009)

Illness in school-aged children obviously accounts for a large number of absences. Approximately 100 children will be absent from school for 41.5 days because of colds, 74.4 days from influenza and 22.7 days from respiratory problems. With more than 50 million students in the US, these three diseases can account for 70 million missed school days for each school year. Days missed because of illness disrupts student learning. Part of this is because teachers

continually have to reteach lessons to students who have been absent to try to catch them up to the rest of the class. (Rodriquez, 2009)

Another issue of absent students is cost. Not only are children missing out on learning opportunities, but school districts spend valuable time and money with administration tracking students' attendance and parents who are not able to take vacation or sick days to take care of their child also lose money and possibly risk their job. (Rubino, 2009)

In the spring of 2009, the H1N1 (aka Swine Flu) seemed to take over the United States along with the rest of the world, and is still a concerning issue as I write this paper. It was near the end of the school year for me, and in the tiny city in I live in, Rutland, Vermont, it seems like we never get hit as hard with things like other cities and towns throughout the country. Then one day H1N1 was in our little city, in our little high school. The question the superintendent had to answer, were they going to close the school?

Many schools in other states had closed because of H1N1. We did not. Instead they responded by organizing and through October and November, the schools are preparing for H1NI flu immunization clinics for the children. There is a huge debate among parents whether or not they should let their children be immunized. Some of the concerns brought up by parents include: "There hasn't been enough research, My child never gets sick... and Immunizations cause Autism" (from the preservative thimerasol which has never been proven in a scientific study). (Centers for Disease Control and Prevention [CDC], February 8, 2008) Parents have also been leaning towards not having their child vaccinated because they think that children should be exposed to diseases to build up their immune systems. The reality is they are exposing their children to diseases that can be prevented by vaccines and can cause severe illness and/or death. (Harkavy, 2009)

Parents and traditional staff (teachers, paraeducators, secretaries and principals) have their traditional roles for educating children in their A-B-C and 1,2,3s. School healthcare is now more important than ever with many health care professionals providing services to children inside the schools. Many children get their health care needs at the school because of lack of insurance. Most of these children are minorities and live in poverty. It's important for all who work with children to think about improving students' health.

Unfortunately, a large number of children who are infected are those with a low socioeconomic status and live in multifamily homes which increases the amount of person-to-person contact and the spread of germs. Many of these children do not have the means to get the preventive healthcare they need. (Wiggs-Stayner et al., 2006) It is frustrating for both the teachers and students because of the catch up work that needs to be done as a result of the student being absent. Many times the children who have lower socioeconomic status don't have the resources that might be needed in order to catch up to their peers.

There are around 99,000 counselors, 56,000 nurses, 30,000 school psychologists, 15,000 social workers and also a number of dental hygienists, dentists, doctors, and also substance abuse counselors working in 95,000 different public schools who serve over fifty million children throughout the US. Like many issues in the school system, there are many barriers involved when providing care for children. The decision made on budgets for nurses and whether they need to expand is usually made by administration or the school board, and sometimes the voters in the town. Health programs also have the difficulty of contending with academics in the time of 'No Child Left Behind'. Sometimes schools are able to get funding from the State Children's Health Insurance Program and Medicaid to assist with certain programs. Unfortunately, many of these programs are usually undermanaged and do not have a real plan or budget and are lacking

the staff needed to help find the collaboration needed with possible partners in the community. Some schools also don't apply for funding because they don't have the necessary paperwork or the appropriate billing system to track it and are unsure of how reimbursement works. Whether or not the school is able to provide services for their students, it's important to note that the health of the schools is not separate from the communities in which they reside. (Lear, 2007)

It's scary to think that someone can get to anywhere in the world in almost 36 hours, and that their germs will come along with them. These invisible germs are genuine threats to healthy people, and are an even more serious threat to those who are immunocompromised. (Ilardi, 2007) Objects which are shared among students such as a keyboard or a pen can pass diseases such as the flu or the common cold. Some viruses can survive for a couple of days on these surfaces. Although vomiting and diarrhea isn't deadly to most, it's a nuisance that no one enjoys and more importantly, causes loss from important learning at school. Even though most illnesses caught from these germs may not be a deadly concern for most children, it can be for those who live with, work or care for a child, whose immune systems are weak. It can also affect infants and the elderly who live with or spend a lot of time with children. Not only is prevention needed for the child or staff member to avoid getting sick, but also for others who work and live with the child. ("Stomach Flu Spread By Contaminated Computer Keyboards", 2008)

The CDC provides several tips for simple ways to prevent contracting an illness:

- Stay at least 6 feet away from someone who is ill or away from other people if you are ill to prevent the spread of the illness.
- Make sure that you stay at home when you are sick – do not go into school or work, avoid close contact with other people and call your health care provider. – Keep people who are sick away from those who are healthy.

