
IndiaCLEN Program Evaluation Network (IPEN)

Clinical Epidemiology Unit
All India Institute of Medical Sciences
New Delhi
Session 1
Registration of Participants

• *This session will be an ice breaker*

The participants will fill up the
• Registration form and
• Assessment of Communication Needs Form
Session 2
Rationale for Model Injection Centre Program

- This session will review the burden of injections worldwide and the need for Model Injections Centres in India
- magnitude of injections
- need for safety of injections
- construction of MIC and its objectives
Injections Per Year

- India (AIPI-IPEN): 3 billion
- Rest of the world: 9 billion
- World Estimate (WHO): 12 billion
Nearly 2/3rd (63%) injections in India are unsafe

- Causes of unsafe injections
  - use of inadequately sterilized injection equipment;
  - reuse of disposable syringes/needles;
  - improper technique of giving injections

Assessment of Injection Practices in India
Effects of Unsafe Injections

• Unsafe injections increase the risk of Blood Borne Infections (HBV, HCV, HIV, others)

• Local reactions/injuries/abscess to the recipients
Effects of Unsafe Injections cont....

• Worldwide unsafe injections are responsible for
  • HIV 80,000-1,60,000 HIV new infections annually
  • Hepatitis B 8 to 16 million
  • Hepatitis C 2.3 - 4.7 million

- WHO
Generation of Injection Related Waste & its Disposal

• An enormous amount of infectious and environmentally dangerous waste is generated
  - In Delhi 65 tones of waste is generated annually
• AIPI- IPEN study showed satisfactory waste disposal only
  - 61% in Health Facility level
  - 45% in Terminal Disposal
Current Use of Injections - How Rational?

• Huge burden of injection
  • 83% for curative purposes
  • almost one of every two patients (48.1%) attending out clinics receives an injection
  • injections commonly prescribed for fever-cough-loose motions
  • most of these injections can be considered “UNNECESSARY”
What Should Be Done?

- The need of the hour is to create an institutional mechanism for generating awareness in:
  - safe injection techniques
  - safe disposal of injection related waste
  - rationale prescription of injections and
  - creating community awareness through institutional mechanism
Model Injection Centres Program
-Construct

• To improve injection practices in the country
  IPEN in collaboration with the GOI/MoHFW & State Governments has initiated the Model Injection Centres Program in 25 medical colleges across the country.
Model Injection Centres Program - Objectives

- To setup a network of model injection centres where injection prescribers and providers could be trained in principles and practices of injection safety and safe disposal of injection waste.
- Model injection centres to act as a catalyst for development of locally feasible injection waste disposal mechanisms.
- To develop communication strategy for behavior change among prescribers and community regarding injection practices.
Sites for Model Injection Centres in India (n=25)
Session 3
Technique of Injections

This session will make the participants aware of the correct technique of injections.
What is a Safe Injection?

WHO definition

No Harm to the Recipient

No Harm to the Health Care Provider

No Harm to the Community

Model Injection Centres

- Reuse of equipment
- Unsafe Collection
- Unsafe Disposal

No harm to the recipient, no harm to the health care provider, no harm to the community.
Steps Involved in giving Injection

- Preparing to give injection
- Drawing up the medication
- Locating the injection site
- Preparing the skin
- Giving the injection
- Disposing the syringe/needle
A. Preparing to give Injection

- Wash hands
- Wear gloves

Area commonly missed in hand washing

Most frequently missed
Least frequently missed

Least clean areas of hands

- Washing hands where running water is not available

Model Injection Centres
Preparing to give Injection

- Assemble the necessary equipments
  - syringe and needle
  - spirit/alcohol swabs
  - medicine/vaccine vial/ampoule
  - diluents
  - hub cutter
  - bin to dispose the syringe
B. Drawing up Medication

- From a glass ampoule
  Hold the ampoule in your left (non-dominant) hand
- Sawing all around the neck of the ampoule with the blade.
- Hold the top of the ampoule with your index finger and thumb firmly and flick open the ampoule.
Drawing up Medication

cont...

• From a vial

• Remove the metal/plastic cap
• Clean the rubber cap with a spirit swab.
• Remove the syringe from the plastic/paper cover
• Fix the needle to the syringe securely

Model Injection Centres
Drawing up Medication

• From a vial

• Hold the vial in an up-right position with your non-dominant hand and push the needle at a $90^\circ$-degree angle.

• Inject air into the vial and turn it upside down.

