

Immunization Myths and Concerns

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Disclosure

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- Sanofi Pasteur- research grant, advisory board, speakers bureau

Objectives

- *Review concepts of vaccine hesitance and vaccine confidence*
- *Use specific vaccine scenarios to address response to hesitance and confidence concerns*
- *Identify vaccine hesitance in discussions with potential vaccine recipients*
- *Craft responses that address hesitance and confidence questions using evidence-based approaches*

What Is Vaccine Hesitance?

- Intent to skip or delay at least 1 of the vaccines recommended by the Advisory Committee on Immunization Practices (ACIP)
- Uncertainty as to whether a vaccine should be administered in accordance with the ACIP recommended immunization schedule
- Overarching question is... "will that vaccine hurt me or cause harm to those around me?"

What Is Vaccine Confidence?

- Vaccine confidence is trust in the:
 - Safety and efficacy of immunizations
 - Reliability and competence of the HCPs who recommend and administer vaccines
 - Motivations of policy makers who decide which immunizations are needed and when they should be administered
- Vaccine confidence increases the likelihood of our achieving and maintaining high immunization rates
- Overarching thought... "I trust that the vaccine is safe, but will it actually help me?"

Types of Vaccine-Hesitant Individuals

- Uninformed but educable
 - Want education to counter anti-vaccine information
- Misinformed but correctable
 - Need information about vaccine benefits
- Well-read and open-minded
 - Want to intelligently discuss pros and cons
- Strongly vaccine-hesitant
 - Willing to listen but not likely to change their mind right away
- Strong-willed and committed against vaccines
 - Want to sway the HCP to *their* line of thinking



The CASE Framework for Conversations about Vaccines

- Corroborate
 - Acknowledge the concern
 - Find some point on which you and the patient can agree
 - Set the tone for a respectful conversation
- About me
 - Talk about what you've done to enhance your knowledge and expertise (e.g., additional training, mentorship, continuing education or conference)
- Science
 - Describe what science has to say about the topic in question
- Explain and advise
 - Offer your recommendation, based on the evidence and the science

How to Broach the Topic of Vaccines With Patients

- Use a presumptive format (e.g., "Today, I want you to have a vaccine")
 - This approach presupposes that the patient will be immunized, thereby increasing the likelihood of vaccine acceptance
- Refrain from using a participatory format (e.g., "What do you want to do about vaccination today?")
 - This approach implies that choosing not to vaccinate is medically acceptable

Tips for Handling Vaccine Hesitance

- Take a (or another) deep breath
 - Listen to the patient
 - Identify *their* questions or problems
 - Make no assumptions
- Have a plan
 - What is your practice philosophy?
 - How will you handle the adult patient who refuses vaccines?
- Tailor your advice to each individual patient, based on his or her concerns

Tips for Handling Vaccine Hesitance (cont)

- Document your discussion
- Revisit the discussion at each subsequent visit
 - Inform the patient that you will be doing so
- For unimmunized or partially immunized patients, flag the chart for the benefit of yourself and other HCPs, in the event that those patients require sick visits
- Be direct, clear, and authoritative with respect to your office's philosophy and policy vis-à-vis a patient's ongoing refusal to vaccinate
 - Know the plan, and maintain a consistent approach within your practice
- Make sure you are able to separate hesitance from inability (\$\$\$)

Tips for Handling Vaccine Hesitance (cont)

- “Help me understand how you came to that decision”
- “Help me understand your reasons for feeling that way”
- “What is it about vaccines that worries you?”
- “Share with me what you’ve read”
- “Share with me what you’ve heard about getting 2 or more shots at once”

Concerns That Have Been Raised Regarding Vaccines

- “Overloading of the immune system”
- “Autism or other neurologic side effects”
- “Mercury exposure and brain damage”
- “Aluminum toxicity and brain damage”
- “Formaldehyde injection”

