

QUICK REFERENCE



Immunization Communication Tool

For Immunizers

In the last 50 years
immunization has
saved more lives than
any other health
intervention.



ImmunizeBC

Immunization Communication Tool

2008

AUTHORS

Immunization Communication Working Group: A Working Group of the BC Immunization Subcommittee

ANDREA DERBAN, RN, BSN (BC Centre for Disease Control)

LISA JARVOS, RN, BSN (Fraser Health)

MYRNA KLEIN, RN, BSN (Vancouver Island Health)

TAMSIN MORGANA, B.Admin, RN, BSN, (Vancouver Coastal Health)

JAMIE PRINGLE, RN, BSN, MSc(A) (BCNurseLine)

ACKNOWLEDGEMENTS

DONNA MCNEIL, RN, BSN (Vancouver Island Health)

IAN ROE, (BC Centre for Disease Control)

JOANNE SMREK, RN, BSN (Interior Health)

MARGOT SMYTHE, RN, BSN (Vancouver Coastal Health)

JILL WALKER, RN, BSN (Northern Health)

BC HealthFiles Immunization Working Group

1: MULTIPLE INJECTIONS

Clinical Evidence

Client Knowledge

1.1 Will multiple injections overwhelm my baby's immune system?

NO Babies are born with thousands of antibodies that are ready to fight against many different diseases, as well as create an antibody response to many vaccines at one time.¹

New babies come into contact with millions of germs when they are born and their immune system can respond immediately.

Theoretically, babies have the capacity to produce one billion antibodies. Therefore they could handle up to 10,000 shots at any one time.¹

Vaccines never “use up” antibodies because the body constantly replaces B and T cells.

Because of progressive vaccine science we are giving fewer antigens now than we did 20 years ago. Today at the two month visit there are a total of 34 antigens.² In 1980 the DPTP vaccine alone had 3017 antigens.

Supplementary resource:
<http://pediatrics.aappublications.org/cgi/content/full/109/1/124>

NO Your baby's immune system is AMAZING. It could handle thousands of vaccines even if they were given at the same time.

New babies come into contact with millions of germs and their immune system protects them.

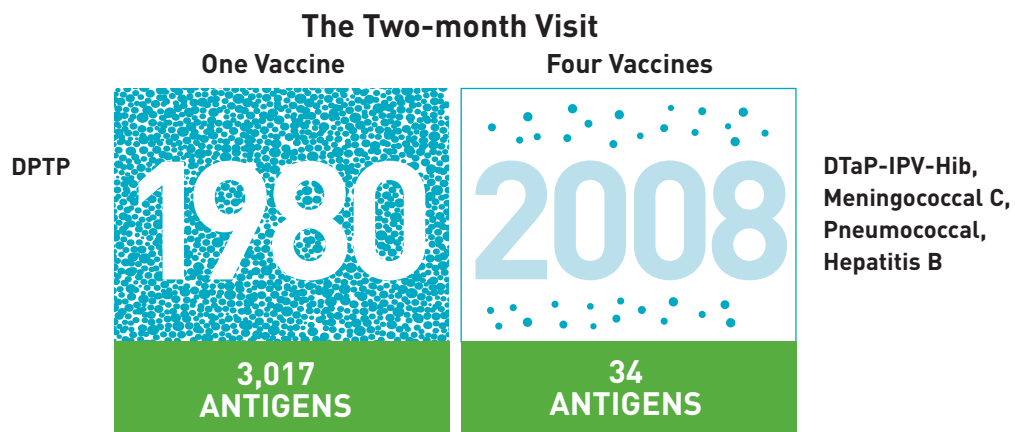
Vaccines never “use up” your body's immune system because the body is always making more and more immune system cells to protect you all the time.

IT'S JUST LIKE When you give blood your body constantly and quickly makes more.

What is an antigen?

Antigens are anything foreign that your body has not encountered before. The most common antigens are viruses and bacteria. Specific antigens are used in vaccines to induce immunity.

DID YOU KNOW? Scientists have estimated that babies can respond to 10,000 shots at one time? Today, at your baby's two month visit, your baby will receive four shots.



1: MULTIPLE INJECTIONS

Clinical Evidence

Client Knowledge

1.2 Does my baby really need all of these shots?

YES B cells in infancy are too immature to fight encapsulated organisms such as Haemophilus Influenzae Type b (Hib), Streptococcus Pneumoniae (pneumococcal) and Neisseria Meningitidis (meningococcal).

Babies are most susceptible to severe consequences including death from these diseases within the first two years of life therefore:

- **We want to protect your baby as soon as possible.**

Babies do receive passive protection via transfer of Immunoglobulin G (IgG) through the maternal placenta, but these antibodies break down. It also depends on what the mother is immune to. For example, if the mother is immune to pertussis – antibodies readily cross the placenta, and are found in infant sera in concentrations comparable to those in maternal sera – but the half life of transplacental pertussis antibodies is about six weeks with disappearance by four months of age.²

We need to continue to vaccinate against diseases that we don't see anymore such as diphtheria and polio because if we stop immunizing these diseases will come back (see Section 5.2 *What Happens When We Stop Immunizing*).

Give all vaccines a client is eligible for at every visit. This means fewer office visits and fewer periods of discomfort. It increases the probability that children will be fully immunized and protected at the appropriate age.³

YES These diseases could really harm or even kill your baby.

Babies have strong immune systems which can protect them against many germs, but there are some germs which they can't fight very well.

There are vaccines to protect against these germs.

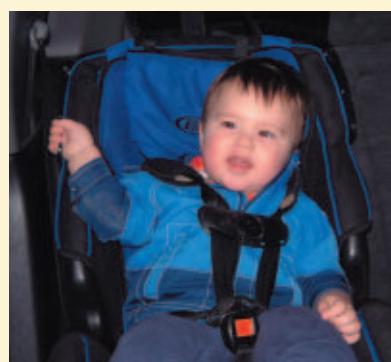
Babies are most at risk for vaccine preventable diseases and their effects within the first two years of life.

It is important to protect your baby as soon as possible.

IT'S JUST LIKE Would you only buckle up your kids in the car half the time? Not getting all of their shots at the same time is like taking a chance by not strapping them in a car seat for the first six months of life. It is important to protect them at all ages – that's what vaccines given together do.

Seat belts protect your baby's body on the outside. Vaccines protect it on the inside.

