Vaccine Handling, Storage, and Administration Review

ACTIVITY DESCRIPTION
Vaccination recommendations change frequently. Pharmacists must stay up to date on current vaccine storage, handling, and administration techniques in order to ensure patient's receive competent and safe care.

TARGET AUDIENCE
The target audience for this activity is pharmacists, pharmacy technicians, and nurses in hospital, community, and retail pharmacy settings.

LEARNING OBJECTIVES
After completing this activity, the pharmacist will be able to:

• Define proper vaccine storage
• Recognize vaccine administration routes
• Identify vaccine administration procedures

After completing this activity, the pharmacy technician will be able to:

• Define proper vaccine storage
• Recognize vaccine administration routes
• Identify vaccine administration procedures

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Vaccine Handling, Storage, and Administration Review

Learning Objectives

• Define Proper Vaccine Storage
• Recognize Vaccine Administration Routes
• Identify Vaccine Administration Procedures

Why are Vaccines Important?

• Beginning practice over 1000 years ago
• Prevention better than treating
• Once common diseases now rare
• Saved millions of lives

Vaccine Handling Importance

• Biologic products
• Ensure potency
• Expensive
Cold Chain

• Temperature controlled environment to maintain and distribute vaccines in optimal condition
  • Manufacturer
  • Transportation to distributor
  • Delivery to and storage at provider
  • Administration to patient

Must be maintained at every link!

Cold Chain Breakdown

• Heat, cold, or light
• Loss of potency
• Each incident reduces further
• Freezing can destroy some refrigerated vaccines
• Vaccine appearance not reliable indicator

Effective Cold Chain

• Well trained staff
• Reliable storage
• Accurate temperature monitoring
• Appropriate vaccine inventory management

Vaccine Coordinator

• Designated staff member
  • Substitute staff member
• Oversees all aspects of vaccines
  • Ordering
  • Storage
  • Inventory
  • Emergency preparedness
Vaccine Storage

• Do's
  • Dedicated fridge
  • Reliable electric supply
  • 50% full maximum
  • Defrost/calibrate regularly
  • Have back up storage

Vaccine Storage

• Don’t’s
  • No food
  • No medical specimens
  • No direct sunlight/heat source
  • Do not store in doors
  • Store away from walls

Vaccine Storage

• Good air circulation around unit
• One unit per electrical outlet
• Use "Do Not Unplug" signs
• Temperature ranges
  • Refrigerator
    • 36°-46°F (2°-8°C)
    • *40°F Ideal temperature
  • Freezer
    • -58° - +5°F (-50° - -15°C)

Refrigerator Storage

• Store in original packaging with lids closed
• Water bottles on top and bottom shelf and doors
  • Labeled “Do Not Drink”
• Store diluent with corresponding vaccine
• Store in center, 2-3 inches from walls, ceiling, and doors
• Do not store in drawers or door
• Do not pack tightly
Freezer Storage

- Store in original packaging with lids closed
- Never store diluent in the freezer
- Keep water bottles in back, against walls, and in doors
- Replace bins with water bottles
- Store in center, 2-3 inches from walls, ceilings, and door
- Do not pack tightly

Refrigerated Vaccines

- Hepatitis A
- Hepatitis B
- Hib
- HPV
- Influenza
- IPV
- Meningococcal
- Pneumococcal
- Rotavirus
- Diphtheria, tetanus, and pertussis
- Zoster, vaccine recombinant, adjuvanted
- *Measles, Mumps, and Rubella

Freezer Vaccines

- Varicella
- Zoster vaccine, live
- Measles, Mumps, Rubella, and Varicella
- *Measles, Mumps, and Rubella

Vaccine Storage Equipment

- Proper equipment is key!
- Purpose built units
  - Pharmaceutical grade
- Stand alone units
  - Household refrigerator/freezers
  - Dorm/bar style-Not recommended
Temperature Monitoring Equipment