Debunking of the “Link” Between Vaccines and Neurologic Side Effects

- In 2010, *The Lancet* retracted the 1998 report alleging a link between vaccines and autism
 - Studies have demonstrated that no such link exists
- Vaccines are given at around the same time that autism becomes apparent; however, they do not cause autism
 - To explain the difference between causal and temporal relations, use the analogy of the rooster that crows every morning
 - The sun will rise whether or not the rooster crows
- Signs of autism in a child may predate a vaccination but not be noticed until after a particular vaccine has been given
- The increased number of vaccines recommended for children has *not* resulted in a higher prevalence of neurodevelopmental problems

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Safety of Thimerosal and Adjuvants in Vaccines

- Thimerosal: a mercury-containing preservative that helps prevent bacterial or fungal contamination in vaccines
 - No scientific evidence linking thimerosal with autism
 - Symptoms of mercury poisoning differ from those of autism
 - Measles, mumps, and rubella vaccine never contained thimerosal or any other form of mercury
 - As a precautionary measure, thimerosal was removed from nearly all vaccines (the exception being multidose vials) in 2001
 - Yet the incidence of neurodevelopmental problems has continued to rise
- Adjuvants: enhance the immune response
 - Safety is established as part of vaccine development, phased trials, and post-market surveillance

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Key Facts About Formaldehyde

- Used to inactivate:
 - Viruses that cause influenza and polio
 - Tetanus and diphtheria toxins
- Diluted during the manufacturing process
- Naturally occurring in all humans to synthesize thymidine, purines, and amino acids
 - Quantity of formaldehyde found in infant’s blood is 10-fold greater than that contained in any individual vaccine

Addressing Common Philosophical Objections to Vaccination

- “Too much, too soon?”
- “Natural disease provides better immunity”
- “Most of the vaccine-preventable diseases don’t even exist anymore”
- “My [fill in the blank] told me I did not need those vaccines”

“The Use of Fetal Cells in Vaccine Production is Immoral”

- Cell lines derived from aborted fetal lung tissue were used to develop vaccines against diseases such as hepatitis A, polio, rubella, and varicella
 - Some Catholics may refuse vaccination in order to express their strong opposition to abortion¹
 - Others may believe that vaccination involves some form of cooperation with abortion
- Bear in mind that the lung tissue for those cell lines was from 2 fetuses that were aborted during the 1960s
 - The cells used today are grown in culture
- The Vatican supports use of all vaccines available at this time
 - Administration of those vaccines is morally justified because they:
 - Avoid a serious risk
 - Provide for the good of children and all who come in contact with them
 - However, alternative vaccines should be used if and when they become available

References: 1. Furton E.J. *Ethics & Medics*. 1999;24(3):3-4. 2. Vatican Statement on Vaccines Derived from Aborted Human Fetuses. <http://bit.ly/11xmRb6>. Accessed April 28, 2014.

“The Use of Vaccines Containing Pork Gelatin is Wrong”

- Islam and Judaism accept vaccination
- According to Islamic legal scholars, it is permissible for observant Muslims to receive vaccines containing pork gelatin
- Jewish laws do allow receipt of non-oral products containing porcine ingredients

Institute for Vaccine Safety, Johns Hopkins Bloomberg School of Public Health. Religious Leaders Approval of Use of Vaccines Containing Porcine Gelatin. <http://www.vaccinesafety.edu/Porcine-vaccineapproval.htm>. Accessed April 28, 2014.

Vaccines of Interest: Influenza

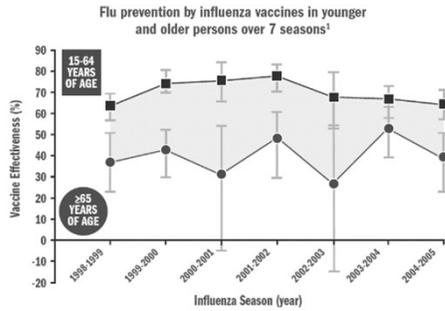
- How can we decrease hesitance and increase confidence?
- What are some approaches for ‘personalized vaccination’?

