Vaccine Induced Autoimmune Insulin Dependent Diabetes Mellitus (IDDM) in children: Is there sufficient evidence to support a causal relationship?

Jane Lukshis, MN, RN, CNS
Clinical Nurse Specialist
Children's Hospital
Palmetto Health Richland
Columbia, SC 29203
Phone: +1 803 434 2064 Fax: +1 803 434 3955
Email: Jane.Lukshis@PalmettoHealth.org

Abstract

Pharmaceutical companies and health agencies within the U.S. government assure medical consumers that vaccines are safe and the benefits far outweigh the risks. Yet the Food and Drug Administration (FDA) receives 11,000 reports of serious adverse reactions, including death, to vaccines annually. The FDA estimates that less than 10% of serious adverse events are reported. Grieving parents of otherwise healthy children who have died from unexplainable causes following mandatory vaccinations have rallied together forming advocacy groups questioning the safety of vaccines. In recent years the components of vaccines, some of which are known to be carcinogens and neurotoxins, and their unknown long-term effects on children, have many wondering if vaccines may be a contributing factor to the increase in chronic childhood illnesses. This review of the literature investigates the possible relationship between the increasing number of childhood vaccines and concomitant increase in incidence of insulin dependent diabetes mellitus in children throughout the world. The biological mechanisms involved in the human immune system are not fully understood. While the evidence remains inconclusive to accept or reject a causal relationship, the hypothesis is plausible and warrants further investigation.

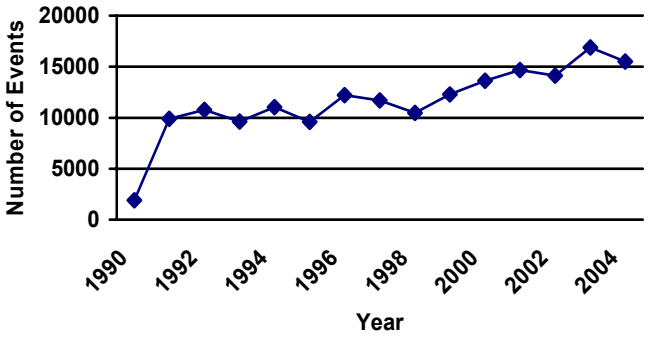
Keywords: vaccine induced reaction, Insulin Dependent Diabetes Mellitus (IDDM), type 1 diabetes mellitus in children, autoimmune disease

1. Introduction

In the last 40 years, intensive national mass immunization campaigns have dramatically increased vaccination rates among American children. This has resulted in children receiving 52 vaccine doses in the form of 15 intramuscular injections by the time they are six months of age if they receive all the recommended shots, including the Prevnar [1]. Since the start of widespread vaccinations in the United States, the numbers of cases of some formerly common childhood illnesses like measles and pertussis have dropped by at least 95% [2]. However, vaccination can be harmful as well as beneficial. The United States Government acknowledges that, "[a] vaccine can have severe side effects, including death or disabling conditions requiring lifetime medical care [3]." "Even those vaccines that are valuable can be misused and thereby cause untold human suffering. Inappropriate vaccination programs have caused unimaginable damage. Indeed, illnesses from diabetes to immune dysfunction and death, have been documented to result from inappropriate use of vaccines [4]."

In the early 1980s, reports of harmful side effects following diphtheria, tetanus, and pertussis (DPT) vaccine posed major liability concerns for vaccine companies and health care providers. In response, lawmakers passed the National Childhood Vaccine Injury Act of 1986 (P.L. 99-660), which established the National Vaccine Injury Compensation Program (VICP) which is administered jointly by the U.S. Department of Health and Human Resources (HHS), the U.S. Court on Federal Claims (the Court), and the U.S. Department of Justice (DOJ). The VICP requires the Public Health Service to investigate all reports of vaccine injury and formulate guidelines for compensation. The Food and Drug Administration's (FDA) Vaccine Adverse Event Reporting System (VAERS) receives about 11,000 reports of serious adverse reactions annually, some 1% (112+) of which are deaths from vaccine reactions [5]. The FDA estimates that only 10% of adverse reactions are reported [6], a figure supported by two National Vaccine Information Center (NVIC) investigations [7]. As of February of 2003, 3,482 vaccine victims have received compensation totaling over $1.4 billion [5].