- Make sure that you cover your mouth when you cough and your nose when you sneeze. It's best to use a tissue and throw it out once it's been used. (Teaching children to cough and sneeze into their elbow is best if no tissue is available.)
- Don't touch your eyes, mouth or nose. A person can easily become ill by touching something that is infected with germs and then proceed to touch their own eyes, mouth or nose.
- Make sure to wash your hands often and well. Help children who can't wash their own hands very well. Have them sing the "A-B-C" or "Happy Birthday" song twice to make sure they're washing their hands long enough.
- Do not share water bottles, utensils, drinks, etc. with others.
- To prevent from contaminating your hands and spreading germs, keep your hands away from your eyes, nose and mouth
- Have good health habits: sleep, physical activity, drink plenty of healthy liquids, have a healthy diet, manage stress, avoid smoking and alcohol consumption

(Centers for Disease Control and Prevention [CDC], June 26, 2009)

And more recently with the H1N1, they also recommend:

- All children aged 6 months up to their 19th birthday get a seasonal flu vaccine as well as the H1N1 flu vaccine.
- People who are experiencing flu-like symptoms should stay at their home for at least 24 hours after there is no longer a fever present and are no longer using anti-viral medications.
- Use a hand sanitizer if soap and water is not available.
- Areas where a child or staff member has touched should routinely be cleaned with the regular disinfection protocol.

(Centers for Disease Control and Prevention [CDC], 2009)

Hand washing is by far the most common response when asked how to prevent contracting illness. They are the major source of transmission from our surrounding environment, to each other. (Harkavy, 2009) Data that was collected from schools in the United

States and Canada showed that having children wash their hands regularly reduced the number of missed sick days at school by 25%. (Mattern & Rotbart, 2008)

Another important step for parents is to keep their health care team (typically the school nurse) informed so they can observe other students who may have similar symptoms and also realize that they may be able to answer any questions they might have. (Tousman et al., 2007) They should also encourage their children to get enough sleep, eat a healthy diet, have regular exercise and wear appropriate clothing for the weather. When a child is sick at school, it's important that the school nurse and/or administrator send the child home when they present with any of the following symptoms: high fever, constant diarrhea, vomiting, conjunctivitis, and difficulty breathing. (Mattern & Rotbart, 2008)

These steps may seem simple, yet at times it can be tedious reminding children constantly to cover their mouth, don't touch that, keep your hands out of your mouth, and not to pick their nose. Making sure that children wash their hands and understand the importance of keeping up the routine is the most valuable behavior to prevent the child from becoming ill. It takes little time to educate children on the importance, and having early interventions for children is the best way to effectively cause a behavior change early in their life. (Tousman et al., 2007)

Influenza

Influenza (or flu) is a viral seasonal respiratory infection that can cause a fever and a cough or sore throat. It is most likely to occur during the fall and winter months. The virus has two main types, Influenza A and Influenza B. Each one has different strains that usually change year to year. H1N1 is a type of Influenza A. Anyone can get ill from influenza, but it is more of a concern for young children, people who are immunocompromised and the elderly. Children with

asthma and diabetes are some of the conditions that can turn influenza into a more serious situation and can lead to hospitalization for a child. It is easily spread through contact with an infected person's droplets from their nose or throat from sneezing and/or coughing. A person can be contagious from the day before their symptoms appear (which usually occurs 1-4 days after exposure) and can last up to a week. Most people will recover within a few days, but some may have to be hospitalized. Each year, about 36,000 people from the United States die from influenza or complications from the virus. (NYC Influenza Information, n.d.)

School absentee rates, not surprisingly, increase over the influenza season. Three of the influenza pandemics throughout the twentieth century had a key common characteristic: their climax of incidence occurred during the months of September and October which is right at the start of a new school year. Interestingly, the more milder influenza pandemics happened during the month of December when most of the students were home during winter break and their peers could not catch the illness from the sick children. (Mattern & Rotbart, 2008)

This past spring, epidemiologic data showed that most of the individuals who contracted H1N1 in 2009 and were not hospitalized seemed to have a fever that lasted for approximately 2 to 4 days. This means that the normal individual should stay home for work and/or school for 3 to 5 days if they caught the virus. Those who had more severe cases would have to stay at home longer. It's important to mention that there were a small number of individuals who did not have fever as a symptom. (Centers for Disease Control and Prevention [CDC], August 5, 2009)