That's because seat belts are built for safety and have been tried, tested and proven – just like vaccines!



DID YOU KNOW? A less mature immune system and lack of physical development such as a smaller wind pipe means an infant or toddler is at much higher risk for serious complications and death from vaccine preventable diseases. This is why it is important to immunize early and on time.

1: MULTIPLE INJECTIONS

Clinical Evidence

Client Knowledge

1.3 Will the vaccines work as well together as they will when given separately?

YES Vaccine safety and efficacy is the same for shots given together as given individually.

A number of studies have shown that the recommended vaccines are as effective in combination as they are individually and such combinations carry no greater risks for adverse side effects.⁴⁻⁶

Giving vaccines in combination is recommended so the child is not left vulnerable to a preventable disease at such a young age.

YES The vaccines work just as well together.

These vaccines are designed to protect your baby as soon as possible against more than one disease.

By *not* using them together means we are leaving your baby vulnerable to one or more of these diseases.

Babies do not experience more side effects when more than one vaccine is given at a time.

1.4 Will multiple injections weaken my baby's immune system?

NO "Vaccines do not weaken the immune system. Rather, they harness and train it to defend, rapidly, against vaccine-preventable pathogens before illness can occur."⁷

On the contrary, in Germany, a study of 496 vaccinated and unvaccinated children found that children who received immunizations against diphtheria, pertussis, tetanus, Hib, and polio within the first three months of life had fewer infections with vaccine-related and unrelated pathogens than the nonvaccinated group.⁸

Bacterial and viral infections, on the other hand, often predispose children and adults to severe, invasive infections with other pathogens. For example, patients with pneumococcal pneumonia are more likely to have had a recent influenza infection than matched controls. Similarly, varicella infection increases the risk of severe invasive group A streptococcal infections such as necrotizing fasciitis, toxic shock syndrome, and bacteremia.¹

NO On the contrary, vaccines strengthen the immune system.

Immunizing against one disease can also protect your baby from other diseases.

EXAMPLE Getting immunized against chickenpox also reduces your chance of contracting Flesh Eating Disease. A healthy child's risk of developing invasive group A streptococcal infections such as Flesh Eating Disease is 40 – 60 times greater when they have chickenpox.⁷

IT'S JUST LIKE When you go to the gym and work out, it doesn't make your body weaker, it makes you stronger and less susceptible to injury over time. Getting a vaccine is like getting an immune system work out!



2: DO VACCINES CAUSE IDIOPATHIC* ILLNESSES SUCH AS AUTISM?

Clinical Evidence

Client Knowledge

2.1 Does MMR vaccine cause autism?

NO 23 studies have refuted this hypothesis:
<http://www.immunize.org/catg.d/p4026.pdf>

A Danish retrospective cohort study of all children born in Denmark between 1991 and 1998 (537,303 children):

- Compared rates of autism and autistic-spectrum disorder in groups of children vaccinated with MMR and unvaccinated groups.
- Concluded no difference in the rates of autism between these groups.
- Concluded no temporal clustering of cases (autism) at any time after immunization.⁹

The controversy around a possible link between the MMR vaccine and autism first appeared in the medical journal *The Lancet* in 1998 by a Dr. A. Wakefield. Wakefield's study involved only twelve children who had inflammatory bowel disease, eight with autism.¹⁰

In 2004, *The Lancet* published a retraction submitted by ten of the 13 original authors. The authors stated that there was no connection between the MMR vaccine and the bowel disease/autism syndrome.

* *Idiopathic: Illnesses of an unknown cause.*

NO There is no increased risk of autism with MMR vaccine.

Because children with autism are often diagnosed at around the same time as they get their shots people sometimes think that it's related to the shots themselves.

Just because some things happens close together doesn't mean that they are related.

IT'S JUST LIKE If you eat a ham sandwich and then get hit by a car. The ham sandwich did not cause the car to hit you.

Many studies show that MMR does not cause autism.

EXAMPLE A study of 537,303 children in Denmark showed that the likelihood of autism was the same in kids who were immunized as those who were not.

THE CONSEQUENCE After the MMR/autism scare in the late 1990s, the number of children immunized with MMR in the UK fell significantly. The result was 1,600 cases of measles, 350 children hospitalized and three previously healthy children died.

DID YOU KNOW? More babies die of measles per year worldwide than are born in Canada each year.

2: DO VACCINES CAUSE IDIOPATHIC ILLNESSES SUCH AS AUTISM?

Clinical Evidence

Client Knowledge

2.1 Does MMR vaccine cause autism?

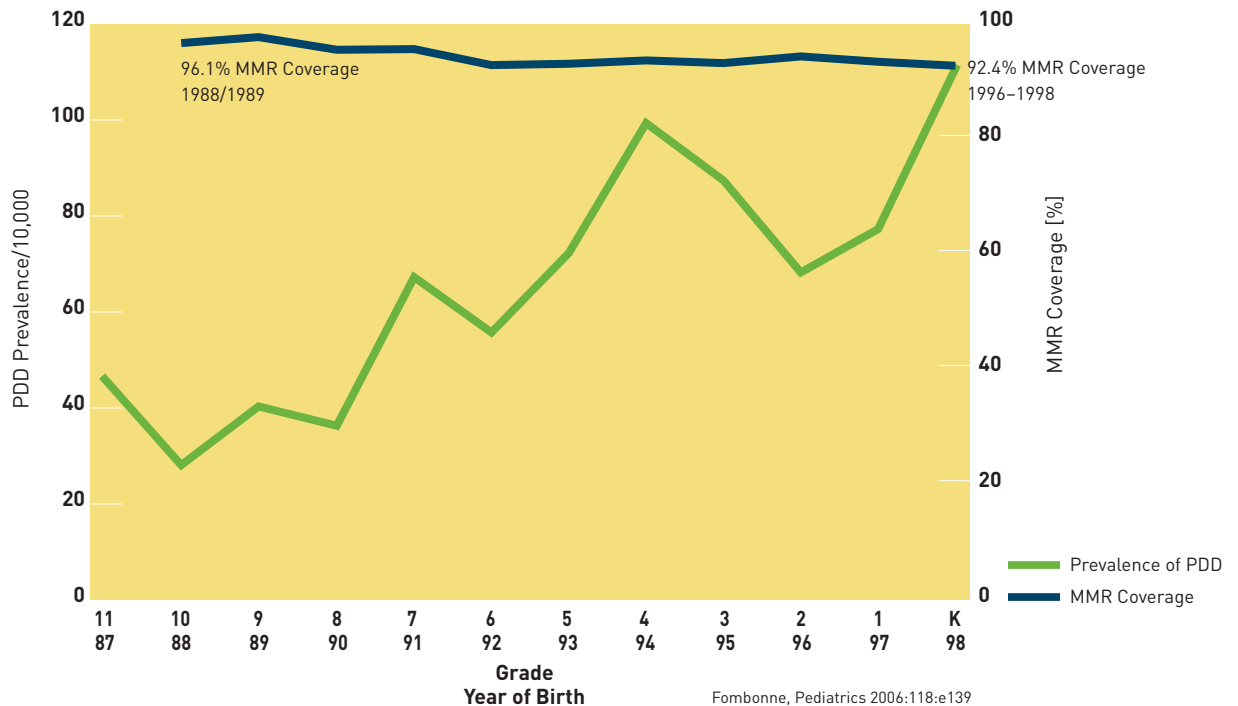
NO A Canadian retrospective cohort study of 27,749 children born between 1987 – 1998 found that the PDD* rates significantly increased when MMR vaccination uptake rates significantly decreased (*see graph below*).

