VACCINATIONS AND IBD

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Ten Great Public Health Achievements-United States 1900-1999

• Vaccination
• Motor-vehicle safety
• Safer workplaces
• Control of infectious diseases
• Decline in deaths from coronary heart disease and stroke
• Safer and healthier foods
• Healthier mothers and babies
• Family planning
• Fluoridation of drinking water
• Recognition of tobacco use as health hazard
## Comparison of 20th Century Annual Morbidity and Current Morbidity

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity</th>
<th>2010 Morbidity</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>175,885</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Measles</td>
<td>503,282</td>
<td>61</td>
<td>99.9%</td>
</tr>
<tr>
<td>Mumps</td>
<td>152,209</td>
<td>2528</td>
<td>98%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>147,271</td>
<td>21,291</td>
<td>89%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>6</td>
<td>99.9%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>823</td>
<td>7</td>
<td>99.1%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>1,314</td>
<td>8</td>
<td>99%</td>
</tr>
<tr>
<td>H. influenzae, type b and unknown (&lt;5 yrs)</td>
<td>20,000</td>
<td>270</td>
<td>99.1%</td>
</tr>
</tbody>
</table>

Source: CDC

## Introduction of New Vaccines, Jenner to the Present Day

![Graph showing the introduction of new vaccines from 1796 to 2000](chart.png)

- **1796**: Smallpox
- **1800-1920**: Rabies, Typhoid, Cholera, Plague, Diphtheria toxin
- **1920-1960**: Diphtheria toxin, BCG (Tuberculosis), Pertussis, Tetanus toxoid, Yellow Fever, Influenza, Polio
- **1960-1990**: Measles, Mumps, Rubella, Adenovirus, Pneumococcal, Meningococcal C, A, Hepatitis B, Rabies, HCCV
True: Vaccines are Not Without Risk
• No vaccine is 100% safe
• No vaccine is 100% effective
• All vaccines have possible side effects, most mild, rarely severe
• The risk of disease far outweighs the risk of vaccine

False: Avoiding Vaccines Would Be "Safer"
• By choosing not to vaccinate one takes on the risk of disease
• Both vaccinating and not vaccinating carry risks
• Children unvaccinated against measles are 35 times more likely than immunized children to catch the disease

Salmon DA. Health consequences of religious and philosophical exemptions from immunization laws. JAMA 1999
Temporal Associations Between Vaccinations and Serious Illnesses Cause Public Concern

- Arthritis
- Asthma
- ADD
- Autism
- Brain Damage
- Cancer
- Chronic Fatigue Syndrome
- Diabetes
- Gulf War Syndrome
- Infantile Spasms
- Inflammatory Bowel Disease
- Multiple Sclerosis
- Neuroimmune Dysfunction
- Sudden Infant Death Syndrome
Temporal vs. Causal Associations: Is Sequence Consequence?

A
Exposure
(Vaccine, Drug, Diet, Occupation Others)?

B
Time

Direct and only cause?
One of multiple potential causes?
Co-factor/indirect cause, trigger?
Coincidental?

From: Pless, CDC

MMR AND IBD

Fig. 1. Measles notifications in England and Wales 1940–1990 and incidence of Crohn’s disease reported from South Wales ( ), Derby ( ), and northeast Scotland ( ). (From ref. 36, © 1995 The Lancet Ltd. Used with permission.)
STANDARDIZED INCIDENCE OF IBD IN CHILDREN <18y IN ONTARIO


MMR AND IBD

COMMENTARY

At this point in the story, things look relatively bleak for the hypothetical association between measles virus and Crohn’s disease, and even more so for a possible role for perinatal exposure to measles and Crohn’s disease. As was mentioned above, even the research growth with Cytomegalovirus, as causal factors. The detailed debate over the association between measles and IBD underscores the propensity to devote time and energy to hypotheses involving perinatal risk factors. To some extent, this fascination with perinatal risk is good, because it has the potential to improve the public health when genuine risks are identified and controlled. The measles debate should remind us, however, that the scientific method ought to be an inherently skeptical process, with avoidance of too rapid acceptance of tantalizing but unproven hypotheses.