Flu vaccinations have been recommended for 'high risk' people, such as the elderly and health care workers, but this doesn't seem to be dropping the rate of influenza in the US. Policy makers are currently discussing if it would be more beneficial for school-aged children to have influenza vaccinations because of their increased likliness to contract the disease and then spread

it to others who live in their home. (“Preventing Influenza - The Case for Immunizing Children at School“, 2008)

The Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention in 2008 stated that a vaccine for influenza should be given yearly to all children 6 months old to age 18 because children in school have a higher risk at becoming ill with influenza. There is a higher risk for children who are younger to need hospital treatment from complications due to the influenza virus infection. (Li, Freedman, & Boyer-Chu, 2009) The yearly number of deaths from influenza surpasses the total number of deaths occurring from other vaccine-preventable diseases combined in the US. In October of 2005, experts on vaccination and influenza, manufacturers of the vaccines, as well as public health care workers, medical professionals and managed care organizations got together to see whether there was enough recent information to support the development of a universal influenza vaccination and to look at the barriers for implementation of such a vaccine. (Schwartz et al., 2006)

Through their discussions and research, they concluded that ‘herd immunity’ which would occur from vaccinating children of school age, would significantly reduce the incidence of the disease not only in their age group, but in other ages as well, especially in immunocompromised persons such as children and the elderly (pg. 147) There is a surprisingly high rate of hospitalizations among young children from influenza-associated illness. Older children are less likely to be hospitalized, studies from several states show that an average of 5-8 visits per 100 children per year occur because of influenza. Vaccination of just 20% of school-aged children can decrease possible influenza-associated deaths in all ages by 140%. If vaccination was up to 50%, the rate would go up more than three-quarters. The ultimate goal should be to have 70% of school-aged children vaccinated. (Wiggs-Stayner et al., 2006)

Vaccination is not only important for the health of school-aged children, but to prevent the health of other population groups (especially high-risk persons) as well from having decreased exposure to the influenza virus. (Schwartz et al., 2006)

There have been studies in Japan about a time when they would annually vaccinate school-aged children between 1962 and 1987. Most of their students were immunized against influenza and deaths from pneumonia and influenza during the winter season were extremely low. When they stopped the immunization program, the death rates due to pneumonia and influenza rose sharply. This is just one example to show the importance of yearly influenza vaccination. (Li et al., 2009)

When they analyzed the economic value of preventing disease, healthy children and adults being vaccinated would be beneficial. The major challenge, (which is happening currently) would be making sure supply could meet the demand as well as having a system to track dosage and treatment. Administering the vaccine in the child's primary care physician's office is preferred, but school-based clinics can also be useful as a site for vaccination. The concern here is having enough staff, more specifically from the local health department who would be required to give the vaccine. Other components needed for a successful vaccination program include, funding, supply, support from health care providers (not only in the school system, but the child's personal physician as well), and addressing myths about flu vaccines such as it being ineffective or causing conditions like autism. (Schwartz et al., 2006)

If someone does become infected with the influenza virus, it's important that they stay at home until the exclusion period and they should also avoid being around individuals who are healthy. By keeping sick people away from healthy individuals, it will hopefully decrease the number of people who contract the illness. The CDC recommends that those on antiviral

medication also stay home until the exclusion period is over because they can spread the virus. They also state that the virus can be detected from some individuals for as long as 10 days. It's important for these individuals to remember to keep up their 'respiratory etiquette' to avoid getting others around them from getting ill. (CDC, August 5, 2009)

Other Important Vaccinations

One of the greatest public health achievements from this past century was immunizations. They are what led to the global obliteration of diseases such as smallpox, polio in the western hemisphere and rubella in the US. These vaccinations are some of the most effective programs schools have in order to prevent outbreaks such as varicella, measles, etc. Although yearly vaccination of the flu is important in preventing illness in children, there are others such as poliomyelitis, measles, mumps, rubella, diphtheria, varicella, meningitis, pneumonia, epiglottitis and others. The vaccinations for most of these infections we tend to receive at a young age. They have helped eliminate vaccine-preventable diseases which would sometimes prove to be fatal. (Grace, 2006 and Mattern & Rotbart, 2008)

The CDC, along with the American Academy of Pediatrics, and the American Academy of Family Physicians has a number of vaccinations that are recommended for children ages 0-18. Because of the vaccinations that have been around for a while, there has been a decrease in the incidence of infections of 95%-100% since the vaccines were established. Each state has their own protocol for deciding which vaccines are needed for school attendance. (Mattern & Rotbart)

Below is CDC's recommended vaccination schedule along with Vermont's Immunization Record Schedule.