- Digital Data Logger
  - Detachable probe, out of range alarm, current, minimum, and maximum temperatures, low battery indicator
  - Continuous temperature logging and recording
  - Record at least every 30 minutes
  - In every unit
  - At least one back up

Vaccine Deliveries

- Notify vaccine coordinator
- Unpack immediately
- Check cold chain monitor
- Check expiration dates

Vaccine Inventory

- Rotated regularly
  - Weekly and with new deliveries
- Earliest expiration date first
  - Month/year
  - Day/month/year

Examples:
  6/18
  6/23/18

Beyond Use Date

- Must be used before printed expiration date
- Based on vial entry and package insert
  - Reconstituted vaccines
  - Multidose vials
  - Manufacturer shortened expiration dates
Vaccine Preparation

- Final step of cold chain
- Prepare in designated space
- Only prepare when ready to administer
- Only administer vaccines YOU have prepared

Single Dose Vials

- Contains one dose
- Do not combine leftover with leftover from another SDV to create an extra dose
- No preservatives
- Open only when ready to use
- Remove cap
- Discard SDV without caps at end of day

Multi Dose Vials

- Contains more than one dose
- Contain preservative to prevent growth of microorganisms
- Only withdrawal number of doses indicated
- Discard remaining
- Use until expiration date UNLESS:
  - Contaminated
  - BUD noted in package insert

Manufacturer-Filled Syringes

- Prepared and sealed under sterile conditions
- Remove cap and attach needle
- Do not activate until ready to use
- Do not contain preservative
- If seal broken should be used by the end of the day
Predrawing Vaccines

- Only draw up vaccines at time of administration
- Cannot tell vaccines apart once in syringe
- Can lead to administration errors
- Vaccine waste
- General use syringes are not designed for storage
  - No preservative
  - Vaccine components may interact with polymers and reduce potency
  - Manufacturers do not recommend for influenza vaccine clinics

Reconstituting

- Lyophilized vaccines = freeze dried
- Form of a pellet or powder
- Diluents are NOT interchangeable
- Never use sterile water or normal saline
- Do not administer vaccine if wrong diluent used

Vaccine Administration

General Precautions

- Precautions to minimize disease exposure and spread
- Wash hands before administration and between each patient
- Gloves not required by OSHA
  - If administrator has open lesions on hands
  - If worn, change between patients
Needles and Syringes

- Sterile
- Disposable
- Changing needles between drawing up vaccine and administration not necessary
- No recapping!
- Safety needles best option
- Discard used needles immediately

Route of Administration

- Intramuscular
- Subcutaneous
- Intradermal
- Oral
- Intranasal

Intramuscular

- Needle length
  - 5/8 – 1 inch, dependent on child or adult
  - 22-25 gauge
- Aspiration not necessary
- 90 degree angle
- Anterolateral thigh or deltoid
Intramuscular Sites

• Infants (<12 months)
  • Anterolateral thigh
  • Gluteal
  • 1 inch needle
• Toddlers (12 months-2 years)
  • Anterolateral thigh
  • 1 inch needle
  • +/- deltoid

• If 2 vaccines in same limb, space 1 inch apart

Intramuscular Sites

• Children (3-10 years)
  • Deltoid
  • 5/8 – 1 inch needle
  • +/- Anterolateral thigh
  • 1-1.25 inch needle
• Adolescents (11-18 years)
  • Deltoid
  • 1 inch needle
  • Anterolateral thigh
  • 1-1.5 inch needle

Intramuscular Sites

• Adults
  • Deltoid
  • <130 lbs
    • 5/8 needle
  • 130-152 lbs
    • 1 inch needle
  • Women 152-200lbs/ Men 152-260lbs
    • 1-1.5 inch needle
  • Women >200lbs/Men >260 lbs
    • 1.5 inch needle
Shoulder Injury Related to Vaccine Administration (SIRVA)

- Caused by immune response
- Inadvertent, direct injection into deltoid bursa or joint space
- Presentation
  - Rapid onset of severe pain
  - Long lasting shoulder pain
  - Limited range of motion
  - Absence of infection