• Pull back the plunger to fill the correct dose of medication.
C. Locating the Injection Sites

• Intramuscular -

An intramuscular injection is given on arm (on the deltoid muscle, antero-lateral aspect of middle one third of the mid the thigh and buttocks)
• **Subcutaneous** – A subcutaneous injection is given in the fatty layer of tissue just under the skin. This injection can be given in the arms, legs, or abdomen.
Locating the Injection sites

• Intradermal

All the sites used to give intramuscular injections can also be used for intradermal injection.
D. Preparing the skin

- **Use of spirit swabs / boiled swabs** for cleaning the site.
- **Cleanse the skin in a circular motion** starting from the centre to the periphery.
- **Allow 30 seconds** for the spirit to dry.
E. Giving the injection

- Intradermal

- Hold the syringe at an angle of 10-15°
- Insert the needle just under the epidermis for about 2-3 mm
- Inject the desired dose of medication
- Note the appearance of a wheal under the skin
Giving the injection

- **Subcutaneous**
- Hold the syringe like a pencil in one hand
- Pinch the skin between the thumb and index finger
  Thrust the needle into the raised fold of skin at an angle of 90°
- For small children and persons with thin skin, insert needle at 45°
Giving the injection

• Subcutaneous

• Release the skin fold after the needle is inserted completely

• Use the free hand to hold the syringe near its base to stabilize it

• Inject the medication slowly taking 5-10 seconds for injecting the entire amount

• Withdraw the needle and press the site with the spirit/boiled swab and press gently for about a minute.

Model Injection Centres
Giving the injection

- Intramuscular

- Hold the syringe like a pencil in one hand

- Thrust the needle through the skin into the underlying muscle at a 90° angle

- Release the skin
Giving the injection cont....

- Intramuscular

- Gently pull back the plunger and check for appearance of blood

- Inject the medication slowly taking about 10 seconds for every ml of medication to be injected

- Withdraw the needle and press the site with the swab

- Don’t rub the injection site
Giving the injection

Venepuncture

• Venepuncture is a frequently done procedure for giving injections/drips and for drawing blood for various investigations.

• This procedure involve direct contact of the needle with the blood stream

• one should be extremely careful while performing a venepuncture because using an unsafe needle may transmit infection to the blood stream directly and this can have serious consequences.
Errors to be avoided while giving an injection

• Not wearing gloves or washing hands.

• Wiping the needle with a swab before giving injection.

• Touching the needle with hands before giving injection.
Errors to be avoided while giving an injection  cont...

- Picking up glass syringe/needle with bare hands from a sterile drum.
- Giving injection over clothes.
- Recapping the needle after injection.
Errors to be avoided while giving an injection

- Not cleaning the site of the injection.
- Using the same needle for withdrawing medication from a multidose vial for giving injection.
This session will introduce the basic principles of safe containment and disposal of injection waste at the health facility level and it’s processing for terminal disposal.
At the Health Facility

A. Steps for handling wastes after giving injection

- Translucent puncture proof containers for collecting sharps at the injection site
- Use hub cutter to cut syringe hub AFTER EVERY SINGLE INJECTION
At the Health Facility

Steps for handling wastes after giving injection

• Don’t accumulate used syringes for hub cutting at one-go

• Use color coded bags for various categories of wastes

Cutting the syringe hub

Model Injection Centres
Flow Chart - I Disposal of Injection Related Wastes at the Health Facility

Disposal of Injection Related Wastes

Wrapper / needle cap / empty vials
- Black Bag
  - Municipal wastes

Needles / broken ampoules / cutter (sharps)
- White Translucent Puncture Proof Container
  - Disinfectant / Autoclaving & Shredding & Recycling

Syringes (after hub cut), gloves, IV set
- Blue Bag
  - Disinfectant / Autoclaving, Shredding & Recycling
  - OR

Swabs
- OR
  - Red Bag
    - Disinfectant / Autoclaving / Recycling
  - OR
  - Yellow Bag
    - Incineration / Burial

Model Injection Centres
Flow Chart – Il Steps of Disposal: Injection Related Waste

- Fresh Syringe & Needle
- Vial / Ampoules

Wrapper/Needle Cap/Empty Vials (Not Ampoules)

Black Bag

Clean the Site of Injection with Swab & Give Injection

Cut Hub

Red Bag – Syringes (after hub cutting) /Gloves/Used Swabs/ All other Vials / Tubes like IV Set.

