Mixing Medications in the Same Syringe

Safety and EBP Guidance

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Module 2

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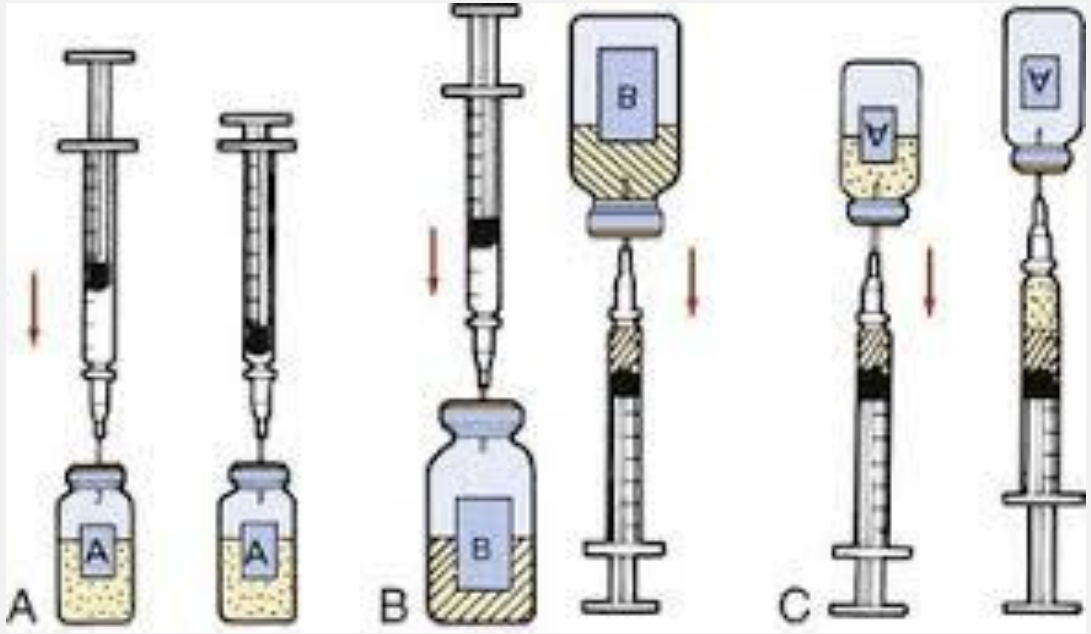
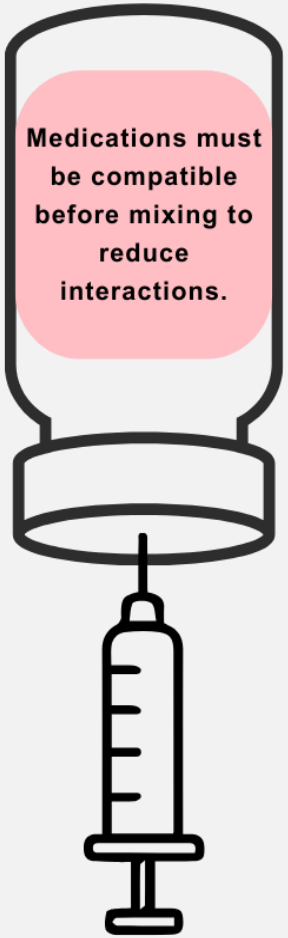
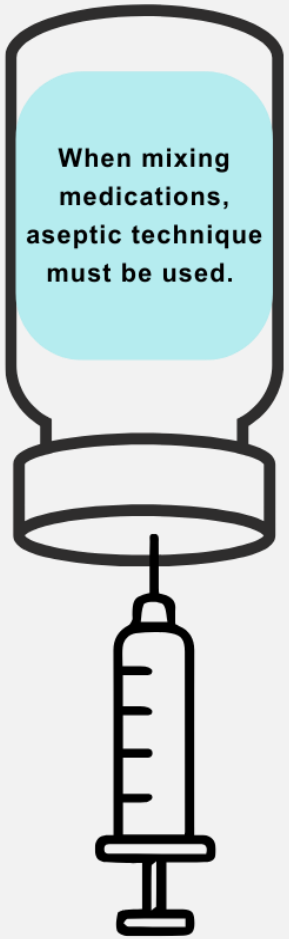


Introduction: Mixing Medications





EBP Findings

01 Some combinations can be safely mixed when they've been tested for compatibility.

02 Safety depends on proven stability — mixtures must remain effective over time.

03 Not all medications can be mixed, and some combinations may become unstable or ineffective.

04 Validated combinations (like some vaccines) show that mixing components can be both safe and efficient when properly formulated.