Figure 1. Number of VAERS Events by Year (data available online at http://www.medalerts.org/vaersdb/stats and printed with permission from National Vaccine Information Center, 421 Church St., Suite E, Vienna, VA 22180, phone: 703-938-DPT3, website: www.NVIC.org)



Adverse reactions to vaccines range from soreness at the injection site to brain damage and death. These adverse reactions are well documented in health care literature (Fig. 1). However, few serious attempts have been made to investigate possible long-term effects of injecting foreign proteins and toxins into infants and children. Recent published data in the medical literature suggest increasing numbers of vaccines may be

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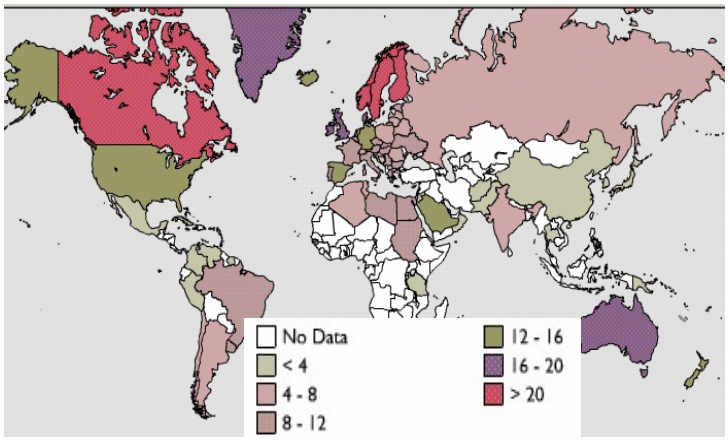
playing a role in the big jump in the number of autoimmune disorders in children. Because a vaccine artificially manipulates the immune system in order to make it act as if it has recovered from or is immune to a particular disease, some scientists are investigating whether vaccination may be a co-factor in the development of autoimmune conditions. One medical historian, researcher and author of numerous articles on immunizations has stated the "unnatural process of vaccination could lead to slow viruses developing in the body. These may bring about the far less curable chronic diseases of the present. These illnesses may be considerably more serious than the original disease, involving deeper structures and more vital organs and less of a tendency to resolve spontaneously. Even more worrisome is the fact that they are almost always more difficult to recognize [8]." Research focusing on possible correlation between vaccines and autoimmune conditions in children is on the increase. Researchers have documented an actual "lowering of the body's resistance resulting from vaccinations" and warn us about the "probability of wide-spread and unrecognized vaccine-induced immune system malfunction [8]."

Increasing prevalence of autoimmune diseases in children is receiving international attention from scientists, researchers, health care professionals, advocacy groups and worried parents. The occurrence of insulin dependent diabetes mellitus (IDDM), for example, is affecting children in certain parts of the world at alarming rates [9-21] (Fig. 2) with an overall annual increase in incidence of 3.0% [22].

Figure 2. Incidence rates (cases per 100,000 per year) of type 1 diabetes in children (ages 0-14), 2003 (with permission from the International Diabetes Foundation).



Data collected from more than 50 countries demonstrate global variability in incidence rates of IDDM, especially between the northern and southern hemispheres. Several European countries and Canada have the highest IDDM rates, with a peak of 36.5 cases per 100,000 children in Finland. In contrast, China and South America countries have some of the lowest annual rates, with a rate of 0.1 cases per 100,000 children in Venezuela. There is also variance between continents. The lowest rates were found in Asia, followed by Australia and New Zealand, North and South America, with the highest rates in Europe [23-24]. In addition, several European studies and one in the U.S., report seeing a marked increase in diagnosis of IDDM in children less than 5 years of age (Fig. 3). These studies speculate that the mechanism(s) behind this early-onset diabetes may differ from those in children diagnosed at a later age. The mechanisms suggested include high familial risk, different diabetes-related autoimmune and genetic characteristics, and environmental influences encountered in early postnatal life [25-30].

2. Immune system basics

In humans, the immune system begins to develop in the embryo at the end of the fifth week with the formation of hematopoietic (Greek for "blood-making") stem cells. One type of cell, collectively called leukocytes (white cells) differentiate into granulocytes, lymphocytes and monocytes—the armed forces of the immune system. Stem cells continue to be produced and differentiate throughout your life. "When an infant is born, its immune system is poorly developed, largely because it has been carried in a microbe-free environment in the womb. It takes around two to three months or more for an infant's immune system to become completely functional [4]."

Lymphocytes comprise 30% to 40% of all white cells and come in two classes: B cells (those that mature in bone marrow) and T cells (those that mature in the thymus). Both B and T cells recognize specific antigen targets. B cells work chiefly by secreting soluble substances called antibodies into the body's fluids, or humors (this is known as humoral immunity). Antibodies belong to a family of large molecules known as immunoglobulins. Immunoglobulins are proteins, made up of chains of polypeptides, strings of the basic units known as amino acids. Each type plays a different role in the immune defense strategy.

