Best Practices: Immunization Strategies and Monitoring
Tracey Walsh-Chocolaad, PharmD, BCOP
Nebraska Medicine – The Nebraska Medical Center

Maurice Alexander, PharmD, BCOP, CPP
University of North Carolina Medical Center

Cathryn Jennissen, PharmD, BCOP
University of Minnesota Masonic Children’s Hospital

Immunization Strategies and Monitoring
Disclosures

• Tracey Walsh-Chocolaad – None
• Maurice Alexander – None
• Cathryn Jennissen - None

Immunization Strategies and Monitoring
Learning Objectives

• Identify clinical pearls that may be useful to consider when developing a vaccine schedule for patients post-hematopoietic stem cell transplantation (HCT)

• Explain important controversies surrounding vaccine administration post-HCT and devise strategies to individualize care
Immunization Strategies and Monitoring

Learning Objectives

• Describe perspectives on immunizations following adult HCT

• Describe perspectives on immunizations following pediatric HCT

Best Practices: Immunization Strategies and Monitoring

Clinical Pearls & Controversies

Tracey Walsh-Chocolaad, PharmD, BCOP
Clinical Pharmacist, Heme/Onc/BMT
Nebraska Medicine – The Nebraska Medical Center

Immunization Strategies and Monitoring

Overview

• Clinical pearls
  • Monitoring for reactions following administration
  • Interference with vaccine response
    — Administering vaccines together or spread out
    — Blood products
    — Medications

• Controversies
  • Thrombocytopenia or anticoagulation
  • Recent or current immunosuppressive therapy
Guidelines for Preventing Infectious Complications among Hematopoietic Cell Transplantation Recipients: A Global Perspective

Marco Tardón, Tan Chiller, Hermann Emans, Ronald Gass, Kent Sepkowitz, Jan Storek, John R. Whitley, Juárez H. Young, Michael A. Bach1


IDSA published a limited update in 2014

Immunization Strategies and Monitoring

U.S. Guidelines

Advisory Committee on Immunization Practices (ACIP)

• Task force appointed by the Centers for Disease Control and Prevention (CDC)
• 15 voting members
  • Medical and public health experts
• Recommendations based on scientific evidence and expert opinion
  • Approved by CDC and published in MMWR


Immunization Strategies and Monitoring

Clinical Pearls – Adverse Reactions

Do I need to monitor my patient for a reaction following vaccine administration?

Types of vaccine reactions

- Allergic
- Systemic
- Local
- Not 100% to all
Immunization Strategies and Monitoring

Clinical Pearls – Adverse Reactions

Syncope
- 80% occur within 15 minutes of vaccination
  - Sit or lie down during vaccination
  - Consider having patients wait (while sitting or lying) for 15 minutes following vaccination
    - At minimum for adolescents
    - Longer until symptoms resolve if patient feels dizzy or light headed after vaccination

Immunization Strategies and Monitoring

Clinical Pearls – Adverse Reactions

Febrile seizures
- Primarily in children 6 months – 5 years old
  - VZV vaccine - <1 in 1,000
  - MMR vaccine – 1 in 3,000
  - DTaP vaccine – 1 in 14,000
- Usually occur within 5-12 days of vaccination
- Prevention/Management
  - Acetaminophen? Requires use during entire period at risk
  - Minimize # of vaccines given at once? No evidence

Immunization Strategies and Monitoring

Clinical Pearls – Timing of Vaccines

Should I administer vaccines together or spread them out over multiple clinic visits?
- Most vaccines can be safely administered together while not interfering with efficacy
  - Avoids need for additional visits
  - Avoids risks of cancellations/non-compliance


DTaP=diphtheria/tetanus/acellular pertussis; MMR=measles/mumps/rubella; MMRV=MMR+varicella; VZV=varicella zoster virus