FIGURE 1. Recommended immunization schedule for persons aged 0 through 6 years --- United States, 2009

FIGURE 1. Recommended immunization schedule for persons aged 0 through 6 years — United States, 2009 (for those who fall behind or start late, see the catch-up schedule [Table])

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years
Hepatitis B ¹	HepB		HepB		see footnote 1		HepB					
Rotavirus ²				RV	RV	RV ²						
Diphtheria, Tetanus, Pertussis ³				DTaP	DTaP	DTaP	see footnote 3	DTaP				DTaP
<i>Haemophilus influenzae</i> type b ⁴				Hib	Hib	Hib ⁴		Hib				
Pneumococcal ⁵				PCV	PCV	PCV		PCV			PPSV	
Inactivated Poliovirus				IPV	IPV			IPV				IPV
Influenza ⁶								Influenza (Yearly)				
Measles, Mumps, Rubella ⁷							MMR			see footnote 7		MMR
Varicella ⁸							Varicella			see footnote 8		Varicella
Hepatitis A ⁹								HepA (2 doses)				HepA Series
Meningococcal ¹⁰												MCV

(Centers for Disease Control and Prevention [CDC], 2009)

FIGURE 2. Recommended immunization schedule for persons aged 7 through 18 years --- United States, 2009

FIGURE 2. Recommended immunization schedule for persons aged 7 through 18 years — United States, 2009 (for those who fall behind or start late, see the schedule below and the catch-up schedule [Table])

Vaccine ▼	Age ►	7–10 years	11–12 years	13–18 years
Tetanus, Diphtheria, Pertussis ¹		see footnote 1	Tdap	Tdap
Human Papillomavirus ²		see footnote 2	HPV (3 doses)	HPV Series
Meningococcal ³		MCV	MCV	MCV
Influenza ⁴		Influenza (Yearly)		
Pneumococcal ⁵		PPSV		
Hepatitis A ⁶		HepA Series		
Hepatitis B ⁷		HepB Series		
Inactivated Poliovirus ⁸		IPV Series		
Measles, Mumps, Rubella ⁹		MMR Series		
Varicella ¹⁰		Varicella Series		

(Centers for Disease Control and Prevention [CDC], 2009)

Figure 3: Recommended immunization schedule for Vermont:

When Do Children & Teens Need Vaccinations?

Vermont Recommended Immunization Schedule

Birth 2 months 4 months 6 months	Hepatitis B Hepatitis B, DTaP, Polio, Hib, PCV, Rotavirus Hepatitis B, DTaP, Polio, Hib, PCV, Rotavirus Hepatitis B, DTaP, Polio Hib, PCV, Rotavirus*, Influenza (every flu season)				
12-15 months 15-18 months	MMR, Varicella, Hib, PCV, Hepatitis A DTaP, Hepatitis A (6 months after 1st dose)			Influenza (every flu season)	
Immunize your little Vermonter: Assure that your child has all of the above vaccines before age 2!					
4-6 years	MMR, Varicella, DTaP, Polio, Influenza (every flu season)				
11-12 years	Tdap, Td booster every 10 years after	Meningococcal, 1 dose	HPV, 3 dose series for females	Varicella? No previous vaccine or disease (2 doses needed)	Influenza, Every Flu Season!
13-18 years	Assess and catch up for any missing vaccines. Influenza (every flu season)				

* Rotateq requires 3 doses; Rotarix requires 2 doses

Diseases that your child will be protected against:

DTaP: diphtheria, tetanus (lock jaw), pertussis (whooping cough)
Hepatitis A & B: serious liver diseases
HPV: human papillomavirus, causes cervical cancer
Hib: haemophilus Influenzae, a brain, throat and blood infection
Influenza: a very contagious viral infection
Meningococcal: a blood infection and/or meningitis

MMR: measles, mumps and rubella
PCV: pneumococcal, a blood, lung and brain infection
Polio: causes paralysis
Rotavirus: causes severe diarrhea
Tdap: tetanus, diphtheria and pertussis for children ≥ 10 years of age
Varicella: chickenpox

(Vermont Department of Health, n.d.)

There are many diseases that children today will hopefully never have to experience. The following are some of vaccines which could sometimes prove to be deadly in even the healthiest of children.