Puncture Proof Box – Used Needle, Ampoules & other Sharps

Model Injection Centres
Flow Chart – III Steps of Disposal: Injection Related Waste

**Fresh Syringe & Needle**
- Wrapper/Needle Cap/Empty Vials (Not Ampoules)
  - Black Bag
  - Clean the Injection Site with Swab & Give Injection
    - Yellow Bag
      - Used Swabs
      - Unused /Partially used / Expired Vials
    - Blue Bag:
      - Syringe after the Hub has Been Cut
      - Glove
      - Tubes like IV Set etc.
- Injection Vial / Ampoule
  - Cut Hub
    - Puncture Proof Box – Used needle, Ampoules & other Sharps
B. Steps to prevent needle stick injury

DO NOT:

• recap needles
• try to bend/break the needles
• manually remove needle from the syringe
• manually transfer needles from one container to another

Do not recap needles
C. Handling of Waste Containers (hub cutter & sharps)

- Leak-proof and puncture-proof
- Should not be filled more than three-fourth of its capacity
Handling of Waste Containers
(hub cutter & sharps)

• Should be closed securely

• Should be kept away from children

• Should not be kept on the floor

• Never transfer used sharps by hand directly from one to another

Model Injection Centres
Terminal disposal of injection related waste

- Segregate injection waste at its source itself
- In case of variations, two basic principles remain:
  - Chemical treatment / autoclaving of cut syringes & needles.
  - Sterilized cut syringes should be recycled and NOT INCINERATED.
Terminal disposal cont...

- Options for local flexibility could be explored in three major areas:
  - collection of waste from different health facilities for transport to a common BMW Facility.
  - construction of sharps pit where it could be disposed.
  - recycling of plastic that has been rendered non-infectious by adequate autoclaving.
Guidelines of the CPCB and the MOHFW on Handling of Injection Related Waste

A. Outreach Level/Outside District Hospital/CHCs

• Remove needles from AD syringe with hub cutter after Injection
• Needle with detached hub to fall in a translucent white sturdy/puncture-proof container
• Store broken vials in a separate similar container
• Segregate & store detached syringes & unbroken vials in red container
Outreach Level/Outside District Hospital/CHCs

- Carry & hand over these containers and unused vaccines to the DH/CHC/PHC etc.
- Label the containers with Biohazard Symbol

The Biohazard Symbol

Model Injection Centres
B. Tertiary Care/PHCs/CHCs/District Hospitals

- Remove needles from AD syringe with hub cutter after Injection
- Store broken vials in a separate similar container
- Segregate & store detached syringes & unbroken vials in red container
- Label the containers with Biohazard Symbol
C. Terminal Disposal

- If CBWTF exists, then send all the containers containing used syringes/needles and broken vials to it.
- If CBWTF does not exist, autoclave both white translucent & red containers or boil such wastes in water for 10 mins/chemical treatment.
Terminal Disposal

- Dispose the autoclaved needle & broken vials in a pit/tank.
- Send the syringes & broken vials for recycling or landfill.
- Wash properly both the autoclaved containers for reuse.
- Proper recording of generation, treatment & disposal of waste.
Terminal Disposal

Design of a Sharps Pit

Concrete Slab

Steel pipe

5 cm

Ground surface

Needles & broken vials

Brick, Masonary of concrete lining

6 ft depth

Not less than 6 ft

Water table level

Model Injection Centres
## Terminal Disposal

### Color-coding & Type of Container for Disposal of Biomedical Wastes

<table>
<thead>
<tr>
<th>Color Coding</th>
<th>Waste Category</th>
<th>Type of Container</th>
<th>Treatment Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Cat. 1 – Human Anatomical Waste. Cat. 2 - Animal Waste. Cat. 3 – Microbiology and Biotechnology Waste. Cat. 6 - Soiled Waste</td>
<td>Plastic bag</td>
<td>Incineration/deep burial</td>
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*Model Injection Centres*
### Terminal Disposal

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<tr>
<td>Red</td>
<td>Cat. 3 – Microbiology and Biotechnology Waste. Cat. 6 – Soiled Waste Cat. 7 – Solid Waste (Plastic)</td>
<td>Disinfected container/plastic bag.</td>
<td>Autoclaving/Microwave/Chemical Treatment</td>
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## Terminal Disposal

**Color-coding & Type of Container for Disposal of Biomedical Wastes**

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<td>Blue/White/Translucent</td>
<td>Cat. 4 – Waste Sharps Cat. 7 – Solid Waste (Plastic)</td>
<td>Plastic bag/puncture proof container.</td>
<td>Autoclaving/Microwave/Chemical Treatment and destruction/Shredding</td>
</tr>
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<td>Black</td>
<td>Cat. 5 – Discarded Medicines and Cytotoxic Drugs</td>
<td>Plastic bag.</td>
<td>Secured landfill</td>
</tr>
<tr>
<td></td>
<td>Cat. 9 – Incineration Ash</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cat. 10 – Chemical Waste</td>
<td></td>
<td></td>
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Session 5
Setting up Model Injection Centres

This session will help the participants to set up Model Injection Centres in their own health facility
Basic Elements of a Model Injection Centre

- Well Equipped
- Safe
- Efficient
- Convenient
- Hygienic
Spacing in the Injection Room

• Flow of patients should be uni-directional

• Sufficient space and privacy for the patient to sit/lie down comfortably

• The seating arrangement should allow attendant to hold the child comfortably but firmly for injection.

