



IMMUNIZATIONS

Why The Fuss?

Joel Stimson, MD
Kevin Fairbairn, MD

Chilliwack Family Medicine Residents

Conflicts of Interest

- We do not receive any funding/incentives from pharmaceutical companies
 - No funding (whatsoever)... from anyone...
 - (except our moms, student loans, and lines of credit)
- Family Medicine Residents at the University of British Columbia
 - We do not claim to know everything about vaccines
- *There will be no personal attacks allowed



Information Resources

- Review Articles, Literature and Studies
- News Articles
- WHO Data
- CDC Recommendations
- Medical Professional Consensus

Outline/Objectives

- Why the Fuss?
 - The local impact of Vaccinations
- History of Vaccinations/Immunizations
- What is a Vaccine?
- Why get Vaccinated?
 - What are the Benefits?
 - **Break – 5-10 minutes**
- FAQ
- Reasons to not Immunize

Why the Fuss?

- March 19, 2014
- Measles outbreak at a school in Chilliwack, BC
- 4 weeks later ~ 375 - 400 fallen ill
 - Average age 11 years old
 - 70% of 2 year olds in Chilliwack vaccinated, some groups have 0%
- December 16, 2014
- Mumps outbreak in the NHL
 - 14+ players and referees infected
 - Including Sidney Crosby
- December 2014
- Disneyland measles outbreak

Sidney Crosby

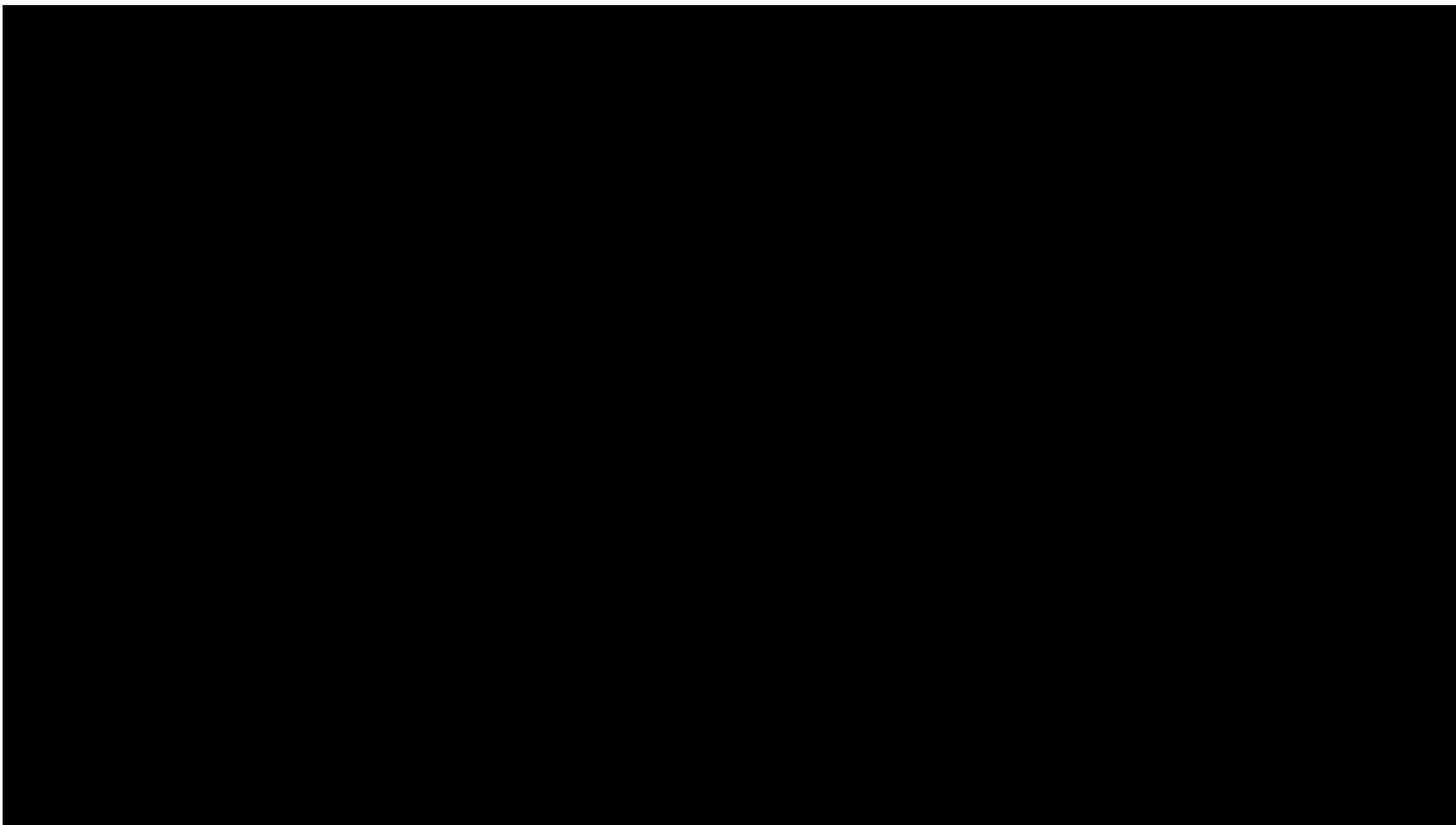


Fraser Valley Outbreaks

- 2014 Measles 375+ cases
 - 2013 Measles 12-17 cases
 - 2012 Whooping cough 250 cases
 - 2011 Mumps 190 cases
 - 2008 Mumps 200 cases
-
- *Numbers obtained from various news sources



History of Vaccines



History of Vaccination

- 1796 Edward Jenner had an idea...
- He noticed that milk maids (with frequent exposure to Cowpox) rarely suffered from Smallpox, a very deadly disease of the time
- To test this idea he gave an eight year old boy pus from a cowpox pustule
- This seemed to work and he expanded his technique to other children

