

Webinar – Safe Injection Practices & More



Presented by:

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Objectives

1. Describe outbreaks of HBV & HBC caused by failure to follow approved infection guidelines.
2. Describe breaches in infection control practices that lead to the outbreaks in HBV & HCV.
3. Describe Standard Precautions, CDC hand hygiene guidelines, bloodborne pathogens, indirect transmission of pathogens, & safe injection practices.
4. Identify safe practices specifically related to diabetes care.

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Objectives

5. List consequences of failure to follow safe injection practices.
6. Describe intradermal, subcutaneous, & intramuscular injections including
 - o Length & gauge of needle used
 - o Location of injection
 - o Angle of needle insertion
 - o Method of filling syringe
 - o Procedure for injection
 - o Examples of drugs given
7. Describe Z-tract injections.

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Headlines!

- HCV Outbreaks at Dialysis Units Linked to Outmoded Infection Control
- Ninety-nine Patients Contract HCV While Undergoing Cancer Treatment
- 300 Patients Exposed to Bloodborne Pathogens at Doctor Office

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First Thought?

This must be happening in poor, third-world countries where people don't know about using the proper infection control practices.

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Think Again!

Since 2001, there have been outbreaks of HBV & HCV due to improper infection control practices in New York, New Jersey, Nebraska, Nevada, North Carolina, Oklahoma, & Texas.

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CDC Outbreak Information

- In the last decade & not including inpatient hospitals, CDC reported:
 - 33 identified outbreaks
 - 12: endoscopy centers, pain management clinics, oncology treatment centers, private medical practice
 - 6: hemodialysis centers
 - 15: long-term care facilities
 - An estimated 60,000 people were exposed to bloodborne pathogens
 - 450 people acquired HBV and/or HCV

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Breaches in Infection Control Practices

- Blood on the floor & work surfaces in a room where chemotherapy was administered
- Open medication vials
- Unsterile saline & gauze
- Use of contaminated gloves
- Misuse of antiseptics
- Cross-contamination of pens, refrigerators, countertops
- Decontamination solutions improperly prepared & stored

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Breaches in Infection Control Practices

- Reuse of syringes & needles
- Failure to change gloves between patients, or perform hand hygiene after contact with patients and/or soiled surfaces
- Visible blood on dialysis chairs, dialysis machine surfaces
- Blood glucose meters not cleaned between patients
- Blood glucose fingerstick lancets reused
- Rolling drug preparation cart with contaminated injection vials & visible blood on surface

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Why would healthcare workers not follow recommended practices?

- Research on non-compliance is sketchy.
- Study on why healthcare workers did not wash their hands per guidelines states:
 - Not a priority
 - Too busy
 - Inconvenient hand washing facilities
 - Allergy/irritation to hand hygiene solutions
 - Lack of leadership, i.e., policies & procedures not enforced
- Estimate only 40% compliance with hand hygiene guidelines

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Worst yet...

- Two HCV positive drug-addicted healthcare workers spread HCV to 38 patients (about 3,100 patients exposed)
 - One was nurse in Virginia; the other a surgical tech in Colorado & Texas
 - Both took syringes of fentanyl (powerful painkiller often used for anesthesia); injected themselves with the drug, then used saline to refill syringe
 - The refilled syringes were then placed back on preparation trays for patient use

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A Quick Review

- Standard Precautions
 - Use appropriate hand hygiene
 - Gloves – wear for
 - Contact with blood, body fluids, secretions, & contaminated items
 - Contact with mucous membranes & nonintact skin
 - Wear masks, goggles, face masks to protect mucous membranes when contact with blood/body fluids is likely

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A Quick Review

- Standard Precautions
 - Gowns – wear to
 - Protect skin from blood/body fluids
 - Prevent soiling of clothing during procedures that may involve contact with blood/body fluids
 - Linen
 - Handle soiled linen to prevent touching skin/mucous membranes
 - Don't pre-rinse soiled linens in patient care areas