Lionne and Scialli, Reproductive Toxicology 1997; 11:647-52.
MMR AND IBD

• Two large epidemiologic studies since 2000
  - USA – Vaccine Safety Data Link
  - UK – national emergency department usage

• No association with IBD
VACCINATION AND THE PERSON WITH IBD

The IBD Patient as “Immunocompromised”?  

- Evidence of defective mucosal immunity ✓
- Proof of a systemic immune defect ✗
- Risk Factors for Opportunistic Infection
  - “Inherent”
    - Age
    - Co-morbidity
    - Malnutrition ✓
  - “Acquired”
    - Immunomodulator and anti-TNF Therapy ✓
    - Pathogen exposure
    - Geographic Clustering
### REGULAR VACCINE SCHEDULE - ADULTS

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Dosing schedule (no record or unclear history of immunization)</th>
<th>Booster schedule (primary series completed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus and diphtheria given as Td; and pertussis given as Tdap</td>
<td>Doses 1 and 2, 4-8 weeks apart and dose 3 at 6-12 months later; one of the doses should be given as Tdap for pertussis protection</td>
<td>Td every 10 years; 1 dose should be given as Tdap if not previously given in adulthood</td>
</tr>
<tr>
<td>Measles, mumps and rubella given as MMR</td>
<td>1 dose for adults born in or after 1970 without a history of measles or those individuals without evidence of immunity to rubella or mumps; second dose for selected groups</td>
<td>Not routinely required</td>
</tr>
<tr>
<td>Varicella</td>
<td>Doses 1 and 2, at least 4 weeks apart for susceptible adults (no history of natural disease or seronegativity)</td>
<td>Not currently recommended</td>
</tr>
<tr>
<td>Zostavax (adults ≥50 years)</td>
<td></td>
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### SPECIAL SITUATIONS - ADULTS

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<thead>
<tr>
<th>Vaccine or toxoid</th>
<th>Indication</th>
<th>Schedule</th>
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<tr>
<td>Influenza</td>
<td>Adults ≥ 65 years; Adults &lt; 65 years at high risk of Influenza-related complications, their household contacts, health care workers, and all those wishing to be protected against influenza.</td>
<td>Every autumn using current recommended vaccine formulation</td>
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<tr>
<td>Pneumococcal polysaccharide</td>
<td>Adults ≥ 65 years; Adults &lt; 65 who have conditions putting them at increased risk of pneumococcal disease</td>
<td>1 dose</td>
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<tr>
<td>Hepatitis A</td>
<td>Occupational risk, life-style, travel and living in areas lacking adequate sanitation. Outbreak control, post-exposure immunoprophylaxis. Patients with chronic liver disease.</td>
<td>2 doses 6-12 months apart</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Occupational risk, life-style, post-exposure immunoprophylaxis. Patients with chronic liver disease.</td>
<td>3 doses at 0, 1 and 6 months</td>
</tr>
<tr>
<td>BCG</td>
<td>Rarely used. Consider for high-risk exposure in selected cases.</td>
<td>1 dose</td>
</tr>
<tr>
<td>Meningococcal conjugate</td>
<td>Young adults</td>
<td>1 dose</td>
</tr>
<tr>
<td>Meningococcal polysaccharide</td>
<td>High-risk exposure groups</td>
<td>1 dose</td>
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<th>Situation</th>
<th>Immunization</th>
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<tr>
<td>College freshmen, military recruits, children, travelers to Africa, people with a damaged spleen</td>
<td>Meningitis</td>
</tr>
<tr>
<td>Babies</td>
<td>Rotavirus*</td>
</tr>
<tr>
<td>Laboratory staff working with vaccinia or other orthopoxviruses</td>
<td>Smallpox*</td>
</tr>
<tr>
<td>Travel to Africa</td>
<td>Live typhoid*</td>
</tr>
<tr>
<td>Children and adults who have not had chickenpox</td>
<td>Varicella (chickenpox)*</td>
</tr>
<tr>
<td>Adults who are 60 or older</td>
<td>Varicella (shingles)*</td>
</tr>
<tr>
<td>Travel to areas with yellow fever</td>
<td>Yellow fever*</td>
</tr>
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</table>
LIVE VACCINES