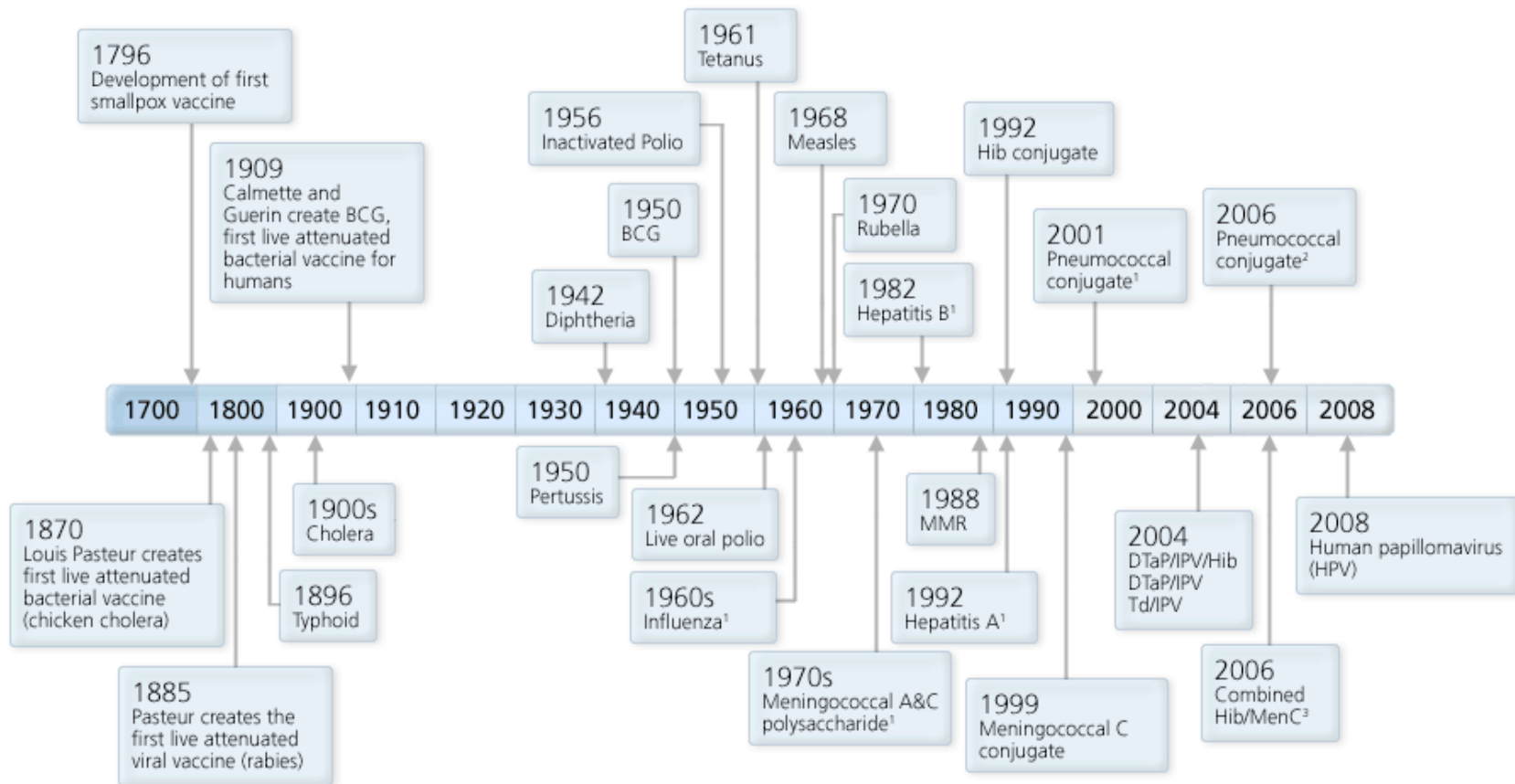


Smallpox



Timeline of Vaccines

Historical vaccine developments and introduction of vaccines in the UK



¹ For the immunisation of at-risk groups

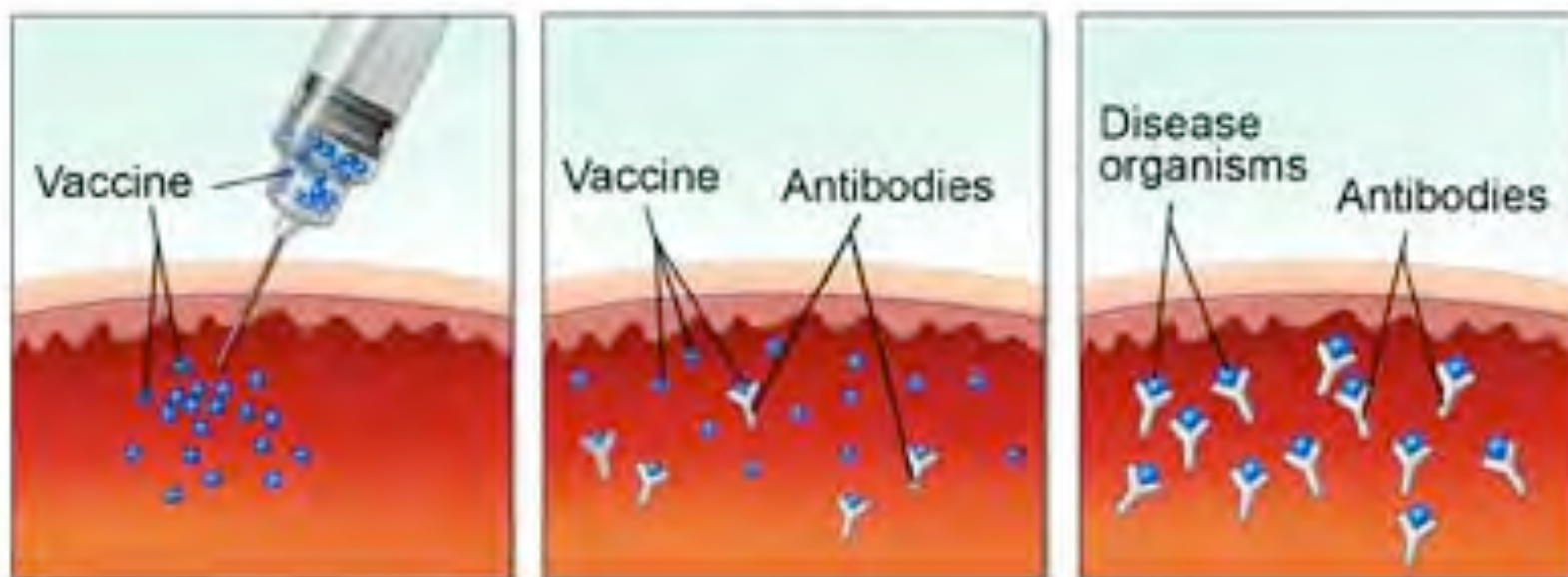
² For routine use in children under 2

³ As a booster in the second year of life

What is a Vaccine

- Small parts of a disease (not enough to get sick) that allows one's body (immune system) to train and **prevent future illness**
- The **antibodies** created by the vaccine/immune system interaction are then stored in the immune system's memory
- Therefore vaccination leads to immunization