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A Quick Review

- Standard Precautions
 - Patient care equipment
 - Handle soiled/potentially contaminated equipment in a manner to prevent contact with skin or mucous membranes, & to prevent contamination of clothing or the environment
 - Disinfect reusable equipment prior to use

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A Quick Review

- Standard Precautions
 - Environmental cleaning
 - Routinely care, clean, & disinfect equipment & furnishings in patient care areas
 - Sharps
 - Avoid recapping used needles
 - Avoid removing used needles from disposable syringes
 - Avoid bending, breaking, or manipulating used needles by hand
 - Place used sharps in puncture-resistant containers

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A Quick Review

- Standard Precautions
 - Patient resuscitation
 - Use mouthpieces, resuscitation bags, or other ventilation devices to avoid mouth-to-mouth resuscitation
 - Patient placement
 - Place patients who contaminate the environment or cannot maintain appropriate hygiene in private rooms

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A Quick Review

- Aseptic technique in the context of injections
 - Purpose – protect the patient from infection & prevent transmission of pathogens
 - Handling, preparation, & storage of medications & all supplies used for injections & infusions – e.g., syringes, needles, IV tubing – in a manner that prevents microbial contamination

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A Quick Review

- Aseptic technique in the context of injections
 - Medications should be drawn up in a designated “clean” medication prep area
 - In general, any item that could have come in contact with blood/body fluids should be kept separate
 - Store & prepare injections in a clean area on a clean surface.

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A Quick Review

- Aseptic technique in the context of injections
 - Hand hygiene is an important step in asepsis
 - Hand hygiene includes handwashing & use of alcohol-based hand rubs
 - Per the *CDC Hand Hygiene Recommendations*, the following describes situations where soap/water & hand rubs are appropriate

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A Quick Review

<p><u>Soap & Water Required</u></p> <ul style="list-style-type: none"> ○ After removing gloves that are visibly contaminated with blood/body fluids ○ When bare hands are visibly contaminated with blood/body fluids ○ Before eating ○ After using a restroom ○ After exposure to known or suspected <i>Bacillus anthracis</i> (anthrax) 	<p><u>Alcohol-Based Hand Rub OK</u></p> <ul style="list-style-type: none"> ○ After removing gloves that are not visibly contaminated ○ After bare hands come in contact with blood/body fluids, mucous membranes, &/or intact skin <u>if hands are not visibly contaminated</u> ○ Before direct patient contact ○ After contact with a patient's intact skin
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A Quick Review

<p><u>Soap & Water</u></p> <ol style="list-style-type: none"> 1. Wet hands with water. 2. Apply the recommended amount of soap to wash hands. 3. Rub hands vigorously for at least 15 seconds, covering all surfaces of the hands & fingers. 4. Rinse hands with water & dry thoroughly with a disposable paper towel. 5. Use another paper towel to turn off the faucet. 	<p><u>Alcohol-Based Hand Rub</u></p> <ol style="list-style-type: none"> 1. Apply the recommended amount of product to the palm of one hand. 2. Rub hands together, covering all surfaces of the hands & fingers, until the hands are dry. 3. Make sure to rub hands together until your hands are DRY!
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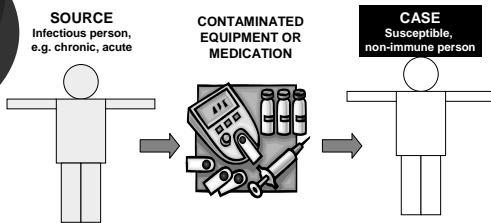
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A Quick Review

- Bloodborne Pathogens
 - Hepatitis B (HBV)
 - Hepatitis C (HCV)
 - Human Immunodeficiency Virus (HIV)
 - Others
 - Syphilis
 - Malaria
 - Creutzfeld-Jakob Disease
 - Babesiosis
 - Viral hemorrhagic fevers (Ebola, etc)
 - Others

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TRANSMISSION OF PATHOGENS VIA CONTAMINATED EQUIPMENT OR MEDICATIONS *Indirect Transmission*



graphics courtesy of CDC

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Safe Injection Practices

- Use aseptic technique to avoid contamination of sterile injection equipment.
- Store & prepare injections in a clean area on a clean surface.
- Never store needles & syringes unwrapped as sterility cannot be assured.
- Use sharps safety devices whenever possible.