IgG is the major immunoglobulin in the blood and is able to enter tissue spaces; it works effectively to coat microorganisms, speeding their uptake by other cells in the immune system. Because it moves across the placental barrier it is important in producing immunity in the infant prior to birth. IgM tends to remain in the blood stream, where it is very effective in killing bacteria. IgA concentrates in body-fluid tears, saliva, and the secretions of the respiratory and gastrointestinal tracts—guarding the entrances of the body. IgE, which under normal circumstances occurs only in trace amounts, probably evolved as a defense against parasites, but is more familiar as a villain in allergic reactions. Finally, IgD is almost exclusively found inserted into the membranes of B cells, where it somehow regulates the cells activation. T cells, in contrast, interact directly with their targets, attacking the body cells that have been commandeered by viruses or warped malignancy (this is known as cellular immunity). They work primarily by secreting substances known as cytokines, or more specifically, lymphokines, which are diverse and potent chemical substances. Binding to specific receptors on target cells, lymphokines call into play many other cells and substances, including the inflammatory response. They encourage cell growth, promote cell activation, direct cellular traffic, destroy target cells, and incite macrophages. A single cytokine may have many functions; conversely, several different cytokines may be able to produce the same effect.

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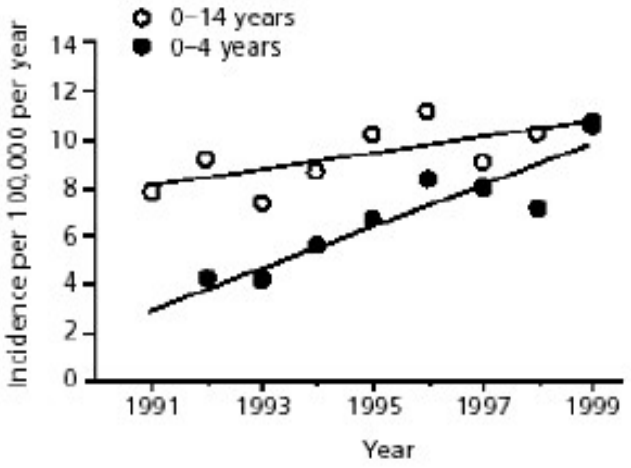
Figure 3. Age-specific incidence of type 1 diabetes mellitus in children aged 0–14 years and 0–4 years in Switzerland between 1991 and 1999.



The success of the immune system depends on its ability to discriminate between host (self) and foreign (nonself) cells. This phenomenon is known as self-tolerance. All cells carry protein markers on its surface that identify them in one of two ways: what kind of cell it is and to whom that cell belongs. When microorganisms such as bacteria or viruses invade an organism, the immune response acts to provide protection. Under normal circumstances the immune system does not mount an attack against itself. However, for reasons not yet fully understood, the immune system can and does attack itself. Failure of the immune system to discriminate between self and non-self cells results in an autoimmune response characterized by activation of autoantibodies and destruction of normal body tissues.

Cells, or antigens, that are recognized as non-self stimulate humoral and cellular immune responses resulting in destruction and elimination of the antigen. The mucosal immune system (IgA) of the respiratory and gastrointestinal systems serves as a buffer, filtering microbes so the impact of these antigens is greatly reduced once it reaches the bloodstream. IgA also allows the antigen to be removed in the same manner to which it arrived, through the mucosal barrier by sneezing, coughing and sweating.

Currently, for the routinely administered vaccines, important barriers are circumvented with the intramuscular injection of all but the live polio and influenza vaccines. All these vaccines, once injected, make their way into the blood stream and bypass the first four lines of normal immune defense: skin, mucous membranes, gut lymphoid tissue, and lymphatic neutralization [1]. In addition, vaccine mediated immunity may suppress adequate T-lymphocyte response, leading to continued circulation, rather than removal of, components of the vaccine itself. Therefore theoretically, normal body tissues may be under a chronic, insidious attack by autoantibodies.

3. Autoimmune IDDM

IDDM is an autoimmune disease, in which the islet β-cells of the pancreas are attacked and destroyed by autoantibodies, resulting in altered insulin production. Genetic predisposition is a known contributor to this chronic disease. What remains unknown is the initiator of the cascade of events that leads to insulin depletion. One theory suggests the unnatural immunity induced by vaccines differs from natural immunity, inhibiting the development of a healthy immune system, and ultimately causing the immune system to attack itself [31].