Vaccine Immunity



What is a Vaccine

- Types:
 - Live (attenuated)
 - Inactivated (killed)
 - Inactivated toxin (toxoid)
 - Subunit (conjugate)
 - DNA

What is a Vaccine

- Routes:
 - Injected (MMR) vs Oral (Oral Polio Vaccine) vs Nasal Spray (Influenza)
- It's not all about needles!

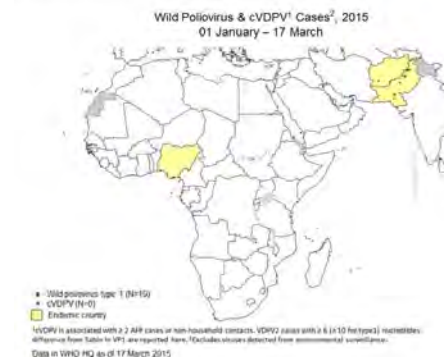
BC Vaccinations

- British Columbia offers a number of vaccinations to a wide variety of diseases (some that fortunately you have not heard too much about!):
- Diphtheria, pertussis, tetanus, polio, Haemophilus influenzae b, hepatitis A, hepatitis B, meningococcal disease, pneumococcal disease, measles, mumps, rubella, chickenpox, influenza, HPV, rotavirus and rabies for post-exposure prevention
- Many other vaccinations exist for other illnesses including: Japanese encephalitis, yellow fever, smallpox, anthrax, and shingles

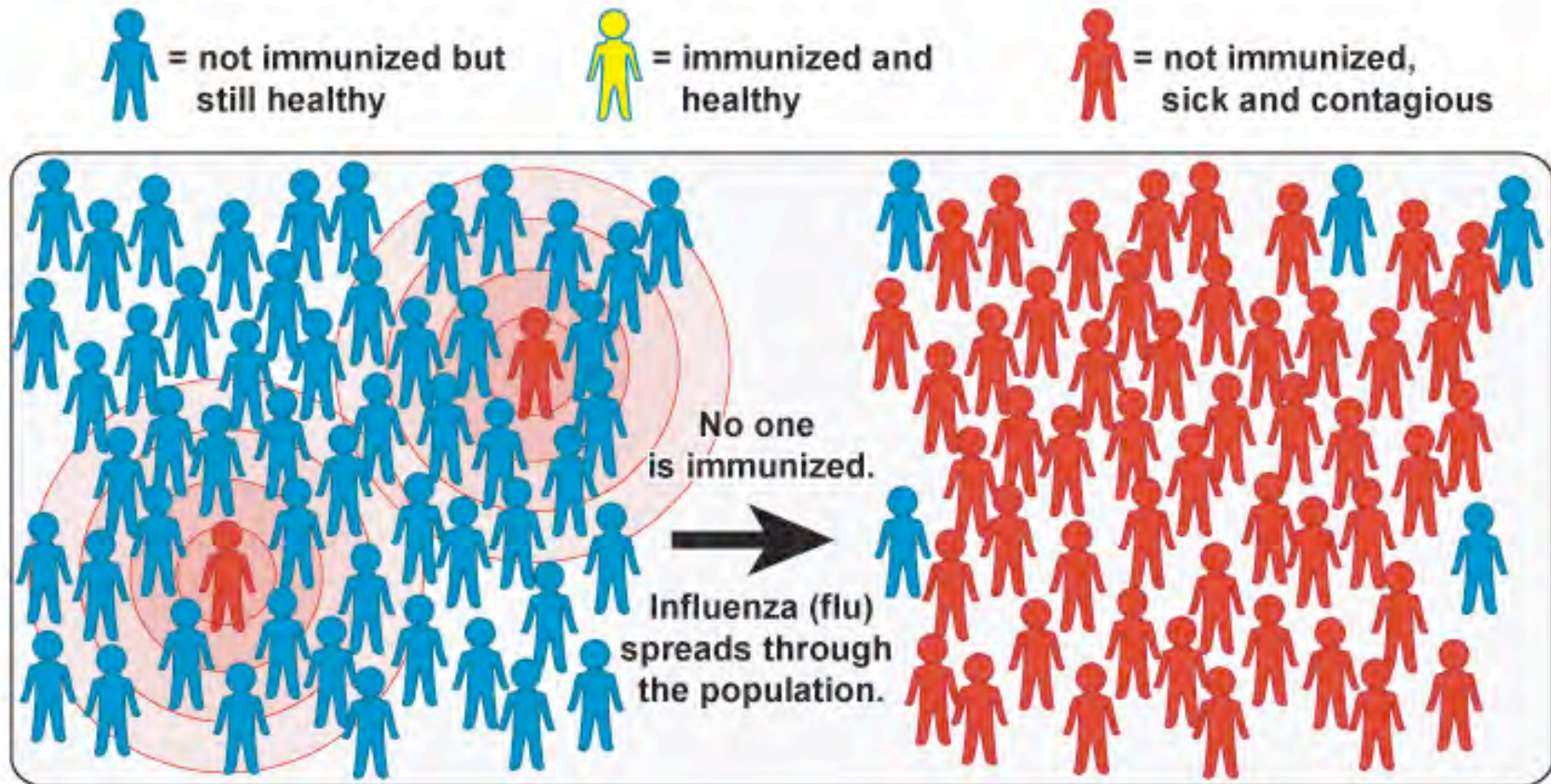
Why Get Vaccinated


- Prevent significant disease – Pneumonia, meningitis, liver cancer, blood stream infections and even death
- Herd Immunity – It's all our responsibility to each other
 - Immunocompromised, allergies to vaccine, next generations
- We have the potential to eradicate diseases – ie: Small pox, near eradication of polio (Afghanistan, Nigeria, Pakistan endemics), diphtheria