MacDonald SE, et al. CMAJ. 2014;186:824-9
Immunization Strategies and Monitoring

Clinical Pearls – Timing of Vaccines

• History of febrile seizures - Not predictive of future episodes
• Pediatric patients - Involve them in the decision
• Inactive Vaccines - Most can be administered simultaneously
  • Separate pneumococcal conjugate vaccine (PCV) and Menactra®, meningococcal (Groups A,C,Y & W-135) polysaccharide diphtheria toxoid conjugate vaccine, by at least 4 weeks1,2


Immunization Strategies and Monitoring

Clinical Pearls – Timing of Vaccines

Live vaccines – simultaneous administration1,3
• 3-fold higher risk of varicella disease when given MMR and VZV vaccines on different visits (but within 28 days)
• Administer live vaccines together or separate ≥ 4 weeks

Live vaccines and blood products4
• Passive antibodies interfere with response to live vaccines
• Administer live vaccines 2 weeks prior to blood products or after passive antibody has cleared (range, 3-11 months)


Immunization Strategies and Monitoring

Clinical Pearls – Timing of Vaccines

Live vaccines and antiviral therapy
• Antivirals (i.e. acyclovir) may interfere with response to VZV vaccine
  • Stop antiviral therapy ≥ 24 hours before vaccine administration
  • Do not resume antiviral therapy until at least 2 weeks after vaccine administration

ACIP Vaccine Recommendations, Special Situations.
Immunization Strategies and Monitoring

Controversies – Coagulation Disorders

My patient has thrombocytopenia or is on anticoagulation. Can I safely administer vaccines?

- Subcutaneous (SC) – yes
  - Live vaccines
- Intramuscular (IM) – controversial
  - Most inactivated vaccines
  - Adjuvant-containing

Immunization Strategies and Monitoring

Controversies - Coagulation Disorders

Vaccination – low platelets or anticoagulation

- Bleeding disorders (hemophilia, von Willebrand's)¹,²
  - Hepatitis B – IM only; 4% mild bruising¹
  - Hepatitis B – SC versus IM: similar efficacy, IM 2x more hematomas⁷
- Therapeutic anticoagulation³,⁴
  - Influenza – SC versus IM: similar efficacy and toxicity³
  - Influenza – IM caused no local symptoms, no bleeding⁸


Immunization Strategies and Monitoring

Controversies – Coagulation Disorders

Vaccination – low platelets or anticoagulation

- ACIP – Give IM if physician deems it is safe

- Additional recommendations
  - Fine-gauge needle (≥ 23), apply firm pressure for 2 minutes, do not rub site

ACIP Vaccine Recommendations.
**Immunization Strategies and Monitoring**

**Controversies - Immunosuppression**

How does recent or current immunosuppressive therapy impact response to vaccinations?

- Corticosteroids
- Rituximab
- Others
  - Adalimumab
  - Etanercept
  - Infliximab

<table>
<thead>
<tr>
<th>Corticosteroids post-HCT</th>
<th>Rituximab peri/post-HCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Post-HCT relapse</td>
<td>• Conditioning</td>
</tr>
<tr>
<td>• GVHD</td>
<td>• Post-HCT maintenance</td>
</tr>
<tr>
<td>• BOS</td>
<td>• Post-HCT relapse</td>
</tr>
<tr>
<td></td>
<td>• Chronic GVHD</td>
</tr>
<tr>
<td></td>
<td>• PTLD</td>
</tr>
</tbody>
</table>

*BOS=bronchiolitis obliterans syndrome; GVHD=graft-versus-host disease; HCT=hematopoietic cell transplantation; PTLD=post-transplant lymphoproliferative disorder*

**Immunization Strategies and Monitoring**

**Controversies – Corticosteroid Effect**

Vaccine trials in post-HCT recipients taking corticosteroids:

- Details lacking
  - Drug
  - Dose
  - Duration
- Correlations between immunosuppression and vaccine response inconsistent
Immunization Strategies and Monitoring

Continued – Corticosteroid Effect

CDC/ACIP – ok to administer LIVE vaccines to an otherwise immunocompetent person if corticosteroid therapy is:

• < 14 days duration
• < 20 mg/day or ≤ 2 mg/kg/day prednisone (or equivalent); maintenance, physiologic dose
• Alternate day treatment with short-acting steroids
• Route other than oral or intravenous
  ➔ Otherwise, delay LIVE vaccines ≥ 1 month


Immunization Strategies and Monitoring

Continued – Rituximab Effect

Rituximab effects on vaccine response

• Rheumatoid arthritis1 – trivalent influenza vaccine
  • <25% seroprotected (rituximab), 25-70% (methotrexate), 50-90% (healthy controls)
• Lymphoma2 – H1N1 influenza vaccine
  • 0% response (rituximab group) v 82% response (controls)
• Post-HCT
  • Pertussis response 0% in rituximab recipients3
  • PCV response 50% in children who received rituximab4


Immunization Strategies and Monitoring

Continued – Markers of Immunity

Consider measuring markers of immune competence prior to vaccination:

• B cell immunity
  • CD19+ cell # – “normal” range decreases with age
  • IgG > 500 mg/dL
  • Isohemagglutinin titer ≥ 1:8
• T cell immunity
  • CD4+ > 200 cells/μL
  • Phytohemagglutinin levels >50-75% LLN

Immunization Strategies and Monitoring

Audience Response Question #1

Syncope following vaccine administration is most common in what age group?

a. Young children < 5 years old
b. Adolescents and young adults

c. Middle aged adults
d. Elderly
e. Syncope is not a side effect of vaccine administration

Immunization Strategies and Monitoring

Audience Response Question #2

True/False: Corticosteroids only interfere with the response to LIVE vaccines. They have little impact on the response to inactivated vaccines.

a. True
b. False

Immunization Strategies and Monitoring

Conclusions

• Monitor for reactions for 15 minutes following vaccine administration in adolescents
• Consider products that interfere with vaccine response and adjust timing of vaccines accordingly
• Do not alter the U.S. FDA-approved route of vaccine administration unless the risk outweighs the benefit
• Avoid live vaccines in patients on extraphysiologic doses of corticosteroids or within 6 months of rituximab. Avoid inactive vaccines, except in cases of outbreaks
Best Practices: Immunization Strategies and Monitoring
Adult Perspectives

Maurice Alexander, PharmD, BCOP, CPP
Clinical Pharmacist Practitioner, Heme/Onc/BMT
University of North Carolina Medical Center

University of North Carolina BMT Program

- Staff
  - 7 Attending physicians
  - 6 Advanced Practice Professionals (NP/PA)
  - 3 Pharmacy FTEs
- Capacity
  - 16-bed inpatient unit
  - ~180 transplants per year
  - Outpatient Clinic
    — Pharmacy presence since 2010

UNC BMT Immunization Protocol

- Outlines:
  - Recommended vaccines
  - Recommended vaccine schedule
Immunization Screening Strategies

- Daily clinic huddle
  - Identification of patients scheduled for vaccines
- Review of clinic schedule
  - Post-transplant timing
  - Immune status
    - Post-transplant complications
    - Current or recent medications

Patient Screening and Assessment

High Risk Immunosuppression

<table>
<thead>
<tr>
<th>Steroid therapy</th>
<th>≥ 20 mg prednisone or equivalent x 14 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biologic immune modulators</td>
<td>Rituximab, TNF-α-inhibitors, IL-2 inhibitors</td>
</tr>
<tr>
<td>Active chemotherapy</td>
<td>2 weeks prior 3 months after</td>
</tr>
<tr>
<td>CD4 T-lymphocyte count</td>
<td>&lt;200 cells/mm³</td>
</tr>
</tbody>
</table>


Patient Screening and Assessment

- Acute illness
  - Vaccination not contraindicated: Mild illnesses (diarrhea, URI with or without low grade fever, other low-grade febrile illness)
  - Sufficient reason to postpone: moderate to severe acute illness
- Concerns
  - Superimposing adverse events of vaccine on underlying illness
  - Attributing symptoms of illness to vaccine

ACP Vaccine Recommendations, Contraindications and Precautions
Patient Screening and Assessment

Anti-infectives

<table>
<thead>
<tr>
<th>Antimicrobials</th>
<th>May interfere with response to oral typhoid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antivirals for Herpes Viruses</strong></td>
<td>May interfere with response to varicella-containing vaccines</td>
</tr>
<tr>
<td><strong>Antivirals for Influenza Virus</strong></td>
<td>May interfere with response to live attenuated influenza vaccine</td>
</tr>
</tbody>
</table>

ACIP Vaccine Recommendations, Special Situations.