Smallpox was one of the first mandatory school immunizations. (Mattern & Rotbart, 2008) Smallpox has no treatment available, so the only way for a person to prevent from having the very infectious and possibly fatal disease, is vaccination. The disease has two different variations. The most common smallpox is Variola which included having a rash and a high fever and comes in different forms with rashes being from mild and flat to hemorrhagic. This version of the disease has a death rate of 30%. The other variation of small pox, Variola minor is less common and its fatality rate is 1% or lower. Both viruses usually spread from person-to-person, direct contact with bodily fluids and through items that have been infected by a person with the disease, such as, clothing or bedding. A person with smallpox can be infectious as soon as they have a fever, but usually they are most contagious when they have a rash and continue to be contagious until the last scab from the smallpox comes off. Thankfully because of vaccinations, the disease has been eliminated from universal vaccinations. The US saw their last occurrence of smallpox in 1949, and the entire world was in 1977 in Somalia. Since the disease has been eradicated, vaccination is no longer needed in order to prevent the disease. (Centers for Disease Control and Prevention [CDC], December 30, 2004)

The disease that is responsible for most of the severe diarrhea in children is the Rotavirus. Every year, 55,000 children in the US are hospitalized because of the virus and over 600,000 children die across the world. Rotavirus not only causes diarrhea, but vomiting as well. It usually lasts for 3-8 days and those with the disease may have a fever and abdominal pain as well. (Centers for Disease Control and Prevention [CDC], March 28, 2007)

Haemophilus influenza causes bacterial infections such as meningitis, pneumonia, epiglottitis and other infections in children under the age of five. Before the Hib Vaccine, it was estimated that 1 in every 200 children under the age of 5 would contract the disease.

Hospitalization is usually needed for those who contract the disease along with antimicrobial treatment. The transmission of Hib is assumed to be from coughing and sneezing. Risks for contracting the disease are: crowded households, number of children in child care centers, low socioeconomic status, parent's education status, and having siblings of school-age. There is a 'protective factor' for infants who are younger than 6 months: breastfeeding. (Haemophilus influenza type B)

Pneumococcal Disease is a type of bacteria that can cause pneumococcal pneumonia (cough, hard time breathing, fever) bacteremia (not feeling well, fever) and meningitis (headache, fever, not being able to think straight). This disease is the most frequent cause of death in the United States from a vaccine-preventable illness. It is spread like many other diseases by coughing or sneezing. The vaccine is a great way to prevent hospitalization and death from the disease, but some people may still have minor symptoms. (Centers for Disease Control and Prevention [CDC], May 18, 2009)

The MMR vaccine prevents against 3 different diseases, measles, mumps and rubella.

Measles (rubeola), caused by a virus, is a respiratory illness. People who have measles tend to have a fever, runny nose, cough and a full body rash. Other side effects from the disease include ear infections, pneumonia, encephalitis, and death. In pregnant women, it can cause a woman to have a preemie or a miscarriage. Fortunately it has almost disappeared from the US, but it still causes death to almost 200,000 people worldwide each year. Measles is extremely contagious and it spreads from people breathing the air from coughs and sneezes of those who

have it. Measles is rare in countries like the US where they can vaccinate most of the population but infected travelers from other countries can bring the disease with them and infect those who have not been vaccinated. Throughout the world there are about 10 million cases each year, resulting in around 197,000 deaths annually. (Centers for Disease Control and Prevention [CDC], August 31, 2009)

Mumps is also caused by a virus which causes fever, headache, muscle aches, sleepiness, lack of appetite, and salivary gland swelling among those who have contracted the disease. Even though cases are not usually severe, it can cause meningitis, inflammation of the testicles, ovaries and/or breasts, miscarriage, and possible permanent deafness. Mumps is spread from direct contact, sneezing coughing, saliva, and from anything that has been contaminated by someone with the disease (door knobs, computer keyboards, etc.). The average number of days a person is contagious is around 16 to 18 days. There is no treatment for mumps, but the vaccine is key for prevention. (Centers for Disease Control and Prevention [CDC], September 24, 2008)

The last part of the MMR vaccine is for the disease, Rubella (aka German Measles). Rubella is a viral disease that causes a rash and a fever for two to three days, usually in children and younger adults. Complications can occur to the fetus of pregnant women such as, cataracts, deafness, heart defects, mental retardation, and damage to the liver and spleen. It is also contracted by a healthy person from an infected individual when they cough or sneeze. (Centers for Disease Control and Prevention [CDC], May 29, 2009)

Polio is a very serious and highly contagious virus through an infected person that attacks the nervous system. Only 4%-8% of people with the disease will have minor symptoms such as fever, fatigue, nausea, headache, flu-like symptoms, back and neck stiffness, and pain in their extremities, while almost 95% that have been contracted the disease will have no symptoms at

all. Less than 1% of those infected will have lasting paralysis of their extremities, and 5%-10% of them will die when paralysis hits the respiratory system. (Centers for Disease Control and Prevention [CDC], May 14, 2009)