05 Careful evaluation is essential before mixing any medications together.

06 Proper technique and oversight help reduce risks and ensure patient safety.

07 Even clear mixtures can form micro-particulates that may be harmful if injected.

08 Strict aseptic technique is required to prevent contamination and reduce infection risk when mixing medications.

EBP Findings: De-mystifying the "Mixinfusor"

In the UK, there was an evaluation of 880 pediatric patients receiving propofol-remifentanil mixtures in the same syringe for TVA (total venous anesthesia).

- This study showed only **1.7% serious complications** with this practice.
  - This rate is substantially lower than other large anesthesia safety studies. ***indicating this technique is safe**
- This practice is **beneficial** because it allows a single infusion pump.
  - Reduces equipment needs, cost, setup time.
  - Valuable in high-turnover pediatric OR.
- **Reduces the total infusion volume:** This is beneficial because fluid balance must be very carefully managed in young and small patients.
- **Lower infection risk:** Combining drugs into one line limits the number of IV connections lowering the chance of line contamination and infection.
- **Drawbacks:** Stability concern.
  - Remifentanil concentrations can decline slightly (8–12%) within the first hour in low-dose mixtures, which could affect consistency if syringes are stored for extended periods.
- **Legal and Compatibility Issues:** Under some regulations, mixed syringes are considered unlicensed products.

Applying EBP:
Step-by-Step Guide for Nursing Practice

Steps for mixing medications in the same syringe:

1. **Confirm Compatibility**: Refer to the hospitals or facility's protocol, verify through the eMAR, and contact pharmacy or provider for further clarification.

2. Hand **hygiene** and gather **supplies** needed.

3. **Clean** the top of each vial for 15 seconds.

4. Use **aseptic technique** while drawing up the medications from different vials.

5. Pull back the syringe plunger to **draw air equal** to the amount of the first medication.

6. **Inject air** into the **first** vial (without touching medication).

7. **Inject air** into the **second** vial, invert, and withdraw the second medication first if it's the smaller or more critical dose.

8. **Return** to the **first** vial and withdraw the correct dose.

9. **Remove** syringe and check for bubbles.

10. **Verify** the total **volume** matches the planned combined dose.

11. **Label** syringe with both medication names and doses.

12. **Verify** patient with **2 identifiers** (name and DOB).

13. **Educate** patient on the medications (seven medication rights).

14. **Confirm** acceptance or refusal to take the medications.

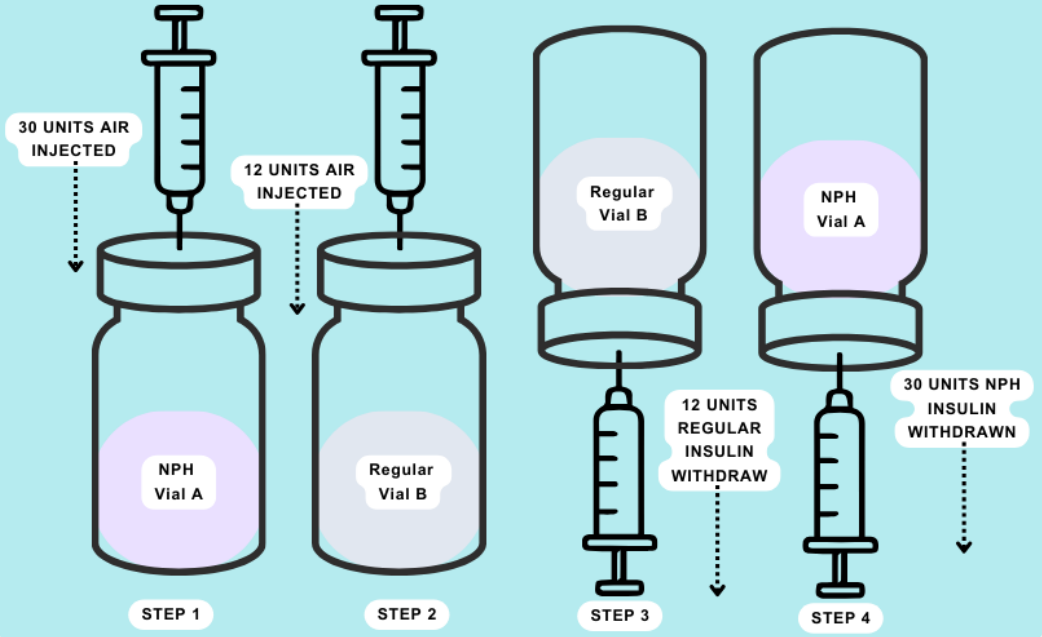
15. **Administer** medication.

Last Step: Documentation

Name, dose, route, frequency, site of administration, time when administered, acceptance or refusal, and signature.