The study also concluded that the two dosing schedule with MMR before age two is not associated with an increased risk of PDD.¹¹

*Pervasive Developmental Disorders (PDDs) refer to a class of disorders composed of several diagnoses, including autistic disorder, PDD not otherwise specified (PDDNOS), Asperger syndrome, and childhood disintegrative disorder (CDD).

NO MMR does not cause autism. Autism rates have increased even though fewer children have been vaccinated with MMR.

MMR Vaccine Coverage and PDD Rates Over Time



2: DO VACCINES CAUSE IDIOPATHIC ILLNESSES SUCH AS AUTISM?

Clinical Evidence

Client Knowledge

2.2 Is there a connection between thimerosal in vaccines and autism?

NO The rapid increase in rates of autism is a result of better recognition and diagnosis of Pervasive Developmental Disorders (PDD).

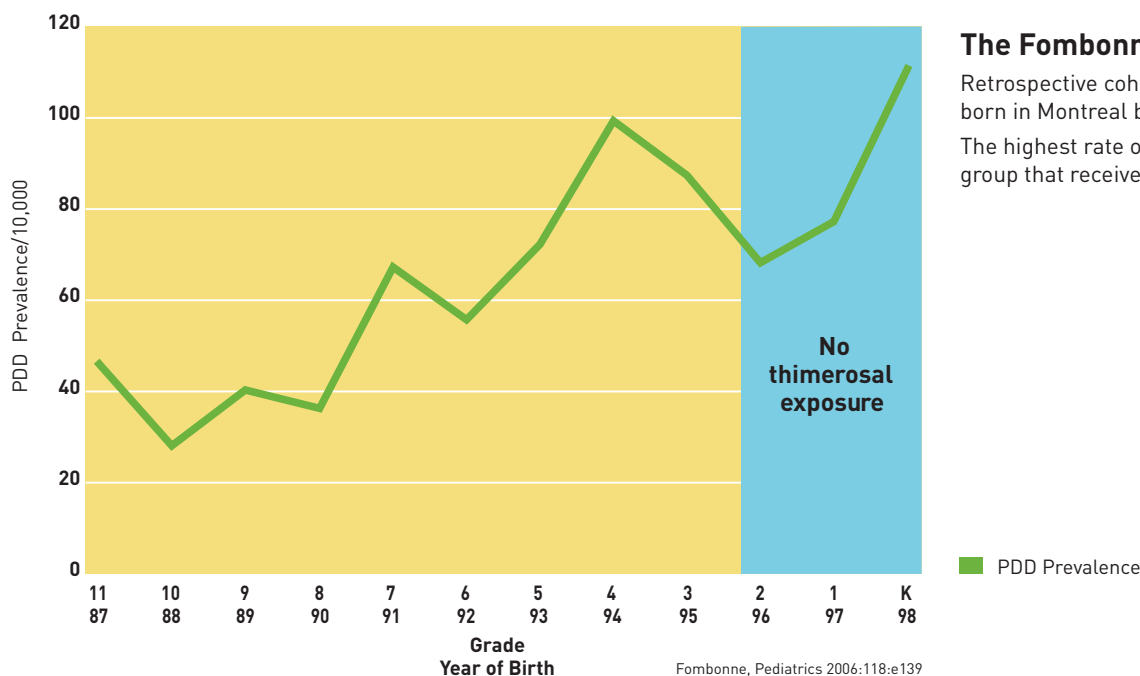
A Canadian retrospective study from 1987 – 1998 of 27,749 children born in Montreal showed that as the amount of thimerosal in vaccines declined, the rate of autism increased.¹¹

NO Studies have shown that there is no link between thimerosal and autism.

DID YOU KNOW? In the mid 90s much of the increase in autism was due to a broader definition and inclusion of behaviours and learning disorders that previously had no specific diagnosis that now fall under what is known as autistic spectrum disorders.

Thimerosal is a safe and effective preservative that has been used in some vaccines since the 1930s. There has never been any scientific evidence that it is harmful in the extremely small amounts used to preserve vaccines.

DID YOU KNOW? Thimerosal is no longer present in childhood vaccines, with the exception of influenza. It was not removed because of safety concerns, but as a result of public perception.



2: DO VACCINES CAUSE IDIOPATHIC ILLNESSES SUCH AS AUTISM?

Clinical Evidence

Client Knowledge

2.2 Is there a connection between thimerosal in vaccines and autism?

NO The Institute of Medicine (IOM) – Immunization Safety Review Committee did an extensive review of research studies and literature and found no causal relationship between thimerosal containing vaccines and autism.

The committee members are leading authorities in their respective fields (pediatrics, neurology, immunology, internal medicine, infectious diseases, genetics, epidemiology, public health, nursing and ethics) and have no conflicts of interest.