According to CDC National Estimates on Diabetes in 2003 1 in 400 to 500 children and adolescents have type 1 diabetes in the US compared to 1 in 7,100 between 1945 and 1969 (Fig. 4).

4. Mechanism of vaccines

"There is no currently known vaccine that confers lifelong immunity [4]." Vaccines are designed to stimulate the immune system to protect against microorganisms such as viruses. Microorganisms such as viruses contain many molecules that are seen as foreign to the body. These different molecular shapes are called antigens, or epitopes. Recognizing these antigens activate the B cells and T cells. Each individual T cell or B cell will only recognize and respond to its individual "destiny antigen". Once its destiny antigen activates a T cell or B cell, the cell clones itself, making many duplicate copies of itself. Some of these cloned T cells attack and destroy cells infected by the invading virus. Other cloned B or T cells remain in the body as memory cells. If the body is re-invaded by the virus in the future, the memory cells will be reactivated and respond faster and more powerfully to destroy the virus.

In general there are two major types of vaccines: those made of bacteria and those made of viruses. Vaccines are further distinguished as being live or dead. Dead vaccines are inactivated through heat, radiation or chemicals. Before a live vaccine is deemed suitable for human use it must be weakened by serial passage. This means the vaccine is passed through viable tissue several times (sometimes as many as fifty times) to reduce its potency. Many different species may be used for this purpose; monkeys, chick embryos and even surgically aborted human fetuses are used. Once the virus is weaker it must be strengthened with disinfectants and stabilizers such as, but not limited to, streptomycin, sodium chloride, sodium hydroxide, aluminum , hydrochloride, sorbitol, hydrolyzed gelatin, formaldehyde and thimerosal, a mercury derivative that is a known strong immune sensitizer and proven autoimmune triggering agent [32,33].

5. Pertussis Vaccine

Pertussis (whooping cough) exposures have been suggested as a risk for IDDM [34]. The pertussis toxin has been called an islet-activating protein because it targets the insulin secreting parts of the pancreas known as the Islets of Langerhans'. Islet-activation may lead to hypoglycemia due to over stimulation of insulin production, followed by IDDM due to destruction of the islet β-cells. As early as 1949 reports appeared in the medical literature that some children injected with pertussis vaccine (now part of the DPT or DTaP injection) were having trouble maintaining normal glucose levels in their blood [35]. In 1979 Sweden stopped vaccinating against Pertussis because their studies found it not only to be ineffective in preventing the disease, but also because the adverse effects far outweighed any proposed benefit [36].

Animal data indicate immunization starting after two months of life with an aluminum based pertussis vaccine was associated with a three-fold increase in the cumulative incidence of diabe-

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tes in mice [37]. Rises in the incidence of IDDM have also been seen following administration of a similar aluminum based whole cell pertussis vaccine in humans. In Finland the incidence of IDDM in children under age five rose 64% after the pertussis vaccine was made more antigenic [38]. In the UK the incidence of IDDM tripled in children under five as immunization rates with the pertussis vaccine rose [26].

6. Hepatitis B

Young children are in the lowest risk category for contracting hepatitis; the only way a newborn is at risk for hepatitis is if it is born to a mother with an active hepatitis B infection. Yet children are given three doses of the vaccine by the age of 18 months, and then a fourth booster shot around 11-12 years of age. "In surveys in the 1990s, 87% of the pediatricians and family doctors surveyed said they did not believe the vaccine to be necessary [4]."

In 1997, U.S. federal health officials acknowledged that one of their own studies showed that particularly in older children, the Hepatitis B vaccine may increase insulin dependent diabetes mellitus [39]. France has already discontinued the Hepatitis B vaccine. A large epidemic of IDDM (60% increase) occurred in New Zealand following initiation of the Hepatitis B vaccine program in 1988 [40]. However, the latest recommended immunization schedule in New Zealand still calls for three doses of the vaccine [41]. The United States' Association of American Physicians and Surgeons (AAPS) has called for an immediate suspension of mandatory Hepatitis B vaccine for all children pending further research on the potential dangerous side effects [42].

7. Hemophilus Influenza (Hib)

Data confirming a rise in IDDM in the US and UK following the introduction of the hemophilus vaccine (Fig. 4) was presented to the U.S. House of Representatives in 1999. A Finnish study of 114,000 children found that those who received four doses of the vaccine had a higher incidence of IDDM than those who received only one dose. Still the latest recommended immunization schedule in Finland calls for four doses of the Hib vaccine. Classen and the CDC, in two separate studies, found a 17% and 22%, respectively, increase in IDDM in children who received the newer, more potent hemophilus vaccine [43].