Polio cases in the world in 2014




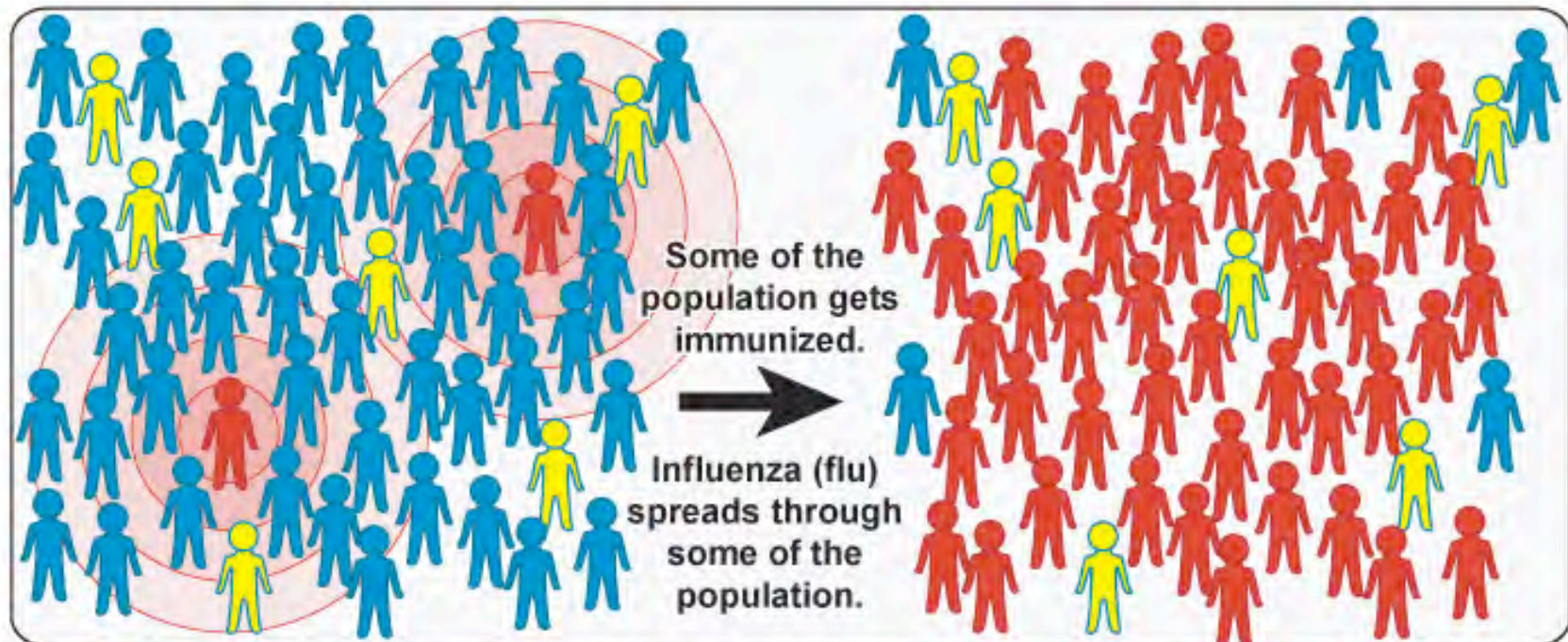
Herd Immunity



 = not immunized but still healthy

 = immunized and healthy

 = not immunized, sick and contagious





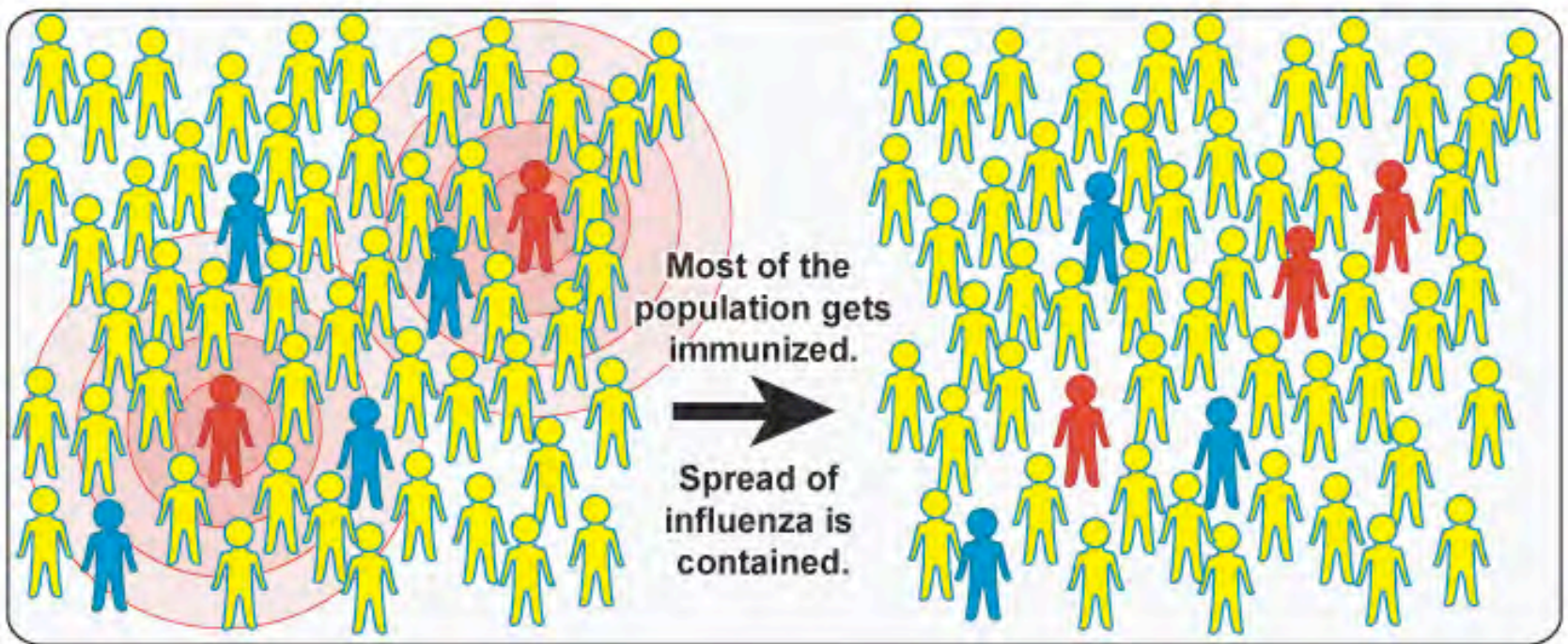
= not immunized but still healthy






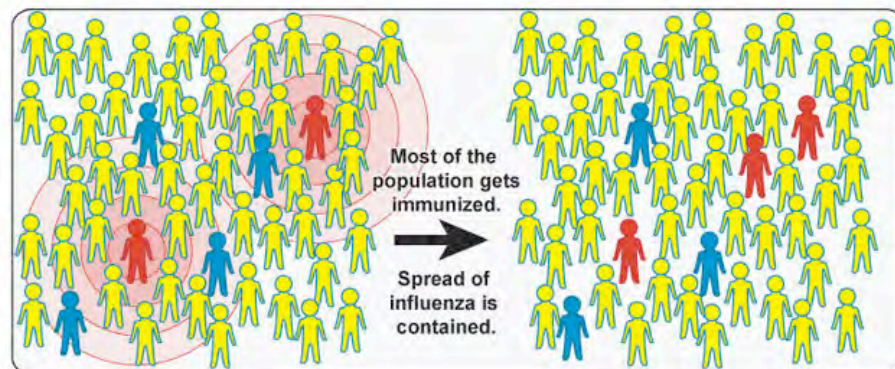
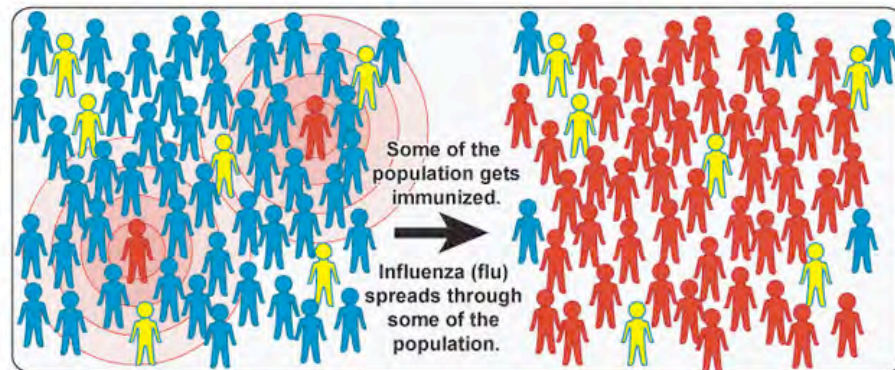
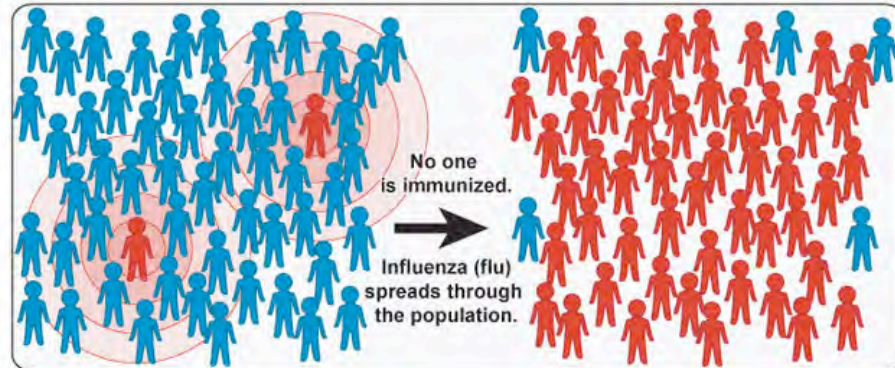
= immunized and healthy



= not immunized, sick and contagious



 = not immunized but still healthy  = immunized and healthy  = not immunized, sick and contagious





Questions up to this point?



Break – 10 minutes

Frequent Reasons Not to Immunize



1. Too Busy/ Forgetting

Obtained from
Healthlinkbc.ca

| Routine Immunization Schedule | | | | | | | | | | | |
|---|-------------|-------------|------------------------------------|--------------|--|---|------------------|------------|------------------------|-------------------------|-------------------------|
| Age Group → Vaccine ↓ | 2 Months | 4 Months | 6 Months | 12 Months | 18 Months | Starting at 4 Years of Age (Kindergarten Entry) | Grade 6 | Grade 9 | Adult | 65 Years and Over | High Risk Program |
| Diphtheria, Tetanus, Pertussis, Hepatitis B, Polio, and Haemophilus Influenzae type b (DTaP-HB-IPV-Hib) Vaccine | ✓ | ✓ | ✓ | | | | | | | | |
| Diphtheria, Tetanus, Pertussis, Polio, Haemophilus Influenzae Type b (DTaP-IPV-Hib) Vaccine | | | | | ✓ | | | | | | |