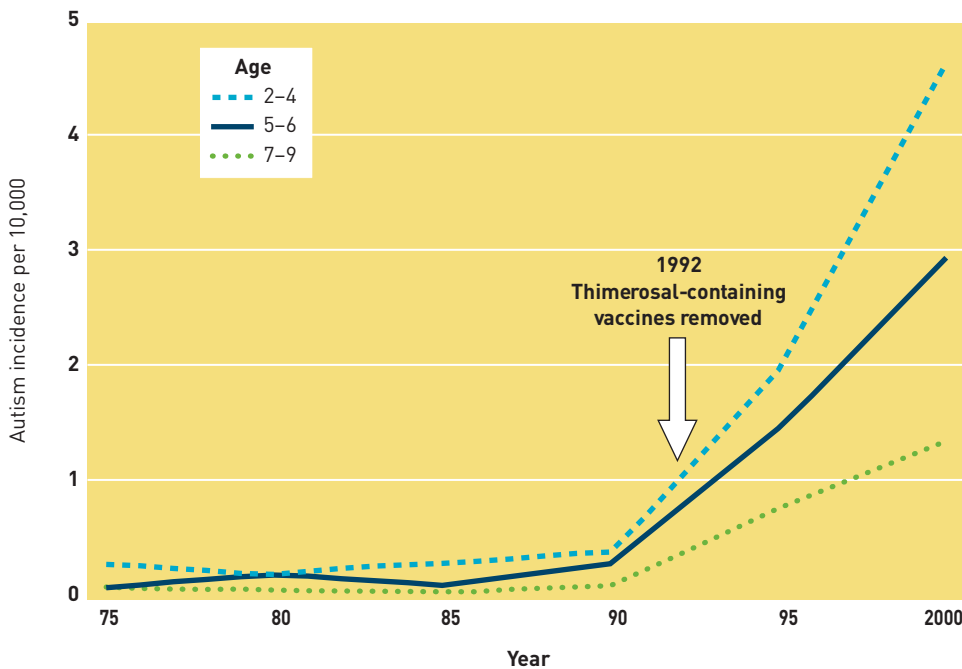
For the full report see:

<http://www.iom.edu/CMS/3793/4705/4717.aspx>

For more information on thimerosal see Section 3 *The Safety of Vaccine Components.*

NO The evidence is clear that thimerosal does not cause autism.

Danish Population-Based Study



Madsen, Pediatrics 2003;112:605

The graph reflects data analysis from a study in Denmark of all children between 2–10 years old who were diagnosed with autism during the period 1971–2000.

There was no trend toward an increase in the incidence of autism during that period when thimerosal was used in Denmark, up through 1990.

The discontinuation of thimerosal-containing vaccines in Denmark in 1992 was followed by an increase in the incidence of autism.¹²

2: DO VACCINES CAUSE IDIOPATHIC ILLNESSES SUCH AS AUTISM?

Clinical Evidence

Client Knowledge

2.3 Can vaccines cause chronic illnesses?

NO There has never been any evidence that vaccines cause or are linked to chronic illnesses.

EXAMPLE Studies comparing vaccinated and unvaccinated adults did not show any increased risk of chronic fatigue syndrome after vaccination.¹³

There is no evidence that immunization causes Multiple Sclerosis (MS) or even flare-ups of MS.¹³

There are no studies that reveal any significant differences in vaccination rates of children with Type 1 diabetes compared with the rates of healthy children without diabetes.¹³

A large international study analyzed immunization rates and rates of asthma and other allergic diseases. Researchers obtained rates for six and seven year olds from 91 centres in 38 countries, and for 13 and 14 year olds, from 99 centres in 41 countries. They found no correlation between immunization rates and asthma/allergy rates.¹³

NO There is no evidence that vaccines cause or are linked to chronic illnesses including MS, diabetes and asthma.



3: THE SAFETY OF VACCINE COMPONENTS

Clinical Evidence

Client Knowledge

Vaccine Components

3.1 Thimerosal

Thimerosal is a preservative that is used in some vaccines. It is made of thiosalicylic acid and mercury. The mercury contained in thimerosal is an organic form called ethylmercury.¹⁴

Studies have never shown that ethylmercury at the level contained in vaccines causes neurological problems.¹⁴

- Ethylmercury is more easily excreted from the body than methylmercury (half life of seven days as opposed to 50 days for methylmercury).
- Methylmercury can cause brain damage and is responsible for pollution.¹⁴
- For more information on thimerosal see Section 2.2 *Is There a Connection Between Thimerosal in Vaccines and Autism?*

3.2 Formaldehyde

Formaldehyde is used in the production process to kill or inactivate viruses and bacteria.

- The vaccines are purified to remove almost all the formaldehyde and the quantity left in a vaccine does not exceed 0.1 mg.
- Formaldehyde is naturally found in the human body and is an essential intermediate for metabolism.
- Infant circulation naturally contains approximately 1.1 mg (ten times the amount found in vaccines).¹⁵

3.3 Aluminum

Aluminum is an adjuvant used to enhance the immune response after immunization.

- Aluminum has been used for the past 70 years in vaccines.
- Vaccines contain quantities of aluminum similar to those found in infant formula.¹⁵

For exact amounts of aluminum in vaccines consult product monographs.

3.1 Thimerosal

Vaccines are made with ingredients that make them safe and effective.

Vaccine components are used in very small amounts and their use in vaccines has not been linked to disease or illness.

Preservatives such as thimerosal prevent vaccines from contamination with bacteria or fungi, particularly when the vial contains more than one dose (multidose vials).

DID YOU KNOW? Thimerosal is no longer present in childhood vaccines, with the exception of influenza. It was not removed because of safety concerns, but as a result of public perception.

3.2 Formaldehyde

Formaldehyde is naturally occurring in the human body and helps with metabolism.

DID YOU KNOW? There is approximately ten times the amount of formaldehyde in a baby's body at any time than there is in a vaccine.

3.3 Aluminum

Aluminum is the most abundant element in the earth's crust and is found in air, food and water.

Aluminum salts in vaccines help vaccines to work faster, better and longer.

DID YOU KNOW? Aluminum is present in breast milk (40 µg/L) and in infant formula (225 µg/L) in similar amounts as in vaccines. This amount is very small and extremely safe for infants.¹⁵

3: THE SAFETY OF VACCINE COMPONENTS

Clinical Evidence

Client Knowledge

3.4 Gelatin

Gelatin is used as a stabilizer. The gelatin in vaccines is the same product used in many products we eat.