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Safe Injection Practices

- Do not administer medications from one syringe to multiple patients, even if the needle or cannula on the syringe is changed. *Needles, cannulas, & syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient.*
- Use single-dose vials whenever possible.

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Safe Injection Practices

- Use fluid infusion & administrations sets (i.e., intravenous bags, tubing, & connectors) for one patient only & dispose appropriately after use. Consider a syringe or needle/cannula contaminated once it has been used to enter or connect to a patient's IV infusion bag or administration set.
- Assign multi-dose vials to a single patient whenever possible.

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Safe Injection Practices

- Do not administer medications from single-dose vials or ampules to multiple patients or combine leftover contents for later use.
- If multi-dose vials must be used, both the needle or cannula & syringe used to access the multidose vial must be sterile.
- Do not use bags or bottles of IV solution as a common source of supply for multiple patients.

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Safe Injection Practices

- Do not keep multi-dose vials in the immediate patient treatment area; store in accordance with the manufacture's recommendations; discard if sterility is compromised or questionable.
- A needle should never be left inserted into a medication vial for multiple uses.

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Safe Injection Practices

- Medications should be discarded upon expiration, or any time there are concerns regarding the sterility of the medication.

Are these recommendations new?

- No.
- They are part of established practice. Unfortunately, they just were not followed in outbreaks listed.

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Diabetes Care Techniques

- Prepare medications such as insulin in a centralized medication area.
- Multi-dose insulin vials should be assigned to individual patients & labeled appropriately.
- For glucose monitoring, use single-use fingerstick devices that permanently retract upon puncture.

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Diabetes Care Techniques

- The surfaces of the glucose meters should be decontaminated between patients, immediately if contamination with blood or body fluids occurs or is suspected, or at least daily. An EPA-registered disinfectant effective against HBV, HCV, & HIV must be used.
- Glucose meters should be assigned to individual patients. If this is not possible, the device must be cleaned & disinfected before use on another patient.

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Diabetes Care Techniques

- If possible, keep supplies & equipment in individual rooms.
- Trays or carts used to deliver medications or supplies to individual patients should remain outside of patient rooms.
- Do not carry supplies & medications in pockets.

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Diabetes Care Techniques

- Dispose of used fingerstick devices at the point of use in approved sharps containers.
- Because of possible contamination, unused supplies & medications taken to a patient's bedside for glucose monitoring or insulin administration should not be used for another patient.

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Frequently Asked Questions

Q: Is it OK to use the same syringe to give intramuscular (IM) or subcutaneous (SC) injections to more than one patient if I change the needle between patients?

A: **No.** Once the syringe & needle are used, they are contaminated & must be discarded.

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Frequently Asked Questions

Q: Is it OK to use the same syringe to give an IM or intravenous (IV) injection to more than one patient if I change the needle between patients & I don't draw back before injecting?

A: **No.** A small amount of blood can flow into the needle & syringe even when only positive pressure is applied outward.

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Frequently Asked Questions

Q: Why can't I just visually inspect syringes to determine if they are contaminated or can be used again?

A: Bloodborne pathogens can be present in enough quantity to produce infection in the absence of visible blood.

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Frequently Asked Questions

Q: Can I reuse a syringe during a procedure for a patient who requires additional medication as long as the vial will not be used for another patient?

A: It is preferable to always use a new sterile syringe to withdraw medications, even if the medication will only be used for one patient. This provides an extra layer of protection for patients & is encouraged.

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Frequently Asked Questions

Q: How can our facility ensure that injections are performed correctly?

A: To ensure staff understand & adhere to safe injection practices

1. Designate someone to provide ongoing oversight for infection control issues.
2. Develop written infection control policies.
3. Provide training.
4. Conduct quality assurance assessments.