| Pneumococcal Conjugate (PCV 13) Vaccine | ✓ | ✓ | | ✓ | | | | | | | ✓ * |
| Rotavirus Vaccine | ✓ | ✓ | | | | | | | | | |
| Hepatitis A Vaccine [a] | | | ✓ Aboriginal infants only | | ✓ Aboriginal infants only | ✓ Aboriginal children not previously immunized | | | | | ✓ * |
| Hepatitis B Vaccine [b] | | | | | | | ✓ If eligible | | ✓ If eligible | | ✓ * |
| Measles, Mumps, Rubella (MMR) Vaccine [c] | | | | ✓ | | | | | ✓ If susceptible | | |
| Meningococcal C Conjugate (Men-C) Vaccine [d] | ✓ | | | ✓ | | | ✓ | | ✓ If eligible | | ✓ * |
| Chickenpox (Varicella) Vaccine [e] | | | | ✓ | | | ✓ If eligible | | ✓ If susceptible | | |
| Measles, Mumps, Rubella and Varicella (MMRV) Vaccine [e] | | | | | | ✓ | | | | | |
| Human Papillomavirus (HPV) Vaccine [f] | | | | | | | ✓ | | | | |
| Diphtheria, Tetanus, Pertussis, Polio (DTaP- IPV) Vaccine | | | | | | ✓ | | | | | |
| Tetanus, Diphtheria, Pertussis (Tdap) Vaccine | | | | | | | | ✓ | ✓ | | ✓ * |
| Tetanus and Diphtheria (Td) Vaccine [g] | | | | | | | | | ✓ Every 10 years | ✓ Every 10 years | |
| Inactivated Influenza (Flu) Vaccine [h] | | | | | | | | | | | |
| Live Attenuated influenza (Flu) Vaccine [h] | | | | | ✓ Annually for infants 6 months to 4 years of age | | | | | ✓ Annually | ✓ * Annually |
| Pneumococcal Polysaccharide Vaccine | | | | | | | | | | ✓ 1 time only | ✓ * |