The Effect of Influenza and Influenza Vaccination on Cardiovascular Events and Complications From Diabetes

- A case-series analysis determined the risk of having a heart attack was 6x higher in the 7 days following a laboratory-confirmed influenza infection¹ N=364 acute myocardial infarction (AMI) hospitalizations. Incidence ratio: 6.05 (95% CI: 3.86-9.50). Age: ≥35 years
- During influenza epidemic weeks, the odds of death by AMI and of dying from chronic ischemic heart disease (IHD) increased² N=34,892; AMI: 1.30 (95% CI: 1.08-1.56); IHD: 1.10 (95% CI: 0.97-1.26). Age: 30-89 years
- A meta-analysis showed that estimates of the efficacy of influenza vaccine in AMI range from 15% to 45%³ Smoking cessation: 32%-43%; statins: 19%-30%; antihypertensive drugs: 17%-25%
- In patients with type 2 diabetes, influenza vaccination was associated with significant reductions in admission rates for stroke (30%), heart failure (22%), pneumonia or influenza (15%), and all-cause death (24%)⁴ N=124,503 (UK). Age: ≥18 years

References: 1. Kwong JC, et al. *N Engl J Med*. 2010;378(4):345-353. 2. Madjid M, et al. *Eur Heart J*. 2007;28(10):1205-1210. 3. MacIntyre CR, et al. *Heart*. 2016;102(24):1953-1958. 4. Vamos EP, et al. *CMAJ*. 2016;188(14):E342-E351.

Declining Vaccine Effectiveness and Age



References: 1. Monto AS, et al. *Vaccine*. 2009;27(37):5043-5053. 2. LeGrand J, et al. *Vaccine*. 2006;24(44-46):6605-6611.

Vaccine Effectiveness and Age During Two Influenza Seasons



References: 1. Jackson ML, et al. *N Engl J Med*. 2017;377(6):534-543. 2. Ferdinands J. Poster presented at: Meeting of the Advisory Committee on Immunization Practices (ACIP); June 21, 2017; Atlanta, GA.

Fluzone High-Dose



- 60 mcg of HA per strain
- 180 mcg total HA per vaccine dose
- 4 times the amount of HA compared with Fluzone vaccine
- Single 0.5-mL dose for intramuscular injection
- Provided in prefilled syringes with gray plunger rod
- No preservative
- Not made with natural rubber latex

Fluzone High-Dose Efficacy

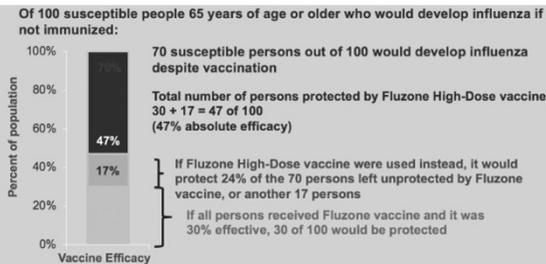
	Fluzone High-Dose Vaccine N=15,990 n (%)	Fluzone Vaccine N=15,993 n (%)	Relative Efficacy % (95% CI)
Primary Endpoint:	228 (1.4)	301 (1.9)	24.2 (9.7; 36.5)
Secondary Endpoint:	22 (0.1)	45 (0.3)	51.1 (16.8;72.0)

Primary Endpoint: Occurrence, at least 14 days post-vaccination, of lab-confirmed influenza caused by any viral type or subtype (regardless of similarity to vaccine components)*

Secondary Endpoint: Occurrence of culture-confirmed influenza caused by viral types/subtypes antigenically similar to those contained in the vaccine in association with a modified CDC-defined ILI

References: 1. DiazGranados CA, et al. *N Engl J Med*. 2014;371(7):635-645. 2. Fluzone High-Dose vaccine [Prescribing Information]. Swifwater, PA: Sanofi Pasteur Inc.