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Consequences of Failure to Follow Safe Injection Practices

- o Patients die
- o Patients live with life-threatening diseases
- o Malpractice suits filed by patients or patient's family
- o Revocation of licenses

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Giving Injections

- Using aseptic technique, reconstitute drug following manufacturer instructions
- Four basic types of injections
 - Intradermal
 - Subcutaneous
 - Intramuscular
 - Intravenous (will not be discussed)

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Giving Injections

- Intradermal
 - Most commonly used for allergy testing & TB skin tests
 - With this type of injection, the contents of the syringe are emptied between the layers of the patient's skin (epidermis)
 - The procedure is painful & is used only with small amounts of solution

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Giving Injections

- Intradermal
 - A 25- to 27-gauge needle is used; the needle length is $\frac{3}{8}$ to $\frac{3}{4}$ inch
 - Injections are normally given on the palm-side surface of the forearm



Source: Wikipedia

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Giving Injections

- Intradermal
 - Procedure
 1. Wash hands & put on gloves.
 2. Prepare a sterile needle & syringe.
 3. Cleanse rubber stopper of medication vial with alcohol wipe. Let dry.
 4. Insert needle through rubber stopper.
 5. Insert some air from the syringe to equalize the pressure in the container.
 6. Draw slightly more than the required amount of drug into the syringe.
 7. Hold the syringe vertically at eye level, then expel drug until the exact quantity needed is present in the syringe.

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Giving Injections

- Intradermal
 - Procedure
 8. Remove the needle from the syringe & replace with a new needle. This helps minimize injection pain.
 9. Using a swab, rub the injection site vigorously to increase the blood supply before cleansing with an alcohol wipe. The rubbing may minimize injection pain.
 10. Using an alcohol wipe, cleanse the injection site in a circular manner, going from center of the site & progress outward.

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Giving Injections

- Intradermal
 - Procedure
 11. Allow the cleansed site to air dry.
 12. With your non-dominant thumb about 1 inch away from the injection site, stretch the skin downward toward the patient's hand.
 13. With your dominant hand, insert the needle with the bevel up at an angle parallel to the patient's arm (about 5° - 15°).

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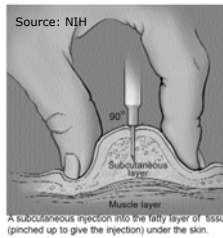
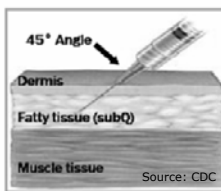
Giving Injections

- Intradermal
 - Procedure
 14. Advance the needle below the epidermis, stopping when the needle's bevel under the skin (about $\frac{1}{8}$ "). You should see the outline of the needle just under the skin.
 15. Slowly inject the drug, observing for a bleb (wheal) formation.
 16. Withdraw the needle at the same angle at which it was inserted.
 17. Do not massage the skin.
 18. Discard the needle & syringe appropriately.
 19. Complete all appropriate documentation.

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Giving Injections

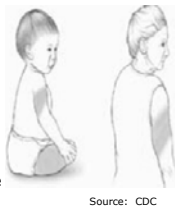
- Subcutaneous (SC, SQ, sub-cu, sub-Q, subcut)



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Giving Injections

- Subcutaneous
 - Injection sites
 - Triceps (outer aspect of the upper arm)
 - Anterior lateral aspect of the thigh
 - Alternate
 - Abdomen below the rib cage at least 1 -2 inches away from the umbilicus
 - Scapular region of upper back
 - Buttocks



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Giving Injections

- Subcutaneous
 - Drug is injected into the fatty tissue just below the skin
 - Skin is often pinched up to allow easy access
 - Needle size is 23- to 25-gauge needle; $\frac{5}{8}$ inch in length
 - For small children & persons with little subcutaneous fat, the needle inserted at 45° angle; 90° angle for others
 - Avoid areas with skin lesions, scars, bones

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Giving Injections

- Subcutaneous
 - Drugs given subcutaneous
 - Insulin
 - Heparin
 - Hyoscine
 - Most vaccines
 - Human Growth Hormone
 - Epinephrine
 - Maximum amount of fluid injected is 1 cc (1 mL)

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Giving Injections

- Subcutaneous
 - Procedure:
 - Steps 1-3 same as intradermal.
 - 4. With the needle capped, pull back the plunger, filling the syringe with air equal to the amount of drug to be injected.
 - 5. Remove the needle cap.
 - 6. With the vial in an upright position, push the needle at a 90° angle through the rubber stopper.
 - 7. Inject the air in the syringe into the vial.
 - 8. Turn the vial upside down, with the needle remaining in the vial.