- Gelatin can be bovine-derived, but there are no reported cases of variant Creutzfeld-Jakob disease (“Mad Cow Disease” in humans) linked to immunization despite tens of millions of vaccines manufactured using bovine derived material.¹⁵
- The gelatin used must be sourced from countries whose cattle are free of Bovine Spongiform Encephalopathy (“Mad Cow Disease” in cattle).

3.5 Human Cell Lines

Vaccines do not contain human cells or tissue.¹³

Viruses are necessary for the production of certain vaccines and the cell lines are used as the medium for the viruses to grow in.

Human cultures may be used in the process of making certain vaccines, but all cells are removed during the purification process. Trace amounts of some proteins may remain in the vaccine.¹³

Some vaccines are made from cells that came from two fetuses aborted in the 1960s. They were not aborted to make the vaccine, but had been aborted for medical reasons.¹³

These cell lines are self-sustaining and additional abortions are not needed to continue producing vaccines.¹⁷

At this time the vaccines which use human cell lines are MMR, Varicella, Hepatitis A, Rabies, Quadracel™ and TdP.

3.4 Gelatin

Gelatin is contained in some vaccines and is prepared from cows known to be free of mad cow disease.¹⁵

3.5 Human Cell Lines

Vaccines do not contain human cells or tissue.¹³

Human cultures may be used in the process of making certain vaccines, but all cells are removed during the purification process.¹³

Vatican statement: “parents have a serious obligation to protect their children from disease whenever possible, and in doing so they are not signaling their approval for abortion.”¹⁶

Ethicists from the US National Catholic Bioethics Centre concluded the use of human cells in vaccine production was not contrary to their religious practices or beliefs.¹⁷

IT'S JUST LIKE When a transplant recipient receives an organ from someone who died from a hit and run accident – it does not make the recipient responsible in any way for the death.

3: THE SAFETY OF VACCINE COMPONENTS

Clinical Evidence

Client Knowledge

3.6 Animal Cell Lines

Vaccines do not contain animal cells or tissue.¹³

Vero is a continuous cell line developed in 1962, initiated from kidney cells of an adult African green monkey.¹⁸

The Vero cell line is regularly validated by the World Health Organization (WHO) and European Pharmacopoeia for safety and the requirements for absence of bacteria, fungi, mycoplasma and viruses.

Downstream purification has resulted in excellent safety as attested by pharmacovigilance in the production of 100 million doses of inactivated polio vaccine (IPV) over a twelve year period, more than 20 million doses of rabies vaccine over a ten year period, and more than 1 billion doses of oral polio vaccine (OPV) over an eight year period.¹⁹

3.6 Animal Cell Lines

Vaccines do not contain animal cells or tissue.¹³

During purification of the vaccine, all cells are removed. Trace amounts of some proteins from the cells may remain in the vaccine.¹³

4: IS “NATURAL” IMMUNITY BETTER THAN VACCINE IMMUNITY?

Clinical Evidence

Client Knowledge

4.1 Is it better to get the disease “naturally” than it is to get the vaccine?

NO Immunity after most vaccines is similar to immunity that is induced from disease, but without the risk of disease.

Vaccines are designed to provide protective antibody levels.

The same kinds of antibodies and immune cells are made after a vaccine as after a disease.

Antibodies are produced ahead of time, prior to exposure to an actual infection so they are ready to fight immediately.

Some vaccines, such as tetanus, actually produce a stronger immunity than occurs through natural infection.

EXAMPLE Immunization with tetanus vaccine is very important because tetanus can be fatal and survivors usually do not become immune.¹³

NO Natural infection from certain diseases can kill or seriously harm a child before their body is able to mount an effective immune response.

The vaccine triggers your own body’s natural immune response into action to protect you against the disease without the risk of disease.

Vaccination is like a dress rehearsal for your immune system so it is prepared for the ‘real show.’

IT’S JUST LIKE Most of us would not allow our children to drink unpasteurized milk even though it is “natural.” “Natural” is not always better.

4.2 Are there risks associated with the vaccine that are worse than the risk of the disease?

NO Severe adverse events from vaccines are extremely rare.

Adverse events from vaccines are actively and closely monitored and tracked through a nationwide pediatric hospital surveillance system called IMPACT.

Nurses at each of the 13 IMPACT hospitals (90% of pediatric tertiary care beds across Canada) review all admissions with certain serious illnesses such as seizures, encephalitis, encephalopathy and acute paralysis. They report details about illness and immunization history to rule out a link to immunization.

There is also a passive reporting system in BC which receives and reviews approximately 2,000 reports per year.

- The majority are mild/moderate, but very rarely serious. All serious events that occur in association with vaccines are sent to the National Advisory Committee on Causality Assessment for a case-by-case review.

NO It’s not even close. As an immunizer, I take vaccine safety very seriously.

Vaccine preventable diseases can kill you, while severe adverse events from vaccines are extremely rare.

EXAMPLE Anaphylactic reactions to vaccines are rare (approximately two per million doses given). Anaphylaxis can be life-threatening, but is treatable with medication.⁷

DID YOU KNOW? Vaccines are one of the most monitored and studied topics in medicine because they are given to healthy children and adults.

Try not to focus on the wrong risk!

IT’S JUST LIKE Constantly looking skyward because you are worried about getting hit by a plane and you get hit by a car. Don’t get hit by a vaccine-preventable disease!

4: IS “NATURAL” IMMUNITY BETTER THAN VACCINE IMMUNITY?