Example: Mixing Insulin in the Same Syringe

Incorporating Regular insulin (short-acting) and NPH insulin (fast-acting): These medications are compatible, allowing them to be mixed in the same syringe. This reduces injection sites, increasing patient safety and care. Fewer injections reduces the risk of lipodystrophy, infection, or multiple adverse reactions.

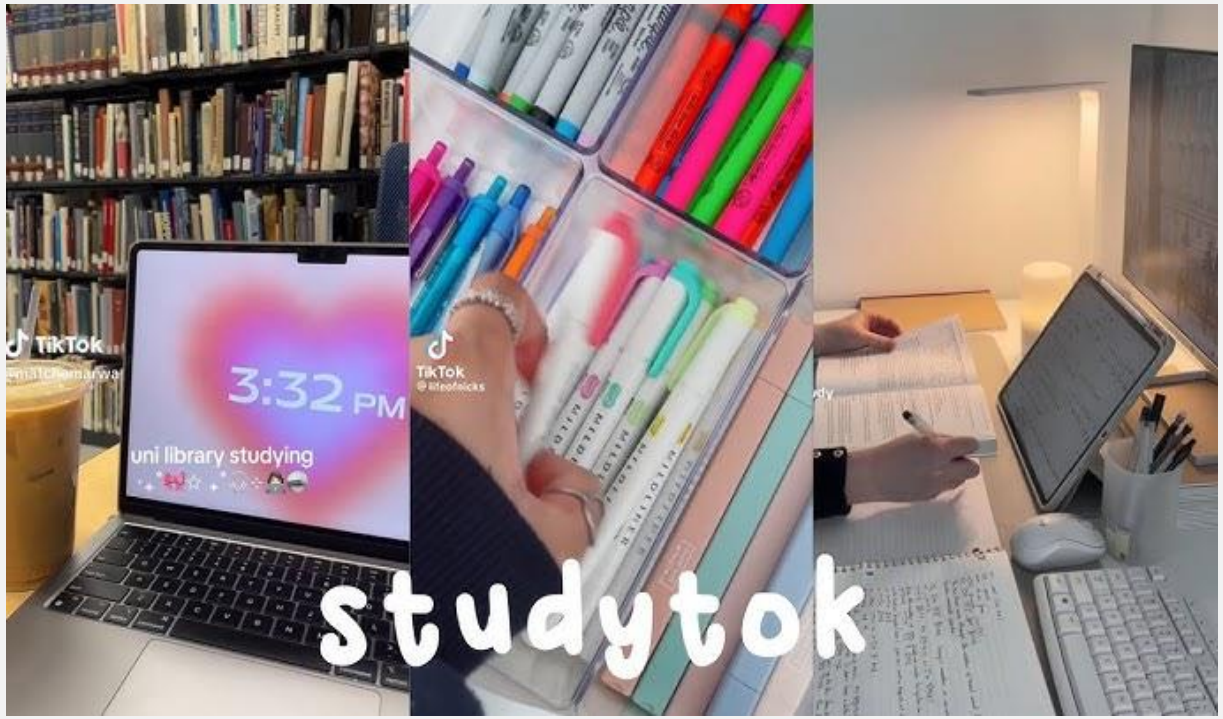


Ethical & Legal Considerations

- **Ethical Obligation:** Mixing medications in a syringe or infusion should only be done when essential for the patient's needs, not simply for the convenience of staff.
- **Legal & Regulatory Framework:** The guidance states that mixing parenteral injections must be:
  - In the best interests of the patient.
  - Avoided where possible
  - Performed only by competent and willing persons AKA qualified personnel, preferably in a pharmacy setting.
  - Accompanied by prescriber-written instructions and verification of competence.
- **Risks to Patient Safety:** Mixing can lead to **physicochemical incompatibilities** (precipitation, separation, gas formation), **chemical instability** (loss of potency or formation of toxic by-products), or **therapeutic failure** — all of which raise ethical concerns about non-maleficence and informed consent.
- **Documentation & Accountability:** Practitioners must check compatibility, monitor for signs of harm or therapeutic failure, and ensure that mixing decisions are transparent and justified.
- **Professional Responsibility:** Pharmacists, prescribers, and administrators share the responsibility to ensure mixing is **appropriate, safe and legally compliant — aligning with ethical principles of beneficence, non-maleficence and justice.**

Fun Fact!

- When it comes to studies about medications and where we get knowledge from, it seems to be different for everyone!
- TikTok has been a learning tool for over 300 drugs!
- A 2021 study showed TikTok study guides were just as effective as handwritten flash cards!
  - Students studied both TikTok and flash cards, then they were given the exact same test.
  - Results showed grades were not significantly different & the students had more fun learning on TikTok!



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