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Giving Injections

- Subcutaneous
 - Procedure:
 9. Make sure the tip of the needle is completely covered by the drug.
 10. Pull back on the plunger to fill the syringe with the correct dose of drug.
 11. Keeping the vial upside down & the needle in the vial pointed upward, tap the syringe barrel with your fingertip to help move any bubbles to the top of the syringe.
 12. Once bubbles are at the top, gently force the bubbles out of the syringe & back into the vial.

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Giving Injections

- Subcutaneous
 - Procedure:
 13. Check to make sure the drug dose in the syringe is correct.
 14. Remove the needle from the vial & carefully replace the needle cap.
 15. Cleanse the injection site as previously discussed & let air dry.
 16. Using the dominant hand, hold the syringe like a pencil.
 17. Remove the needle cap.
 18. Using the non-dominant hand, grasp the skin between the thumb & index finger.

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Giving Injections

- Subcutaneous
 - Procedure:
 19. Quickly thrust the needle all the way into the skin at the appropriate angle.
 20. Release the skin.
 21. Aspirate? Not always required.
 22. Inject the medication at a slow steady rate. It should take about 5 seconds.
 23. Pull the needle out of the skin while gently pressing a 2x2 gauze onto the injection site.

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Giving Injections

- Subcutaneous
 - Procedure:
 24. Press or rub the site for a few seconds as this helps the drug be absorbed.
 1. Do not massage heparin doses or any other drug if instructed otherwise.
 25. If a small drop of blood or clear fluid appears, simply press the site with a new 2x2 gauze pad for a few seconds.
 26. Discard needle & syringe appropriately.
 27. Complete all necessary documentation.

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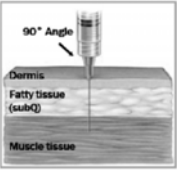
Giving Injections

- To aspirate or not to aspirate?
 - After inserting a needle into subcutaneous or muscle tissue, most individuals have been trained to pull back on the syringe plunger (aspirate) to make sure that the needle is not in a blood vessel before injecting the drug. If blood is aspirated, the needle must be withdrawn. A new needle & syringe should be used to pull of medication & perform the injection.
 - 2006 CDC guidelines for **vaccination** state that aspiration is not required.
 - Aspiration should be performed for all other IM injections unless specified otherwise. **Never aspirate for heparin or LMWH such as Lovenox.**

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Giving Injections

- Intramuscular
 - Given directly into the central area of a specific muscle
 - Offers a faster rate of drug absorption; larger volumes of fluid can also be injected
 - Injection procedure same as subcutaneous



Source: NIH

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Giving Injections

- Intramuscular
 - Muscles most often used
 - Deltoid-upper arm muscle
 - *Vastus lateralis*-outer middle third of thigh
 - *Gluteus medius*-hip
 - *Gluteus maximus*-upper quadrant buttocks
 - Site determination depends on the patient's muscle density & type of drug
 - Maximum volume is 3 mL; a larger dose is usually divided & given at two different sites.