1. Too Busy/Forgetting

- Apps are available to remind you when your child needs immunizations

- www.immunize.ca



- Personalized Immunization Schedules

- Download to calendar
- www.Immunizebc.ca





2. Vaccines are Unsafe

- **A. Reactions**
- **B. Autism**
- **C. Ingredients in vaccines**

A. Reactions

- As with any medical intervention there is a risk of unintended reactions or side effects
- Reactions and side effects will slightly vary depending on the vaccination given

A. Reactions

- Common reactions include:
 - Rash
 - Local Redness
 - Soreness
 - Headache
 - Fever
- Moderate reactions include:
 - MMR: joint pain (up to) 1 in 4
 - DTaP: seizure 1 in 14,000, Fever $>40^{\circ}\text{C}$, 1 in 16,000

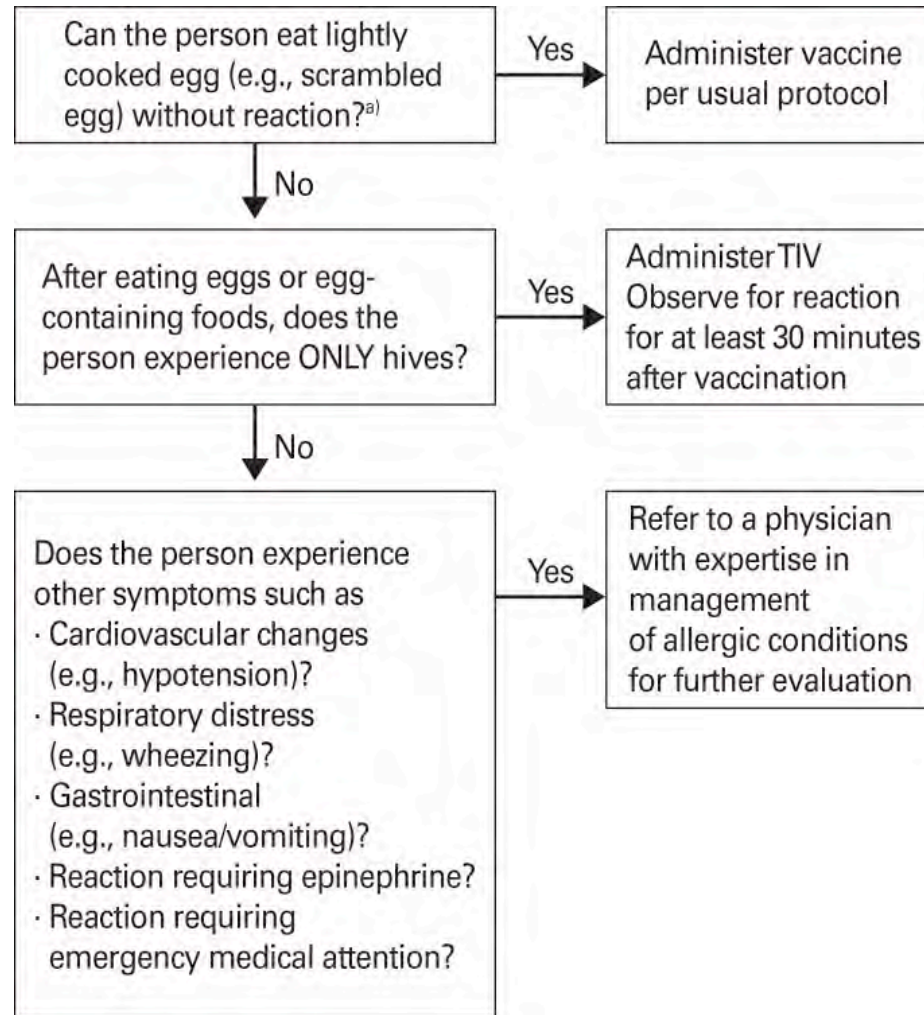
A. Reactions

- Some more serious reactions include:
- Hep B:
 - Severe allergic reaction about 1 in 1,100,000
- MMR:
 - Brain injury or allergic anaphylaxis at less than 1 in 1,000,000
- Overall vaccinations are very safe
- Serious complications are extremely rare
- In perspective, the annual risk of death in a motor vehicle accident is 1 in 10,000 (Canada)

A. Reactions

- What about Guillain-Barré syndrome (GBS)?
- GBS is a neurological disorder that at one time was linked to vaccines
- In 1976 the swine flu vaccine did carry a 1 in 100,000 risk of GBS
- Now there is no increased risk of GBS through vaccination
 - The background rate of GBS in the US is 3,000-6,000 a year

A. Reactions



B. Autism



B. Autism

- In 1998 Dr. Andrew Wakefield published a study suggesting a link between autism and vaccinations
- Certain media and celebrities used this as proof for 'antivax' campaigns
- Unfortunately this led to a lot of confusion for families struggling to find answers to autism

B. Autism

- **Paper Retracted:**
- ‘In a statement published on Feb. 2 (2010), the British medical journal said that it is now clear that “**several elements**” of a 1998 paper it published by Dr. Andrew Wakefield and his colleagues (*Lancet* 1998;351[9103]:637–41) “**are incorrect**, contrary to the findings of an earlier investigation.” .
 - Canadian Medical Journal 2010
- The Wakefield study:
 - Was case based around 12 children
 - A 2012 a meta-analysis using 14,700,000 million children showed no link
 - The original study was not based on statistics and did not have control group

C. Ingredients

Thimerosal

Only in some influenza (multidose vials)
Mercury containing preservative

Formaldehyde

Natural breakdown product in our bodies

Aluminum

Found in a number of sources
(breast milk, formula)

Aborted Fetal Tissue

Cell lines are used to grow the vaccine

Do you know what's in a vaccine?