---

Patient Screening and Assessment

Blood Products

<table>
<thead>
<tr>
<th>2 weeks prior</th>
<th>3-11 months after</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervals relevant for live vaccine administration only</td>
<td></td>
</tr>
</tbody>
</table>

**Thrombocytopenia**

| Platelets ≥ \(50 \times 10^9/L\) |
| Absence of bleeding complications |

**Anticoagulation**

| Platelets ≥ \(50 \times 10^9/L\) |
| Absence of bleeding complications |

ACIP Vaccine Recommendations, Spacing of Vaccines and Antibody-Containing Products.

---

Immunization Schedule

- Initiation of immunization series
  - 6 months post-transplant — influenza vaccine
  - 1 year post-transplant for other vaccines
- Timing considerations
  - Autologous vs. allogeneic patients
  - Early vs. late vaccination
  - Simplify screening efforts
- Together vs. separate
  - Each vaccine series administered together
**UNC Immunizations Policy**

<table>
<thead>
<tr>
<th>Vaccination</th>
<th>6 month</th>
<th>12 month</th>
<th>14 month</th>
<th>16 month</th>
<th>24 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hep B</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hib</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPV</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCV4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPSV23</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**DTaP** – Diphtheria and tetanus toxoids and acellular pertussis; Tdap – Tetanus toxoid, reduced dose diphtheria toxoid, and acellular pertussis; Hep B – Hepatitis B vaccine; Hib – Haemophilus influenzae B conjugate vaccine; IPV – Inactivated polio virus; PCV13 – Pneumococcal conjugate vaccine 13-valent; PPSV23 – Pneumococcal polysaccharide vaccine 23-valent; MMR – Measles, mumps, rubella

**Influenza**

Influenza Virus Inactivated Vaccine 0.5 mL intramuscularly – administer during flu season annually, beginning 6 months post cord cut

<table>
<thead>
<tr>
<th>Vaccination</th>
<th>12 month</th>
<th>14 month</th>
<th>16 month</th>
<th>24 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP, Hepatitis B and Inactivated Polio Vaccine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Haemophilus influenzae B conjugate vaccine**

<table>
<thead>
<tr>
<th>Vaccination</th>
<th>12 month</th>
<th>14 month</th>
<th>16 month</th>
<th>24 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCV13 – Pneumococcal conjugate vaccine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPSV23 – Pneumococcal polysaccharide vaccine 23-valent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR – Measles, Mumps, Rubella</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measles-Mumps-Rubella (MMR) Intramuscularly – live attenuated (***only to patients not on immunosuppressive therapy and without GVHD***)

<table>
<thead>
<tr>
<th>24 month</th>
</tr>
</thead>
</table>
Vaccine Monitoring

- Adverse events
  - Monitored in clinic after RN administration

- Antibody titers
  - Not routinely monitored
  - Lack of standard threshold for adequate response and subsequent revaccination
  - Vaccination timing

Donors and Household Contacts

- Donor vaccination
  - No standard donor vaccine program
  - Practical and ethical concerns

- Household contacts
  - No formal program
  - Recommend to all patients that family and close contacts follow recommended vaccine schedules

Successes and Challenges

- Screening efforts
  - Must commit to daily patient review
  - Opportunity for students and residents

- Immunization passport

- Billing and reimbursement
  - Reimbursement for pediatric vaccines?
  - Clinic nursing productivity for vaccine administration

- EMR updates
  - Transition from paper to electronic templates
  - Formulary management and template maintenance
**Immunization Strategies and Monitoring**

**Audience Response Question #3**

JG is a 67 YOM 4 months post-allogeneic HCT. He has not begun receiving his post-HCT vaccines. He has cutaneous GVHD and has been stable on prednisone 10 mg PO daily for 3 weeks. His physician asks you about giving him DTaP, Hep B, IPV, Hib, and PCV13 vaccines today in clinic. JG also informs you that his 5-year-old nephew is coming to visit and is due for his last set of booster vaccines.