• Examples of live attenuated vaccines:
  • MMR
  • Varicella (chickenpox and shingles)
  • Rotavirus
  • Yellow Fever
  • Oral Polio virus
  • Smallpox
  • Live-attenuated influenza vaccine (LAIV)
    • NASAL SPRAY not injection

TIMING OF LIVE VACCINES

• ECCO Guidelines:
  ▶ “If the medical history of chickenpox, shingles and VZV vaccination is negative, immunisation with VZV vaccine should be performed at least 3 weeks before onset of immunomodulator therapy, and preferably at diagnosis of IBD.”
  ▶ Immunosuppression includes high-dose prednisone (2 mg/kg/day or >20 mg/day in patients >10 kg)
  ▶ Discontinue immunosuppression >3 months prior to live-virus vaccine

NEWBORNS OF WOMEN WITH IBD

- Live virus vaccines safe if on prednisone, azathioprine/6-MP

- Infliximab & adalimumab:


PREGNANT WOMEN WITH IBD

NEWBORNS OF WOMEN WITH IBD

• Live virus vaccines safe if on prednisone, azathioprine/6-MP

• Infliximab & adalimumab:
  – Compatible with pregnancy in 1st and 2nd trimesters
  – Avoid in 3rd trimester – placental trans.
    – If given, avoid live viruses x6 mo. (***)
  – Compatible with breastfeeding


HPV VACCINE
HPV VACCINE – A FEW NOTES

- Women with IBD have higher risk of abnormal pap smears and cervical cancer
- Risk is increased if immunosuppressed
  - HPV Vaccine (Ceravix or Gardasil) recommended for all women 9-26 years old
  - Note: HPV also causes 25% of oral cancers, 35% head and neck cancers
  - HPV Vaccine (Gardasil) recommended for all boys 9-26 years old


INFLUENZA VACCINE
BACKGROUND

- Frequent immunosuppression in children with IBD (30-100%)
  
  Kappelman et al., Inflamm Bowel Dis 2007; 13:890-5.

- International clinical IBD guidelines and PHAC recommend influenza immunization

- Low uptake of influenza vaccine noted in IBD
  
  - 28% of American adults ever vaccinated
    Melmed et al., Am J Gastroenterol 2006; 101:1834-40.
  
  - 50% of Alberta children ever vaccinated
    deBruyn et al., Inflamm Bowel Dis 2012; 18:25-33.
  
  - 28% of German adults vaccinated in 2008
    Teich et al., Dtsch Arztebl Int 2011; 108:105-11.

- Case reports of IBD flare after inf. Immunization

  Fields et al., Inflamm Bowel Dis 2009; 15:649-51
  Kwon et al., Korean J Gastroenterol 2007; 49: 327-30
  Luca et al., Allergy 2004; 59: 367.

- 8-33% of patients don’t get immunized due to concern over adverse effects

  Melmed et al., Am J Gastroenterol 2006; 101:1834-40.
  deBruyn et al., Inflamm Bowel Dis 2012; 18:25-33.
  Teich et al., Dtsch Arztebl Int 2011; 108:105-11.

- Bruce Sands:
  
  - “Additional rigorous epidemiologic studies and randomized controlled trials are needed to determine the efficacy and risks of immunization in patients with IBD.”
Aims

- To determine:
  - Vaccine uptake rates in Ontario, Canada
  - Adverse events secondary to immunization

Flu Vaccine - Conclusions

- Influenza immunization is safe
- Might protect against IBD flare and/or IBD-related healthcare use
- Poor uptake of vaccine in Ontario children with IBD
- Future research:
  - Does influenza trigger IBD flare?
  - Does immunization protect against IBD flare?
  - Best method to increase uptake?
    - e.g. Vaccine clinics attached to IBD visits, SMS/email/social media reminders
VACCINES - CONCLUSIONS

- Immunization does not cause IBD
- Flu vaccine does not cause flare in IBD
- Vaccines are an important part of treatment of IBD
- Vaccine schedule is complex – consult your doctor!
- Avoid live virus vaccines if immunosuppressed:
  - Azathioprine/Imuran/6MP
  - Methotrexate
  - Infliximab
  - Adalimumab

Get immunized BEFORE going on these medications!

THANK YOU!

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