Aluminum

Implicated as a cause of brain damage, suspected factor in **ALZHEIMER'S DISEASE**, dementia, seizures and comas. Allergic can occur on the skin.¹

Ammonium Sulfate [salt]

Suspected gastrointestinal, liver, nerve and respiratory system **POISON**.

Beta-Propiolactone

Known to cause **CANCER**. Suspected gastrointestinal, liver, nerve and respiratory, skin and sense organ **POISON**.

Gelatin

Produced from selected pieces of calf and cattle skins, de-mineralized cattle bones and pork skin. **ALLERGIC** reactions have been reported.¹

Gentamicin Sulfate and Polymyxin B [antibiotics]

ALLERGIC reactions can range from mild to life threatening.¹

Genetically Modified Yeast, Animal, Bacterial and Viral DNA

Can be incorporated into the recipient's DNA and cause unknown **GENETIC MUTATIONS**.

Glutaraldehyde

Poisonous if ingested. Causes **BIRTH DEFECTS** in experimental animals.

Formaldehyde [formalin]

Major constituent of embalming fluid; poisonous if ingested. Probable carcinogen; suspected gastrointestinal, liver, respiratory, immune, nerve and reproductive system **POISON**.

Human and Animal Cells

Human cells from aborted **FETAL TISSUE** and human albumin. Pig blood, horse blood, rabbit brain, guinea pig, dog kidney, cow heart, monkey kidney, chick embryo, chicken egg, duck egg, calf serum, sheep blood and others.



Latex Rubber

Can cause life-threatening allergic reactions.¹

Mercury [thimerosal]

One of the most poisonous substances known. Has an affinity for the brain, gut, liver, bone marrow and kidneys. Minute amounts can cause nerve damage. Symptoms of mercury toxicity are similar to those of **AUTISM**.

Micro-Organisms

Dead and alive **VIRI AND BACTERIA** or their toxins. The polio vaccine was contaminated with a monkey virus, now turning up in human bone, lung lining (mesothelioma), brain tumors and lymphomas.

Monosodium Glutamate [MSG | glutamate | glutamate acid]

A **NEUROTOXIN** that's being studied for mutagenic, teratogenic (developmental and monstrosities) and reproductive effects. Allergic reactions can range from mild to severe.¹

Neomycin Sulfate [antibiotic]

Interferes with vitamin B6 absorption. An error in the uptake of B6 can cause a rare form of epilepsy and mental retardation. **ALLERGIC REACTIONS** can range from mild to life threatening.¹

Phenol | Phenoxyethanol [2-PE]

Used as anti-freeze. **TOXIC** to all cells and capable of disabling the immune system's primary response mechanism.

Polysorbate 80

Known to cause **CANCER** in animals.

Tri (n) Butylphosphate

Suspected kidney and nerve **POISON**.

¹ *When babies are hours or days old it is impossible to know if they have an allergy.*

A major cause of the Roman Empire's decline, after six centuries of world dominance was its replacement of stone aqueducts by lead pipes for the transport and supply of drinking water. Roman engineers, the best in the world, turned their fellow citizens into neurological cripples. Today our own "best and brightest," with the best of intentions, achieve the same end through childhood vaccination programs yielding the modern scourges of hyperactivity, learning disabilities, autism, appetite disorders, and impulsive violence. — Harris L. Coulter, Ph.D.

3. 'I'm not going to get sick anyways'

- *It's much like bailing out a boat with a slow leak. When we started bailing, the boat was filled with water. But we have been bailing 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. Before long we'd notice a little water seeping in, and soon it might be back up to the same level as when we started –*
CDC
 - We can stop this “leak” with immunizations
- **Japan reduced pertussis vaccinations, and an epidemic occurred.**
 - 1974, Japan nearly 80% of Japanese children were vaccinated.
 - **393** cases of pertussis were reported in the entire country, and there were **0** deaths from pertussis.
 - Rumors surfaced that pertussis vaccine was not needed and unsafe.
 - 1976 only 10% of infants were getting vaccinated.
 - 1979 Japan suffered a major pertussis epidemic - more than **13,000** cases of whooping cough and **41** deaths.
 - 1981 started vaccinating with acellular pertussis vaccine - the number of pertussis cases dropped again.
- We live in connected world where you can be exposed in one continent and bring it back (Ebola)

3. 'I'm not going to get sick anyways'

- **Passively** wait for disease that may not affect you or **Actively** engage with immunization, which has the possibility of side effects
- The idea of immunization as a preventative action:
 - Taking an active role in preventing illness as opposed to passively reacting to illness with treatment (medications etc.)
- This point of view actually relies on the benefits provided by **herd immunity**

4. Too Young

- Newborns are protected by their mother's antibodies, but only for a few months
 - Exposed to numerous bacteria and viruses on a daily basis
 - 1000's of germs and antigens in the food/environment/hands/objects



THINKSTOCK

4. Too Young

- Newborns are protected by their mother's antibodies, but only for a few months
 - Exposed to numerous bacteria and viruses on a daily basis
 - 1000's of germs and antigens in the food/environment/hands/objects
- Children most vulnerable to certain diseases. If not vaccinated and exposed to a disease, they may not be strong enough to fight the full disease.
 - They are able to respond to a weakened and killed infectious agent (antigen) in vaccines
- Most young children do not have maternal immunity to diphtheria, whooping cough, polio, tetanus, hepatitis B, or Hib
- No evidence suggests that the recommended childhood vaccines can “overload” the immune system
- Ie: A common cold can expose a child to at least 4 to 10 antigens, while exposure to “strep throat” is about 25 to 50 antigens (*entire vaccine schedule now exposes children to 50 antigens total)