4.3 Summary of diseases and vaccines, Canada

DISEASE	AVERAGE NUMBER OF CASES AND RELATED DEATHS (per year)		EFFECTS OF DISEASE	SIDE EFFECTS OF VACCINE
	Before vaccine	After vaccine		
Diphtheria	12,000 cases with 1,000 deaths	0 – 5 cases with 0 deaths	Severe sore throat, marked weakness, nerve damage, heart failure. Death in 10%.	DTaP vaccine: 20% of infants have local redness, pain; less than 5% have fever; more have redness and swelling with booster at 4 – 6 years.
Tetanus	60 – 75 cases with 40 – 50 deaths	0 – 2 cases and no deaths since 1991	Toxin affects spinal cord leading to painful muscle spasms and seizures.	See DTaP above. Local redness and pain common with adult booster.
Pertussis	30,000 – 50,000 cases with 50 – 100 deaths	3,000 cases with 1 – 5 deaths	Severe coughing spasms lasting 3 – 6 weeks, pneumonia, convulsions. Brain damage or death: 1 of every 400 infants.	See DTaP above. Risk of brain damage after pertussis vaccine is too small to be measured.
Polio	2,000 cases in last epidemic (1959)	0	Muscle paralysis in 1 out of 100 persons infected with polio. Death in severe cases.	Inactivated polio vaccine (IPV) is used in Canada. No risk of disease from vaccine. Given combined with DTaP (see above for side effects).
Hib	1,500 cases of meningitis and 1,500 cases of infections of blood, bone, lungs, skin, joints	About 30 cases	Meningitis kills in 5% of cases and leads to brain damage and deafness in 10 – 15% of survivors.	Given in combination with DTaP/IPV (see above for side effects).
Measles	95% of children have measles by age 18, or 300,000 cases with 300 deaths and 300 children with brain damage	Less than 20 cases with 0 deaths	Severe bronchitis, high fever, rash for 7 – 14 days; death in 1 per 1,000 cases; encephalitis in 1 per 1,000 cases.	Given combined with mumps and rubella vaccines (MMR). 5 – 10% have fever with or without rash 8 – 10 days after vaccine. No risk of disease from vaccine. Risk of encephalitis 1 case per million doses. 1 in 24,000 develops low platelets.
Mumps	30,000 cases	90 cases	Fever, swollen salivary glands. No visible illness in more than 50% of cases. Encephalitis in 1 per 200 cases; deafness in 1 per 200,000 cases.	See MMR, above.

Continued on next page.

4: IS “NATURAL” IMMUNITY BETTER THAN VACCINE IMMUNITY?

4.3 Summary of diseases and vaccines, Canada

DISEASE	AVERAGE NUMBER OF CASES AND RELATED DEATHS (per year)		EFFECTS OF DISEASE	SIDE EFFECTS OF VACCINE
	Before vaccine	After vaccine		
Rubella	85% of children have rubella by age 20, or 250,000 cases. About 200 cases of congenital rubella syndrome.	25 cases. 0 – 3 babies with congenital rubella syndrome born to unvaccinated mothers.	Fever, swollen glands, rash. No symptoms in about 50% of cases. Severe damage to fetus if mother infected during first trimester of pregnancy.	See MMR, previous. Congenital rubella syndrome has not been observed after vaccination of pregnant women. 25% of vaccinated adult women have joint pain.
Meningococcus	200 – 400 cases with 20 – 40 deaths	Too new to see effect.	Deaths in 10%, brain damage, deafness, amputations, skin loss in 10% of survivors.	Minor local redness, swelling and pain in 15% of recipients.
Pneumococcus	3,000 cases of severe disease (meningitis, bacteremia, pneumonia) in children under age 5	250 cases	Deaths in approximately 30 – 50 children; 15 – 20% of survivors of meningitis have brain damage, deafness.	Minor local redness, swelling and pain in 15% of recipients.
Varicella	300,000 cases	87.5% reduction in the US.	Hospitalization in 1,000 and death in 10 cases due to pneumonia, encephalitis, severe skin infections; shingles (zoster) later in life.	Minor local reaction; rash in about 5% of children.
Hepatitis B	20,000 new cases per year with 480 – 500 deaths	Less than 1,000	Death from complications of chronic infections (cirrhosis, liver cancer) or from severe acute illness.	Minor local redness, swelling and pain.
Rotavirus	400,000 cases per year with 2 – 4 deaths in children under age 2	Too new to see effect	Death from severe dehydration caused by profuse, watery diarrhea.	No significant reactions
Human Papillomavirus	1,350 cases of cervical cancer per year with 400 deaths and 200 deaths from other forms of cancer caused by HPV	Too new to see effect	Death from cervical and other forms of cancer.	Mild pain and redness at injection site.

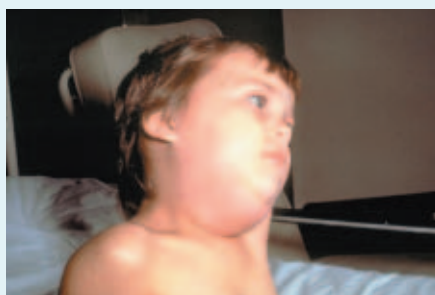
Your Child's Best Shot, 3rd edition, Canadian Pediatric Society

4: IS “NATURAL” IMMUNITY BETTER THAN VACCINE IMMUNITY?

4.4 Examples of Vaccine-Preventable Diseases



Measles



Mumps



Rubella



Tetanus



Pertussis



Polio



Varicella

Source: Immunization Action Coalition
www.immunize.org

5: WHY VACCINES ARE NECESSARY

Clinical Evidence

Client Knowledge

5.1 Didn't diseases decline pre-vaccination due to better sanitation and clean water?

NO Until vaccines became available there was no significant change in the number of cases of diphtheria, tetanus, pertussis, polio, measles, mumps, rubella, Hib, hepatitis B, meningococcal disease, pneumococcal disease and chickenpox.

However, before vaccines became available the mortality rate from some of these infections was decreasing.

Hib was the most common cause of bacterial meningitis and a leading cause of other serious invasive infections in young children before the introduction of Hib vaccines in the 1980s.⁷