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Giving Injections

- Intramuscular
 - Drugs frequently administered IM
 - Analgesics
 - Anti-emetics
 - Corticosteroids
 - Fertility treatment hormones
 - Codeine
 - Morphine
 - Methotrexate
 - Streptomycin
 - Penicillin
 - Gardasil
 - Hepatitis A vaccine


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Giving Injections

- Intramuscular
 - Thigh muscle (*Vastus lateralis*)
 - Anterior lateral aspect
 - Good for adults
 - Good for children <3 years, including newborns & preemies
 - To identify injection location
 - Visualize the muscle divided into 3 equal parts
 - The middle third is where the injection should be made



Source: CDC



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Giving Injections

- Intramuscular
 - Upper hip (*Gluteus medius*)-ventrogluteral site
 - Good for adults
 - Good for children >7 months
 - Location is the side of the hip; avoids possible damage to the sciatic nerve
 - Put the palm of your hand on the greater trochanter (the big lump where the femur inserts into the pelvis) spread your index & middle fingers out to touch the top of the iliac crest & go right between.

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Giving Injections

- Intramuscular
 - Upper side of hip (*Gluteus medius*)

Location of Gluteus Medius

Injection Point
(between the knuckle of the index & middle finger)

Greater Trochanter

Source: CDC

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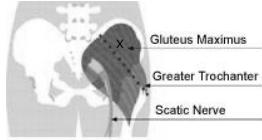
Giving Injections

- Intramuscular
 - Upper buttocks (*Gluteus maximus*)-dorsogluteral site
 - Location: upper outer quadrant
 - Find the trochanter (knobby top portion of the long bone in the upper leg, i.e., femur)
 - Find the posterior iliac crest. Many people have 'dimples' over this bone
 - Draw an imaginary line between the two bones
 - After locating the centre of the imaginary line, find a point one inch toward the head. This is where the needle is inserted

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Giving Injections

- Intramuscular
 - Upper buttocks (*Gluteus maximus*)
 - Location: upper right quadrant

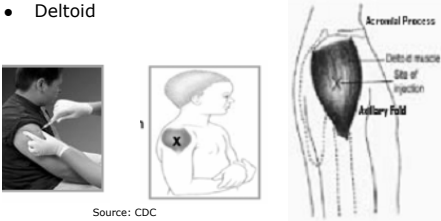


Source: NIH

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Giving Injections

- Intramuscular
 - Deltoid



Source: CDC

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Giving Injections

- Intramuscular
 - Needle gauge: 22 – 25
 - Needle length
 - Anteriolateral thigh
 - Premie/newborn: 5/8"
 - Infant (1-12 mo): 1"
 - Toddler (1-2 yr): 1 – 1 1/4"
 - Children/Adolescent (3-18 yr): 1 – 1 1/4"
 - Adult (>18 yr): 1 – 1 1/4"

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Giving Injections

- Intramuscular
 - Needle length
 - Deltoid/hip/buttocks
 - Toddler (1-2 yr): 5/8" – 1"
 - Children/Adolescent (3-18 yr): 5/8" – 1"
 - Adult (>18 yr)
 - Male/female <130 lbs: 1"
 - Female 130 – 200 lbs: 1" – 1½"
 - Male 130 – 260 lbs: 1" – 1½"
 - Female >200 lbs: 1½"
 - Male > 260 lbs: 1½"

Giving Injections

- Intramuscular
 - Z-tract
 - Technique used to inject dark-color drugs, such as iron, or drugs that can irritate tissues such as haloperidol or vistaril
 - The method seals the medication deep in the muscle leaving no exit path back into the subcutaneous tissue & skin
 - The skin & subcutaneous are displaced prior to the injection then released immediately afterward
 - *Gluteus medius* muscle used

Giving Injections

- Intramuscular
 - Z-tract
 1. Add 0.3 – 0.5 mL of air into the syringe after drawing up drug
 2. Change the needle
 3. Put on new needle; 21–22-gauge, 2"-3", to assure the medication is placed deep into the muscle
 4. Locate the injection site & with the non-dominant hand, pull the skin laterally 1"-1½"; this displaces the skin to the side & creates a broken line


Giving Injections

- Intramuscular
 - Z-tract
 5. Insert the needle at 90° angle
 6. Aspirate to assure that a blood vessel has not been entered
 7. Inject the drug slowly into the muscle
 8. Make sure the syringe is empty, including the air, before withdrawing the needle
 9. Immediate after needle removal, release the skin
 10. Do not massage

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Safe Injection Practices & More

- Questions?
- References available upon request



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