How Does 24% Relative Efficacy Translate to Absolute Efficacy

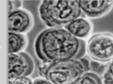


Recombinant Influenza Vaccine-Flublok

- First recombinant hemagglutinin (rHA) influenza vaccine
 Manufacturing process uses a baculovirus expression vector system instead of eggs to produce large quantities of HA for flu vaccine



Baculovirus engineered with the gene of interest (eg, hemagglutinin [HA])
 Baculoviruses are highly specific to *Spodoptera frugiperda* (fall armyworm)-positive cells (SF+)



Virus does not need to be adapted to grow in eggs
 SF+ cells infected with engineered virus
 Incubated for approximately 48 to 72 hours
 High yield of protein of interest generated (in this case, HA)



Protein (ie, HA) extracted and purified

Flublok

- Flublok Quadrivalent Vaccine contains 45µg rHA of each influenza vaccine strain in a 0.5-mL dose vs 15µg of HA per strain in standard-dose inactivated influenza vaccines
- Flublok (trivalent) vaccine was first approved in 2013 for use in adults 18–49 years of age
 - Licensure based on results of a randomized controlled efficacy trial
- Age indication expanded to include adults 50 years of age and older in 2014
 - Licensure granted based on supportive immunogenicity and safety data
- Flublok Quadrivalent vaccine approved in US in October 2016 for adults 18 years of age and older
 - Based on immunogenicity, safety, and efficacy data

Flublock Quadrivalent

- The only influenza vaccine proven to prevent more influenza disease in adults ≥50 years of age compared to a standard-dose quadrivalent inactivated influenza vaccine comparator
- No egg involved in production
- Recombinant process enables a more exact match between the vaccine and the seed virus

Current State of Influenza Vaccination Capabilities

- Standard quadrivalent, recombinant, high dose, intranasal mist
- Ability to 'match' vaccine to the individual patient and their underlying health conditions
- Why this match is important in preventing collateral damage involving comorbid conditions
- Can explain why vaccination is important even in mismatched years

WHAT we ARE afraid of	WHAT we SHOULD be afraid of
 28 attacks average/year	 4,500,000 bites average/year
 50 deaths by peanut allergy average/year	 27,531 deaths by poisoning average/year
 321 deaths by plane crash average/year	 34,017 deaths by car crash average/year

Myths

OBJECTION: The flu shot will give me the flu.
RESPONSE: It's impossible to get the flu from the flu shot. It is made with viruses that are not infectious or with no viruses at all. You can get the flu from someone else.

OBJECTION: I'm healthy. I don't need a shot.
RESPONSE: Every year, healthy people get sick from the flu, and some even die. Even with a mild case, you can still pass the virus along to the people you love and care about.

OBJECTION: I've never had the flu.
RESPONSE: Every year, up to 20% of Americans get the flu—that's up to 60 million people—many of whom have not had the flu before.

OBJECTION: The flu shot doesn't work.
RESPONSE: While effectiveness can vary by season, flu shots can reduce the risk of flu illness by 40-60% in well-matched years. Flu shots can also help reduce the risk of hospitalizations and other serious complications.

Scenarios

- A 53 year old Environmental Services worker is declining influenza immunization. She gives the following 'rationale':
 - I never get the flu
 - If I do, I will stay home and use my sick time
 - The flu shot doesn't work—CDC said only 30% effective
 - I go the flu shot once and it made my sick
 - I get enough shots with my diabetes

Scenarios

- A 27 year old Nurse is declining influenza immunization. She gives the following 'rationale':
 - I am too young to get the flu
 - If I get the flu shot, I might make my baby sick
 - My husband and I practice holistic medicine and we don't like foreign things injected in us-- like mercury
 - I can always wear a mask at work instead of getting the shot