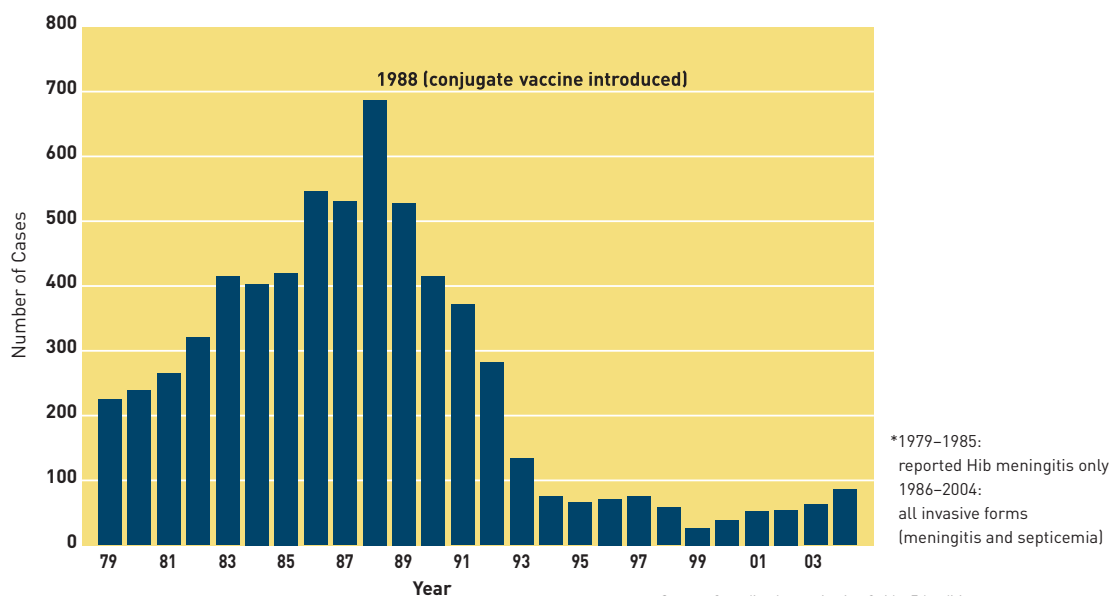
In 1985, before the first Hib vaccine was licensed, there were 485 invasive Hib cases seen at the network of Canadian Pediatric Hospitals (IMPACT). Case totals fell progressively as better vaccines became available. In 2000, only four cases were recorded by the IMPACT centres — **99% fewer than in 1985**.²⁰

Since the introduction of the Hib vaccine the majority of pediatric cases occur in unimmunized children or in children too young to have received their primary series.²⁰

NO What *was* changing before vaccines became available was the *death rate* from some of these infections. Improvements in social and economic conditions led to declining death rates for many common infections.¹³

Did you know? Until recently, haemophilus influenzae type b (Hib) was a leading cause of meningitis, epiglottitis and other invasive infections in children, affecting about **one child in 250 by five years of age**.²⁰

Haemophilus Influenza type b (Hib) Disease: Reported Cases, Canada, 1979–2004*



Source: Canadian Immunization Guide, 7th edition

5: WHY VACCINES ARE NECESSARY

Clinical Evidence

Client Knowledge

5.2 What happens if we stop immunizing? Are these diseases gone now?

NO The diseases are rare in North America because of vaccination.

History has shown rates of disease increase if we stop immunizing:

EXAMPLE In the 1970s anti-vaccination groups spurred the cessation of pertussis vaccine programs in eight countries.

This resulted in pertussis disease rates rising ten to a hundred times higher than neighbouring countries that maintained their immunization programs.²¹

The UK saw 10,000 cases of pertussis and 36 deaths in 1978.²²

Japan saw 13,000 cases of pertussis and 113 deaths between 1976 – 1979.¹⁴

EXAMPLE During the 1990s there were over 140,000 cases of diphtheria and 4000 related deaths in the former Soviet Union due to suspension of vaccine programs.⁷

NO If we stop immunizing, the diseases will come back. In some cases they are just a plane ride away.

IT'S JUST LIKE When we started bailing out a boat that had a slow leak, the boat was filled with water (disease). We have been bailing (vaccinating) fast and hard, and now it is almost dry. We could say, "Good. The boat is dry now, so we can throw away the bucket and relax." But the leak hasn't stopped — the diseases are still present. Before long we'd notice water (disease) seeping in, and soon it might be back up to the same level as when we started.



DID YOU KNOW? Ireland saw measles outbreaks soar from 148 cases in 1999 to 1,200 cases in 2000.

This was the result of significant decreases in MMR immunization rates in response to concerns of an unfounded link between MMR and autism.

Children died in this outbreak.⁷

When enough people stop immunizing, there is more disease and children die.

6: DO VACCINES WORK?

Clinical Evidence

Client Knowledge

6.1 Are routine vaccines effective in reducing the spread of disease?

YES All vaccines used for routine immunization are very effective in preventing disease. In fact, the vaccines are so effective that most of the diseases they protect against are now very rare¹³ — many times only found in unvaccinated people.

EXAMPLE Varicella vaccine is 85 – 90% effective in preventing all cases of chickenpox and close to 100% protective against severe disease.

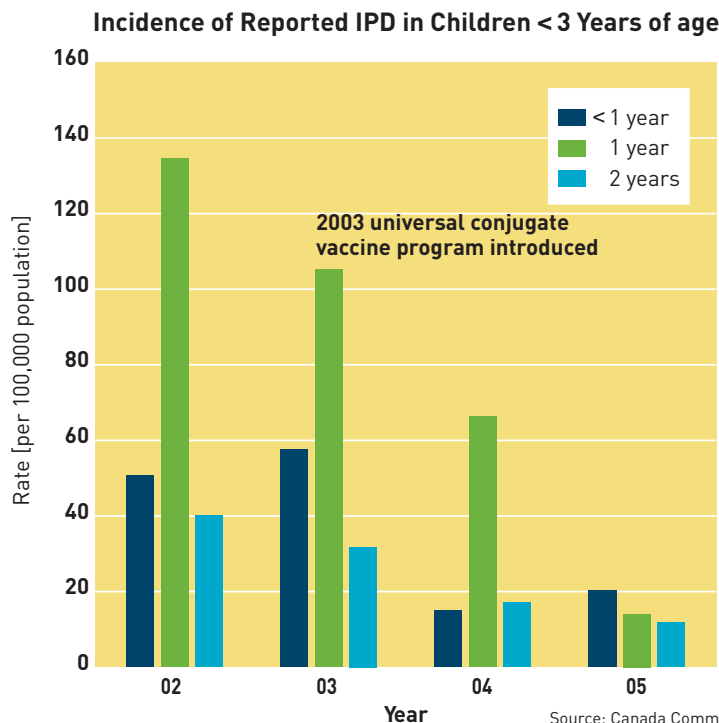
YES Vaccines work!

Everyone who is unvaccinated is vulnerable to disease. Only a small percentage of vaccinated people are at risk from disease.

If a person who has had the chickenpox vaccine gets chickenpox they will get a much milder form of the disease and will not be as sick.

EXAMPLE The efficacy of a single dose of measles vaccine given at 12 or 15 months is estimated to be 85% to 90%. With a second dose, almost 100% of children are protected.

IT'S JUST LIKE Seat belts are not 100% effective at protecting you while driving, but they do significantly reduce your risk of being injured.