5. Religious / Cultural Views

- **Everyone is entitled to their own beliefs and we respect this*
- Many religions have adopted a pro-immunization/neutral stance towards immunizations.
- However, some Dutch Reform communities continue to not vaccinate***
 - Ongoing outbreaks in the Netherlands, which is where the Chilliwack outbreak originated.
 - 2,600 in the Netherlands had measles, 182 hospitalized, 1 death

6. “Big Pharma”

- \$\$\$
- Can't be trusted
 - Merck MMR Vaccine
 - 2010 – falsified data on efficacy, as outbreaks began, and they linked this to be the cause of measles outbreak – however, this shows that vaccines when produced well are effective.
- Soulless
- They “pay-off” doctors



7. Not all vaccines are created equal



7. Not all vaccines are created equal

- Every vaccination is as unique as is its disease counterpart
- Some vaccines aren't as effective as others
 - The Influenza virus changes shape each year making it rather difficult to create a vaccine that is completely effective
 - The Shingles vaccine has an efficacy of ~67%
 - The number needed to treat (in order to prevent 1 case) is 60
- Some vaccines will require multiple boosters (DTaP)
 - Your immune system takes time to generate an appropriate response

Summary

- Vaccines do carry a small risk; however the benefits far outweigh the harms
- Nationally we are doing a good job with immunizations, but there is still room for improvement locally
- All vaccines are not created equal but we encourage you to have a discussion with your healthcare provider
- When researching this topic be sure to use appropriate sources – we would be happy to provide one*

Thank you!





Questions?

Sources

- 1) <http://ed.ted.com/lessons/how-do-vaccines-work-kelwalin-dhanasarnsombut>
- 2) bbc.co.uk
- 3) historyofvaccines.org
- 4) <http://www.msn.com/en-ca/news/canada/the-real-vaccine-scandal/ar-AA9gZKv>
- 5) <http://www.cdc.gov/vaccines/vac-gen/side-effects.htm>
- 6) http://en.wikipedia.org/wiki/Herd_immunity
- 7) <http://www.cbc.ca/news/health/nhl-mumps-outbreak-7-big-questions-answered-1.2873761>
- 8) <http://darwin.wcupa.edu/beneski/bio-515/f11/miller/Main/HistoryOfVaccines?p=3>
- 9) <http://www.vaclib.org/toc.htm#ingredients>
- 10) Taylor LE, Swerdfeger AL, Eslick GD. Vaccines are not associated with autism: An evidence-based meta-analysis of case-control and cohort studies. *Vaccine*. 2014 June;32(29):3623–3629.
- 11) DeStefano F, Price CS, Weintraub ES. Increasing exposure to antibody stimulating proteins and polysaccharides in vaccines is not associated with risk of autism. *J Pediatr*. 2013 Aug;163(2):561-7. Epub 2013 Mar 30

Resources

- 12) <http://www.med.umich.edu/opm/newspage/2007/paintings.htm>
- 13) <http://www.viewzone.com/smallpox.html>
- 14) http://www.riversideonline.com/health_reference/Infectious-Disease/ID00023.cfm?&RenderForPrint=1
- 15) *BMJ* 2007; 334 doi: <http://dx.doi.org/10.1136/bmj.39097.611806.DB>
(Published 18 January 2007) Cite this as: *BMJ* 2007;334:111
- 16) <http://www.jpeds.com/content/JPEDSDeStefano>
- 17) <http://www.bccdc.ca/imm-vac/VaccinesBC/default.htm>
- 18) <http://www.hdwallpapersinn.com/cute-baby-boy-hd-wallpapers.html>
- 19) Chung EH. Vaccine allergies. *Clin Exp Vaccine Res.* 2014 Jan;3(1):50-7. Epub 2013 Dec 18. Review.
- 20) Haber P, Sejvar J, Mikaeloff Y, DeStefano F. Vaccines and Guillain-Barré syndrome. *Drug Saf.* 2009;32(4):309-23.
- 21) <http://www.lebook.com/lacreative/creative/sanofi-aventis-zostavax-advertising-2009>
- 22) Laura Eggertson Lancet retracts 12-year-old article linking autism to MMR vaccines. *CMAJ.* 2010
- 23) <http://www.medicaldaily.com/history-autism-and-vaccines-how-one-man-unraveled-worlds-faith-vaccinations-294474>

And more Sources

- 24) <http://www.msn.com/en-ca/news/canada/the-real-vaccine-scandal/ar-AA9gZKv>
(Chilliwack Outbreak)
- 25) <http://www.cbc.ca/sports/hockey/nhl/sidney-crosby-diagnosed-with-mumps-1.2872807>
(NHL Stats)
- 26) http://apps.who.int/immunization_monitoring/globalsummary/coverages?c=CAN
- 27) http://apps.who.int/immunization_monitoring/globalsummary/incidences?c=CAN
- 28) <http://www.bcd.ie/portfolio.php>
- 29) http://www.thedailybeast.com/articles/2015/02/21/big-pharma-is-america-s-new-mafia.html?google_editors_picks=true
- 30) Grabenstein, J.D. What the World's religions teach, applied to vaccines and immune globulin. 2013. Vaccine 31; 2011-2023.
- 31) <http://www.healthlinkbc.ca/toolsvideos/immunization/#schedule>
- 32) <https://biosil.wordpress.com/2013/09/05/neurosurgeon-speaks-out-on-how-vaccines-harm-child-brain-development/>
- 33) <http://www.polioeradication.org/Dataandmonitoring.aspx>
- 34) <http://www.thespeciallife.com/autism-and-immunizations-opinions.html#axzz3VB3PiA9h>
- 35) <http://www.babycorner.in/parents-checklist/paying-attention-to-what-your-kids-are-swallowing/>

Advances in Health

- Vaccines are frequently listed among the greatest advances of modern medicine:
- Noted in an ABC news article '**10 Health Advances That Changed the World**' 2007
-
- And Vaccinations were ranked as the **4th greatest medical advance since 1840** by a British Medical Journal Survey in 2007