Avoiding SIRVA

- Be familiar with shoulder anatomy
- Provider and patient both in seated position
- Avoid injecting too high
- Inject into thickest, most central portion of deltoid
- Administer at 90 degree angle

Subcutaneous Injections

- 45 degree angle
- < 12 months
  - Anterolateral thigh
- > 12 months
  - Upper-outer triceps
- 5/8 inch needle
- 23-25 gauge

Subcutaneous
Subcutaneous Site

Intradermal Injections

- One injectable influenza vaccine
- Prefilled 3/50 inch microneedle injector
- Approved 18-64 years
- Given over deltoid muscle

Oral Route

- Rotavirus
  - 2 brands
  - Different applicators
  - Different schedules
  - Do not repeat if spit up or vomited
- Oral Typhoid
  - 4 capsules
  - Must follow manufacturers directions
  - Do not open or mix with other substance

Oral

- Oral Typhoid
  - 4 capsules
  - Must follow manufacturers directions
  - Do not open or mix with other substance
Intranasal Route

- LAIV for non pregnant persons 2-49 years
- Not recommended 2017-2018 flu season
- Back for 2018-2019 flu season
- Sprayer with dose divider clip
- 0.1 ml into each naris
- Do not repeat if coughs/sneezes

Multiple Injections

- Multiple vaccines at single visit
- Vaccine site map
  - Thigh
    - Infants and children
    - Deltoid
      - Adolescents and adults
  
*Separate sufficiently so reactions can be differentiated

Pain Alleviation in Children

- Breastfeeding
- Giving sweet-tasting liquids (orally)
- Injecting vaccines rapidly without aspiration
- Injecting the most painful vaccine last
- Using tactile stimulation (rubbing/stroking near the injection site before and during injection)
- Distracting the patient (done by either the parent or clinician)
- Having the patient seated rather than lying down

Topical Anesthetics

- 5% lidocaine-prilocaine
  - 30-60 minutes prior to injection
  - No interference with immune response
- Topical refrigerant spray
  - Immediate before vaccination
  - Can be as effective as lidocaine-prilocaine
Antipyretics Prior to Vaccination

- Used to be routine recommendation
- No longer recommended
- No evidence in prevention of febrile seizures
- May decrease antibody response

Vaccination Procedures

- Review immunization history
- Assess need for immunizations
- Screen for contraindications and precautions
- Educate the patient
- Prepare the vaccine
- Administer the vaccine
- Document vaccination
- Observe patient for 15 minutes

Vaccine Adverse Reactions

- Localized
  - Soreness, redness, swelling - cool compress, pain reducer
  - Bleeding
    - Minor-adhesive compress
    - Major-thick layer of gauze, continuous compression, raise above heart
  - Fear
    - Patient should sit or lie down

Vaccine Adverse Reactions

- Syncope
  - Paleness, sweating, dizziness, visual changes
  - Put head between knees or lie flat
  - Loosen tight clothes
  - Cool damp cloth to head
- Fall without loss of consciousness
  - Examine for injuries
  - Lie flat with feet elevated
- Loss of consciousness
  - Call 911 if do not immediately recover
Anaphylaxis

- Itching, redness, hives, swelling, wheezing, shortness of breath
- Most important intervention
  - Epinephrine 1:1000 dilution
  - 0.01ml/kg/dose
  - Or appropriate dose, pre-filled EpiPen®
- Activate EMS
- Observe patient
- Administer CPR if necessary

Vaccine Adverse Event Reporting System (VAERS)

- Established in 1990
- Managed by CDC and FDA
- Passive reporting system
- Online reporting recommended
- Purpose
  - Detection
  - Monitoring
  - Identifying risk factors
  - Assess safety

Summary

- Vaccines are perishable
- Cold chain preservation essential
- Prepare vaccine when ready to administer
- Appropriate site, needle size and gauge for patient
- Observe patient
- Report adverse events