Meningitis is a serious disease which can cause death. It is a bacterial inflammation of the membranes which surround the brain and spinal cord. For those who are lucky enough to survive, about 20% will have horrible, permanent effects such as amputation, scarring, loss of hearing and neurological damage. The disease is easily spread through respiratory secretions as well as contact with another person, which can happen unexpectedly, and the disease can develop rapidly. (Grace, 2006) A vaccine which was initiated in 2000, the pediatric pneumococcal meningitis vaccine, reduced the number of children and adults infected with the disease. There are still other strains of the disease that are immune to the vaccination. (“Pneumococcal Meningitis ’Vaccine protects both kids and older adults’“, 2009

There are many other vaccinations that are important for a child to receive for overall health, most of which they should receive before they enter Kindergarten. Chicken Pox which was once a common childhood disease is now prevented by the varicella vaccine which was introduced in 1995. It made a massive reduction in the number of cases (4 million annually occurred before the vaccination) in the United States. (“New Guidelines for Chicken Pox Vaccination“, 2007) This vaccine was especially important because of the amount of school that was missed by children when they were infected by the disease, not to mention the cosmetic effects from the scarring that can occur.

Hepatitis B is another serious illness that can wane the immune system and later on in life can possibly lead to liver cancer. This disease can be spread through using drugs intravenously, sexual intercourse, and from the mother to the child at birth. It is now highly recommended that

infants as well as teenagers that did not get vaccinated for HBV to get vaccinated. (Grace, 2006)

Hepatitis A also infects the liver, but is not as serious as Hepatitis B. One gets infected with the virus through the fecal-oral route which can either happen from person-to-person contact or from having food or water that has been contaminated. (National Prevention Information Network [NPIN], n.d.)

A more recent vaccination is the HPV vaccine which will greatly reduce the morbidity and mortality that is linked with HPV disease. (pg. 312) HPV is one of the main causes of cervical cancer along with being the most widespread sexually transmitted disease. (Ehrhardt, 2007)

Another combination vaccination is the DTaP vaccine. DTaP vaccinates against the diseases Diphtheria, Tetanus and Pertussis.

Diphtheria is a respiratory disease formed by bacteria which has symptoms of a fever and sore throat. If the disease is not treated, a person infected could have obstruction of the airway, coma and could be fatal. The disease is transmitted from the coughs and sneezes from an infected person. (Centers for Disease Control and Prevention [CDC], September 24, 2008)

Tetanus is caused by *Clostridium tetani* bacteria and affects the nervous system. Lockjaw, stiffness in the neck and abdomen, and having a hard time swallowing are all symptoms of the disease that occur in the beginning and while the disease progresses, an infected person may also have other symptoms such as, muscle spasms, seizures, and problems with their nervous symptoms. They may also have problems with bones fracturing or having an abnormal heart rhythm. It is fatal in 10%-20% of people who are infected. This disease is different in that it is not transmitted from one person to another, but by a break in the skin. (Centers for Disease Control and Prevention [CDC], May 19, 2009)

Although most vaccines have proven to be very beneficial, there are some that seem to weaken over time such as the Pertussis (Whooping Cough) vaccine. The CDC reported that in 2004 there were 19,000 cases of Pertussis, which is a dramatic increase from the average of 584 cases. Teenagers may only show mild symptoms, but because they can easily infect more susceptible individuals, these people are more likely to suffer from severe complication or death. (Grace, 2006)

There are other immunizations that have not been discussed, but what one may find troubling is that around 35 million teenagers do not have one or more of the vaccines that are recommended. This would not only increase their risk for contracting a vaccine-preventable disease, but also have transmission of the disease to other non-immune individuals. (Grace, 2006) Although most children have to meet certain protocols when they enter Kindergarten, it seems as though the vaccines needed once they enter school are somehow missed and unfortunately, it seems as the only way to have their immunizations up-to-date is to have the schools again force protocols on students later on in their schooling.