8. Measles, Mumps, and Rubella (MMR)

Viral infections caused by mumps and rubella have been associated with β-cell destruction. In 1864, a Norwegian scientist, H. L. Harris, reported that a patient developed diabetes following a mumps infection. More recently, a study reported that in Sweden, the onset of diabetes following a mumps epidemic was greater than expected [44]. *Diabetes Care* reported an increase in IDDM in Philadelphia in 1993, almost two years after a measles epidemic hit the area [45]. Mumps disease has been strongly associated with the development of IDDM by infecting pancreatic islet cells. And like the live rubella vaccine, there are persistent reports in the medical literature that some children develop diabetes after receiving live mumps vaccine [46]. Some reports have suggested that natural mumps or mumps vaccinations can induce islet cell autoimmunity [47]. The rubella virus has already been shown to be associated with diabetes. Babies infected with the rubella virus in their mother's womb, who are born with congenitally acquired rubella syndrome, often develop IDDM. One 1980 study concluded that "rubella virus can infect pancreatic islet cells and that the infection can severely reduce levels of secreted insulin [46]." The MMR package inserts clearly states diabetes to be one of the adverse reactions.

9. Pneumococcus

In 1999 the FDA was told the conjugated 7-valent pneumcoccal vaccine, similar in structure to the hemophilus influenza vaccine, was likely to cause a large epidemic of diabetes. The pneumococcal vaccine contains 7 separate vaccines, each to a separate strain of pneumococcus. "The newer more potent hemophilus vaccines are expected to cause up to 4,000 cases of diabetes in the US. Since the 7-valent pneumococcal vaccine contains 7 separate vaccines each similar to the hemophilus vaccine the pneumococcal vaccine may cause 28,000 cases of insulin dependent diabetes in the US each year [48]." In the US, children receive this vaccine four times before 15 months of age. The Prevnar package insert lists IDDM as one of the many types of hospitalizations occurring during the trial of the vaccine.

11. Conclusion

Two facts are indisputable: children around the world are receiving more vaccines than ever before and the prevalence of IDDM is rising at alarming rates. Classen concludes his data point to a causal relationship. Others would argue the relationship is temporal. Will traditional thinking prevail as pharmaceutical companies create more vaccines in a goodwill effort to protect our children? Or can we learn a valuable lesson on the intricacies of the immune system, and be willing to contemplate the possibility that immunizations are putting our children and future generations at risk? These issues will undoubtedly continue to be debated as we wait on more scientific studies to be conducted.

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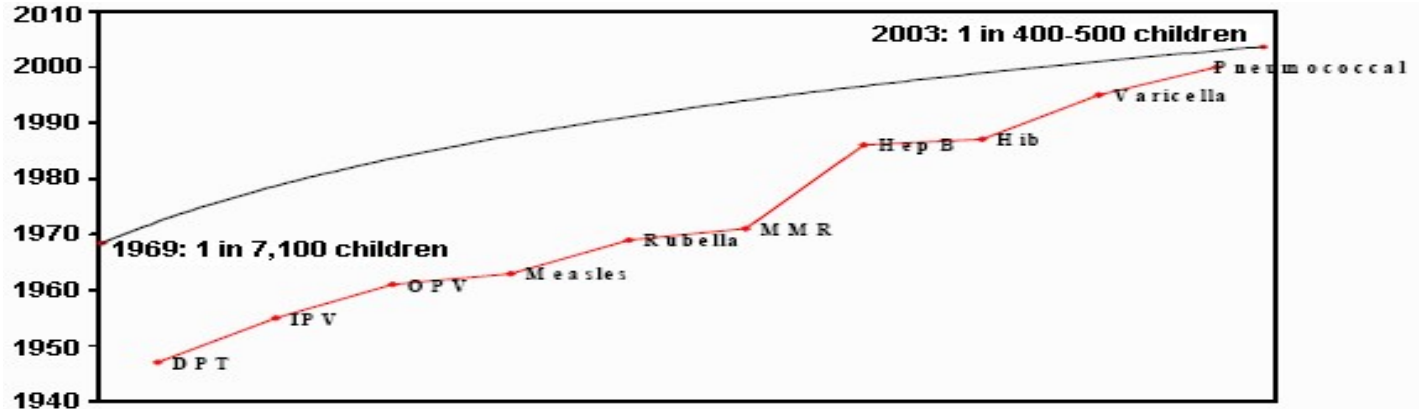
Figure 4. Rise in childhood IDDM over time in relation to the introduction of licensed vaccines



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