The graph reflects dramatic reduction of Invasive Pneumococcal Disease (IPD) after introduction of the Universal Infant Immunization Program in British Columbia.²³

7: IS A HEALTHY LIFESTYLE AND NATURAL ALTERNATIVES ENOUGH TO PROTECT ME OR MY CHILD?

Clinical Evidence

Client Knowledge

7.1 Will a natural, healthy lifestyle protect against disease?

NO A healthy lifestyle is important to help maintain your overall health, but this alone will not protect you or your child from contracting a vaccine preventable disease.

Natural Alternatives

The policy of the Faculty of Homeopathy at the Royal London Homeopathic Hospital supports vaccination.¹³

The Canadian College of Chiropractic recommends that all children should receive routine immunization.¹³

The concept of immunization is not new, it dates back to the 1100s in China.²

I breast feed my child, isn't that enough?

Breastfeeding is important, but it will not protect your child against some diseases that can be prevented with vaccination.

The protection provided by breast milk is incomplete and can be overcome if the baby is exposed to large amounts of germs.

If there is protection it disappears rapidly as soon as breast feeding stops.¹³

NO It's not enough.

A healthy lifestyle is important to help maintain your overall health, but this alone will not stop your child from getting a vaccine-preventable disease.

Previously healthy people die of vaccine-preventable diseases.

EXAMPLE Although infections such as measles and pertussis are much more likely to kill a child who is malnourished or who has immune system defects, these infections can also kill healthy, well-nourished children. Malnutrition was not a contributing factor in the deaths of any of the children who died of pertussis in the United States in the 1990s.¹³

Breastfeeding is important, but it will not protect your child against the specific diseases that can be prevented with vaccination.



ENDNOTES

- ¹ Offit PA, Quarles J, Gerber MA, et al. Addressing Parents' Concerns: Do Multiple Vaccines Overwhelm or Weaken the Infant's Immune System? *Pediatrics*. 2002;109(1):124 – 129.
- ² Plotkin SA, Orenstein WA. *Vaccines*. 4th ed. Philadelphia, PA: WB Saunders Co; 2004.
- ³ British Columbia Centre for Disease Control Communicable Disease Control Manual, Chapter 2: Immunization Program, Section 4: Vaccine Administration. March 2005.
- ⁴ Eskola J, et al. Combined vaccination of Haemophilus influenzae type b conjugate and diphtheria-tetanus-pertussis containing acellular pertussis. *The Lancet*. 1999;354:2063 – 2068.
- ⁵ Dagan R, et al. Safety and immunogenicity of a combined pentavalent diphtheria, tetanus, acellular pertussis pentavalent vaccine. *Pediatric Infectious Diseases Journal*. 1997;16:1113 – 21.
- ⁶ Mills E, et al. Safety and Immunogenicity of a combined five-component pertussis-diphtheria-tetanus-inactivated poliomyelitis-Haemophilus b conjugate vaccine administered to infants at two, four and six months of age. *Vaccine*. 1998; 16:576 – 85.
- ⁷ National Advisory Committee on Immunization. *Canadian Immunization Guide*. 7th ed. Ottawa, ON: Public Health Agency of Canada; 2006.
- ⁸ Otto S, Mahner I, Kadow JE, et al. General Non-specific Morbidity is Reduced After Vaccination Within the Third Month of Life – the Greifswald Study. *Journal of Infection*. 2000; 41:172 – 175.
- ⁹ Madsen KM, Hviid A, Vestergaard M, et al. A Population-based Study of Measles, Mumps, and Rubella Vaccination and Autism. *The New England Journal of Medicine*. 2002; 347(19): 1477 – 1482.
- ¹⁰ Wakefield AJ, Murch SH, Anthony A, et al. Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet*. 1998;351: 637 – 642.
- ¹¹ Fombonne E, Zakarian R, Bennett A, et al. Pervasive Developmental Disorders in Montreal, Quebec, Canada: Prevalence and Links with Immunizations. *Pediatrics*. 2006; 118:139 – 50.
- ¹² Madsen KM, Lauritsen MB, Pedersen CB, et al. Thimerosal and the Occurrence of Autism: Negative Ecological Evidence From Danish Population-Based Data. *Pediatrics*. 2003;112(3): 604-606.
- ¹³ Gold R. *Your Child's Best Shot: A Parent's Guide to Vaccination*. 3rd ed. Ottawa, ON: Canadian Paediatric Society; 2006.
- ¹⁴ Offit PA, Bell LM. *Vaccines: What You Should Know*. 3rd ed. Holboken, NJ: John Wiley & Sons, Inc; 2003.
- ¹⁵ Offit PA, Jew RK. Addressing Parents' Concerns: Do Vaccines Contain Harmful Preservatives, Adjuvants, Additives, or Residuals? *Pediatrics*. 2003;112(6):1394 – 1401.
- ¹⁶ Vatican. Vatican Official Clarifies Stand On Vaccines From Fetal Tissue. 2005. Retrieved January 23, 2008 from <http://www.lifesite.net/ldn/2005/jul/05072604.html>
- ¹⁷ Eldred BE, et al. Vaccine components and constituents: responding to consumer concerns. *The Medical Journal of Australia*. 2006;184(4):170 – 175.
- ¹⁸ World Health Organization Expert Committee on Biological Standardization Requirements. 2006. *World Health Organization Technical Report*. Series No. 932.
- ¹⁹ Montagnon BJ, Vincent-Falquet JC. Experience with the Vero cell line. *Developments in Biological Standardization*. 1998; 93:119 – 123.
- ²⁰ Scheifele D, Halperin S, Law B, et al. Invasive Haemophilus influenzae type b infections in vaccinated and unvaccinated children in Canada, 2001 – 2003. *Canadian Medical Association Journal*. 2005;172(1):53-56.
- ²¹ Poland GA, Jacobson, RM. Understanding those who do not understand: a brief review of the anti-vaccine movement. *Vaccine*. 2001;19:2440 – 2445.
- ²² National Advisory Committee on Immunization. *Canadian Immunization Guide*. 6th ed. Ottawa, ON: Public Health Agency of Canada; 2002.
- ²³ Public Health Agency of Canada. Incidence of invasive pneumococcal disease after introduction of the Universal Infant Immunization Program, British Columbia (2002 – 2005). *Canada Communicable Disease Report*. 2006;32(14).



ImmunizeBC

www.immunizebc.ca