In the early-to-mid 1990s, local health departments were responsible for providing 'back-to-school' vaccinations. There was of course a push for students to find a 'medical home', but as time went on, the vaccinations have lessened and the need for vaccination in the school has returned. The major issue here, like many things, is funding. Local and State governments do not have the money to buy the supplies needed for the vaccines for children who are not eligible. (Ransom, 2009)

Another issue mentioned with vaccines is parents' concern with their children and autism from the preservative thimerosal. There was a study which looked at two different groups of children who had received thimerosal in their vaccinations to see if the children who took in

more thimerosal had ‘delayed neurological development’ that is usually seen with autism. After 10 years of their vaccination, the children were given a number of different neurological tests and the outcomes were compared. Finding minor differences between the groups, this study showed evidence like other studies in the past that there was no link between thimerosal and autism. (“Study Examines Neurological Development of Children Receiving Vaccines that Contained Thimerosal“, 2009)

Children rely on adults for their healthcare needs. Whether it’s their parents, or at times, the state or school system, someone has to teach them ways to prevent disease transmission and help them receive their vaccinations. Children are able to soak up information like a sponge, and the important lifestyle interventions we pass on to them now, will help preserve a healthy lifestyle for the rest of their lives. It’s important to remember that healthy children means less missed days at school, less work days missed by parents or other caregivers and less sickness among those who spend time with a child. It is important to vaccinate our children and those working closely with them in order to prevent serious illness. The CDC and health departments of individual states have created recommended vaccination schedules for parents to use as guidelines (see previous Figures 1-3). These vaccinations help avoid potentially devastating outcomes from diseases that could have been easily prevented. The school is a place where the students grow and learn, and it should be conducive to the well being of the students and the adults who work with the children in order for the right education to happen. (Harkavy, 2009)

References

- Babinchak, T. (2009). Causes of Common Illnesses: An Overview. *NASN School Nurse*, 24(Suppl. 1), 7S-11S.
- Centers for Disease Control and Prevention (2009). *2009 H1N1 Flu ("Swing Flu") and You*. Retrieved October 3, 2009, from <http://www.cdc.gov/h1n1flu/qa.htm>
- Centers for Disease Control and Prevention (2009). *CDC Guidance for State and Local Public Health Officials and School Administrations for School (K-12) Responses to Influenza during the 2009-2010 School Year*. Retrieved September 19, 2009, from <http://www.cdc.gov/h1n1flu/schools/schoolguidance.htm>
- Centers for Disease Control and Prevention (2009). *Recommended Immunization Schedules for Persons Aged 0 Through 18 Years - United States 2009*. Retrieved September 20, 2009, from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5751a5.htm?s_cid=mm5751a5_e
- Centers for Disease Control and Prevention (August 31, 2009). *Overview of Measles and Disease*. Retrieved September 20, 2009, from <http://www.cdc.gov/measles/about/overview.html>
- Centers for Disease Control and Prevention (August 5, 2009). *CDC Recommendations for the Amount of Time Persons with Influenza-Like Illness Should be Away from Others*. Retrieved September 19, 2009, from <http://www.cdc.gov/h1n1flu/guidance/exclusion.htm>
- Centers for Disease Control and Prevention (December 30, 2004). *Smallpox Disease Overview*. Retrieved September 20, 2009, from <http://emergency.cdc.gov/agent/smallpox/overview/disease-facts.asp>

Centers for Disease Control and Prevention (February 8, 2008). *Mercury and Vaccines (Thimerosal)*. Retrieved September 19, 2009, from

<http://www.cdc.gov/vaccinesafety/updates/thimerosal.htm>

Centers for Disease Control and Prevention (June 26, 2009). *Preventing Seasonal Flu*. Retrieved October 23, 2009, from <http://www.cdc.gov/flu/about/qa/preventing.htm>

Centers for Disease Control and Prevention (March 28, 2007). *Rotavirus Home*. Retrieved September 20, 2009, from <http://www.cdc.gov/rotavirus>

Centers for Disease Control and Prevention (May 14, 2009). *Polio Disease In-Short*. Retrieved September 20, 2009, from <http://www.cdc.gov/vaccines.vpd-vac/polio/in-short-both.htm>

Centers for Disease Control and Prevention (May 18, 2009). *Pneumococcal Disease In-Short*. Retrieved September 20, 2009, from <http://www.cdc.gov/vaccines/vpd-vac/pneumo/in-short-both.htm>

Centers for Disease Control and Prevention (May 19, 2009). *Tetanus Disease In-Short (Lockjaw)*. Retrieved September 20, 2009, from <http://www.cdc.gov/vaccines/vpd-vac/tetanus/in-short-both.htm>

Centers for Disease Control and Prevention (May 29, 2009). *Rubella Disease In-Short (German Measles)*. Retrieved September 20, 2009, from <http://www.cdc.gov/vaccines/vpd-vac/rubella/in-short-adult.htm>

Centers for Disease Control and Prevention (September 24, 2008). *Diphtheria In-Short*. Retrieved September 20, 2009, from <http://www.cdc.gov/vaccines/vpd-vac/diphtheria/in-short-both.htm>

Centers for Disease Control and Prevention (September 24, 2008). *Mumps In-Short*. Retrieved September 20, 2009, from <http://www.cdc.gov/vaccines/vpd-vac/mumps/in-short-adult.htm>

Ehrhardt, J. (2007). What School Nurses Need to Know About Cervical Cancer, NPV, and the New Vaccine. *The Journal of School Nursing, 23*, 310-314.