What would your recommendations be regarding vaccines for JG and his nephew?

---

**Immunization Strategies and Monitoring**

**Audience Response Question #3**

a. Give all vaccines to JG and clear his nephew to receive his booster vaccines.
b. Delay all vaccines for both JG and his nephew until he is at least 6 months post-HCT.
c. Delay all vaccines for JG until he is at least 6 months post-HCT, but clear his nephew to receive his booster vaccines.
d. Give all vaccines to JG, but delay his nephew until he is at least 6 months post-transplant.

---

**Best Practices: Immunization Strategies and Monitoring - Pediatric Perspectives**

Cathryn Jennissen, PharmD, BCOP
Pediatric Clinical Pharmacist
Hematology/Oncology/Hematopoietic Stem Cell Transplant
University of Minnesota Masonic Children’s Hospital
University of Minnesota Blood and Marrow Transplant Program - Pediatric

- 10 Attending physicians
- 5 Advanced Practice Professionals (NP/PA)
- 2 Pharmacy FTEs
- ~90 transplants per year
- 24-bed inpatient unit
- Outpatient Clinic
  - Pharmacy presence since 2007

University of Minnesota Blood and Marrow Transplant Vaccination Guidelines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>12 months post HCT</th>
<th>14 months post HCT</th>
<th>24 months post HCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP &lt; 7 years of age</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DTaP ≥ 7 years of age</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Hib</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PCV13</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IPV</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Meningococcal 11-21 years of age</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadrivalent HPV</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza (not live)</td>
<td>Yearly administration recommended beginning pre-HCT and resuming ≥ 60 days post-HCT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Immunization Schedule

- Vaccine orders in Epic therapy plans for anniversary visits
- First vaccine: Influenza
  - ≥ 60 days post-transplant (range 2-6 months)
- Other vaccinations
  - 12 months post-transplant
- Allogeneic vs. Autologous
Future Schedule Updates

- Remove age differences and administer DTaP to all patients
  - FDA approved: 6 months to <7 years of age due to increased adverse effects to DT if > 7 years of age
  - Tdap with poor response in study with autologous patients regardless of timing to transplant
  - Adult HCT patients received DT with lower rate of local side effects compared to previously vaccinated immunocompetent adults
  - Consistent with IDSA, ASBMT, and CIBMTR recommendations

Future Schedule Updates

- Add PPSV23 as a fourth pneumococcal dose and consider giving PCV13 earlier (6 or 9 months?)
  - Study demonstrated that PPSV23 administered after 3 dose series of conjugate vaccine increased response rate (RR)1
  - Consistent with IDSA, ASBMT, and CIBMTR recommendations
  - Study also demonstrated that late immunization (6-9 months vs. 3 months) offers a better long-lasting response yet delays protection after HCT
    - Is 12 MONTHS too late?
  - Add 2nd MMR dose in our pediatric population
    - Multiple studies have demonstrated higher response rate to MMR in adults than children post HCT
    - Consistent with IDSA, ASBMT, and CIBMTR recommendations

Typical day of vaccination

“How many shots am I getting???”