• Preferably a couch for patients who develop reaction after injection
Layout of a Model Injection Centre

- Wash basin with running water
- Refrigerator/Cold chain
- Registration desk with chair
- Patient examination table
- Seat for client/mother and child
- Injection tray
- Hub Cutter
- Message board
- Waste disposal bags
- Injection giver seat
- Seat for client/mother and child
- Patient examination table
- Hub Cutter
- Couch for patients with post injection complications
- IN/OUT
Supply of Injection Equipments

• Plan and arrange the required number of syringes, needles, swabs, vaccines, medications, diluents, etc.

• Arrange the supplies for the session at one place

• Separate areas for injection giving and record keeping

• Arrange prescription slips to avoid giving wrong injections
Essential Equipments for MIC

- Soap
- Gloves
- Spirit swabs
- Ampoule cutter
- Hub cutter & safety box (as per BIS specifications)
- Disinfectant
- Fridge/cold chain/ILR
- Facility for hand washing, preferably running water
- Syringes
- Needles
- Appropriate diluents
- Emergency kit
- Color coded waste disposal bags/sharps containers
- Message board/IEC material
Injection Tray

Contents

- ✓ Needles/syringes
- ✓ Diluents
- ✓ Swabs
- ✓ Injectables/ vaccine vials

DOs

- ✓ Keep it hygienic
- ✓ Keep only fresh needles and syringes.

DONTs

- ✓ Do not place used syringes / needles / swabs / empty vials or ampoules
Waste Disposal Mechanism

- Hub-cutter, sharps container should be within reach in the injection room
- Dispose the sharps and the needle / syringe after EVERY SINGLE INJECTION
- Don’t place injection equipment on the floor to prevent contamination
Message Board

• For the patients and care givers to understand the basic features of injection safety paste:
  ✓ posters
  ✓ paint messages on the wall
### Contents of Emergency Kit

1. Plastic / disposable syringes
2. Injections
   - Anti-histamine
   - Hydrocortisone
   - Adrenaline
   - Terbutaline
   - Atropine
   - Dextrose (25%)
3. IV Canulas (22G and 24G)
4. Cotton, gauze
5. IV Infusion set
6. Oral drug: Paracetamol
7. Mouth gags and tongue depressor
8. Oxygen cylinder
9. Ambu bag
10. Face mask (adult/pediatric)
11. IV Fluids
   - Normal saline
   - N/5 in 5% Dextrose
Session 6
Rationality of Injections

• This session will emphasize on the rational use of injections

• Key Notes
  • Common examples of irrational & unnecessary use of injections
  • Problems of irrational use of injections
  • Rational use of injections
Irrational Use of Injections

- Every 1 in 2 clients who go to a health facility (whether public or private) receive injection irrespective of their presenting complaint.

- Half the cases of clients presenting with common complaints like fever/cough/loose motions were prescribed injection.

Assessment of Injection Practices in India

Model Injection Centres
Need for Rational Use of Injections

• Urgent need to adopt Rational Use of Injections in order;
  • to reduce the overall burden of injections
  • to reduce the burden of unsafe injections
  • to minimize the amount of infectious waste generated by such a large number of injections.
Common examples of irrational use of injections

- For diarrhea
- For ARI
- For undiagnosed fever
- For uncomplicated malaria cases
- For non-specific complaints like general weakness, giddiness, uneasiness, free floating anxiety (*ghabrahahat*).
Are injections more effective and faster acting than oral medication?

• Many injectables like;
  • Antibiotics
  • Analgesics and
  • Vitamins

• Have oral preparations which are;
  • Just as effective
  • Fast acting and
  • Much safer
Problems in the Use of Injections

- Dangers to the patient
- Higher cost of treatment
- Addition to bio-medical waste in the form of used syringe/needles/vials
- Poor compliance
When To Inject

- When the recommended medicines does not come in a form that can be taken by mouth.
- When the person vomits often, cannot swallow, or is unconscious.
- In certain unusual emergencies and special cases, such as severe pneumonia, infections after childbirth, tetanus, poisonous snakebite, meningitis, severe allergic reaction.
When Not To Inject

• Injections should be avoided for
  • For uncomplicated common illnesses like cold, flu, loose motions, fever.
  • For vague symptoms like weakness, giddiness, etc.
  • When equally effective oral medicines are available and the patient is in a position to accept orally.
  • When you are not absolutely sure about the dosage and route of medication.