Grace, J. A. (2006). Adolescent Immunization: Challenges and Opportunities. *The Journal of School Nursing, 22*, 87-93.

Haemophilus influenza type B. (.), 71-84. Retrieved September 20, 2009. Retrieved from <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hib.pdf>

Harkavy, L. M. (2009). Role of Surface Disinfection and Hand Hygiene in Reducing Illness. *NASN School Nurse, 24*(Suppl. 1), 3S-6S.

Hayman, L. L., & Reineke, P. R. (2003). Preventing Coronary Heart Disease: The Implementation of Healthy Lifestyle Strategies for Children and Adolescents. *The Journal of Cardiovascular Nursing, 294-301*.

Ilardi, D. (2007). Rare and Real Illnesses that Affect Our Students. *School Nurse News, 24*(2), 16-21.

Lear, J. G. (2007). Health At School: A Hidden Care System Emerges from the Shadows. *Health Affairs, 26*, 409-419.

Li, C., Freedman, M., & Boyer-Chu, L. (2009). Championing School-Located Influenza Immunization: The School Nurse's Role. *The Journal of School Nursing, 25*(Suppl. 1), 18S-28S.

Mattern, C. S., & Rotbart, H. A. (2008). Germ Proof Your School. *School Nurse News, 25*(4), 31-34.

NASN H1N1 Influenza Media Talking Points. (2009). *NASN School Nurse*, 24, 186, 188.

NYC Influenza Information (n.d.). *General Information Facts about Flu (Influenza)*. Retrieved October 9, 2009, from <http://www.nyc.gov/html/doh/html/flu/flu-pub-fact.shtml>

National Prevention Information Network (n.d.). *Overview of Hepatitis Viruses*. Retrieved October 29, 2009, from <http://cdcnpin.org/scripts/hepatitis/index.asp>

New Guidelines for Chicken Pox Vaccination. (2007). *School Nurse News*, 24(5), 3.

Pneumococcal Meningitis 'Vaccine protects both kids and older adults'. (2009). *Nursing 2009 The Peer-Reviewed Journal of Clinical Excellence*, 39(4), 12.

Preventing Influenza - The Case for Immunizing Children at School. (2008). *School Nurse News*, 25(4), 8.

Ransom, J. (2009). School-Located Influenza Vaccination Clinics: Local Health Department Perspectives. *Supplement to The Journal of School Nursing*, 25(Suppl. 1), 13S-17S.

Rodriguez, S. (2009). The Importance of School-Based Handwashing Programs. *NASN School Nurse*, 24(Suppl. 1), 19S-22S.

Rubino, J. (2009). Economic Impact of a Healthy School Environment. *NASN School Nurse*, 24(Suppl. 1), 23S-26S.

Schwartz, B., Hinsman, A., Abramson, J., Strikas, R. A., Allred, N., & Uyeki, T. et al. (2006). Universal Influenza Vaccination in the United States: Are We Ready?. *US Universal Influenza Vaccination JID*, 194(Suppl. 2), 147-154.

Stomach Flu Spread By Contaminated Computer Keyboards. (2008). *School Nurse News*, 25(3), 4-5.

Study Examines Neurological Development of Children Receiving Vaccines that Contained Thimerosal. (2009). *School Nurse News*, 26(3), 5.

Tousman, S., Arnold, D., Helland, W., Roth, R., Heshelman, N., & Castandea, O. et al. (2007).
Evaluation of a Hand Washing Program for 2nd Graders. *The Journal of School Nurses*,
23, 342-352.

Vermont Department of Health (n.d.). *When Do Children & Teens Need Vaccinations?*.

Retrieved October 28, 2009, from

http://healthvermont.gov/hc/imm/documents/vt_schedule.pdf

Wiggs-Stayner, K. S., Purdy, T. R., Go, G. N., McLaughlin, N. C., Tryzynka, P. S., & Sines, J.
R. et al. (2006). The Impact of Mass School Immunization on School Attendance. *The
Journal of School Nursing*, 22, 219-222.