- 12-month visit
  - DTaP-hepatitis B recombinant-IPV (Pediarix®)
  - Haemophilus B conjugate (ActHIB®)
  - Pneumococcal conjugate (Prevnar 13®)
  - Meningococcal conjugate (Menactra®)
  - Quadrivalent HPV (Gardasil®)*

- 24 month visit
  - DTaP-hepatitis B recombinant-IPV (Pediarix®)
  - Haemophilus B conjugate (ActHIB®)
  - Pneumococcal conjugate (Prevnar 13®)
  - Measles, mumps and rubella (MMR)
  - Varicella virus live (Varivax®)*

*Based on age
Patient assessment and screening

- Consider vaccination delay in patients with high risk immunosuppression
  - Active treatment of acute GVHD
    - No vaccines (especially live) until 6 months off immunosuppression
    - Exception: yearly influenza vaccine
  - Current chemotherapy
    - Consider delaying until 3 months post-chemotherapy
  - Biologic immune modulators
    - Within 6 months of rituximab

Patient assessment and screening

- Thrombocytopenia and/or anticoagulation
  - Physician decision on a per patient basis

- Meningococcal vaccine: Who should receive it?
  - All patients 11-21 years of age
  - Patients >21 years of age living in dormitory setting or military barracks
  - Sickle cell patients (“functional asplenia”) and patients with anatomic asplenia >1 year of age

Patient assessment and screening

- Quadrivalent HPV vaccine: Who should receive it?
  - Our current protocol:
    - Females > 11 years of age and <26 years who are without evidence of the papilloma virus
    - 1st dose: 12 months post HCT, 2nd dose: 14 months post HCT and 3rd dose: 18 months post HCT
  - No data regarding HPV vaccine in HCT recipients, so no recommendations from IDSA, ASBMT or CIBMTR
  - Next protocol update: include male HCT recipients to be in line with ACIP/CDC recommendations
Vaccine Monitoring

- Adverse events
  - Monitored in clinic after RN administration

- Antibody titers
  - Not routinely monitored
  - Lack of standard threshold for adequate response and subsequent revaccination
  - Vaccination timing

Donors and Household Contacts

- Donor vaccination
  - No standard donor vaccine program

- Household contacts

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Recommendation for Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A</td>
<td>Recombinant Vaccines is recommended for all infants and children, according to prestorage AUP policies.</td>
</tr>
<tr>
<td>Influenza</td>
<td>Vaccination. Influenza vaccination is strongly recommended during each influenza season following the vaccine change and corresponding guide. Influenza vaccine is also recommended to all household contacts, including infants, and to all family members, especially those living in close contact with hepatitis A patients. For more than 50 patients, these individuals should talk to the health care provider about HBV vaccine.</td>
</tr>
</tbody>
</table>

Household Contacts who receive Hepatitis A:

- Infants
  - HBV vaccine is recommended for all persons who are 12 months old and who are uninfected or unimmunized.
- Toddlers (2-5 years):
  - HBV vaccine is recommended for all persons who are 12 months old and who are uninfected or unimmunized.
- Toddlers (6-24 months):
  - HBV vaccine is recommended for all persons who are 12 months old and who are uninfected or unimmunized.

Family Immunization Program at UMMCH

- Influenza and pertussis vaccines (when appropriate) offered free of charge to family members
  - Inactivated Influenza only
  - Specific to families that are unable to access their primary caregiver, local outpatient clinic, or local pharmacy
  - Unit nurses assess families for vaccination status
Strategies for successful vaccination in pediatric patients

“No, I don’t want a shot! It will hurt!!”

• Distraction
  ▪ Play games
  ▪ Watch movies
  ▪ Child Family Life

• Schedule vaccines with sedated procedure

• Give patient control

• Numbing cream, e.g. lidocaine/prilocaine cream (EMLA®)

Strategies for successful vaccination in pediatric patients

• Other tools
  ▪ Buzzy® - “physiologic pain blocker”
  ▪ Vibrations and cold confuse nerve fibers according to the Gate Control Theory

http://buzzy4shots.com/

Audience Response Question #4

Which of the following is a recommended strategy used in the pediatric population to help provide a more “pleasant” vaccination experience?

  a. Distraction with movies and games
  b. Coordination of vaccinations with a sedated procedure
  c. Allow the child to choose which vaccines he/she will receive and which ones he/she will not
  d. Application of numbing cream prior to vaccine
  e. Answers a, b and d
  f. All of the above