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Insulin Pens Vs. Vials — Clinical Considerations

Background — Insulin products are often available in both vial and pen dosage forms. Both dosage forms have respective advantages and disadvantages, and Long-Term Care Facility (LTCF) administrators and clinicians face a choice in determining the preferred formulations used for their residents. Generally, considerations include **drug cost, requisite nursing time, waste potential, medication error potential, dosing accuracy, ease of use, and patient satisfaction**.

Insulin Vials[1]

ADVANTAGES of using insulin vials in a LTCF include:

⇩ **Med error potential** with ⇩ **risk of sharing insulin vial syringes/needles** vs risk of sharing pens among residents.

⇩ **Nursing time** & ⇧ **patient satisfaction** as compatible insulins may be **mixed** in a syringe for a single injection.

- Check out PharMerica's DYK on Mixing Insulins for more information on compatible insulins!

- Generally, insulin vials may be ⇩ **costly per dose** and may produce ⇩ **waste** compared to insulin pens.

DISADVANTAGES of using insulin vials in a LTCF include:

⇧ Risk of inaccurate dosing when using an insulin syringe for measurement.

- Nursing errors have occurred when units have been mistaken as milliliters and when the U-100 designation on insulin vials has been misunderstood to represent 100 units per vial.[2]

⇧ Risk of med errors due to confusing look-alike insulin vials or mix-ups with other similarly packaged vial drugs.

⇧ Risk of med errors due to limited/absent labeling on clinician-prepared insulin syringes.

- Only ~ 1/3 of nurses always label syringes of medications they prepare and 1 in 4 nurses never label the syringes.[3]

⇧ Risk of med errors due to 'beyond use expiration' dating and the requirement for staff to document a puncture date.

⇧ Risk of cross-contamination when using insulin vials, given common lapses in basic infection control practices.[4]

Improper injection techniques with insulin vials + syringes/needles can contribute to **poor glycemic control**, **transmission of infections**, **medication errors**, and **other adverse effects**!

ISMP offers Safe Practice Recommendations to reduce the risk of errors when transitioning to insulin vials, which may benefit your facility staff if they are primarily familiar with insulin pen administration.

Check out PharMerica's Insulin Drug Chart for general information on today's array of insulin products, including storage considerations before-use and in-use, injection timing recommendations, and more!

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Insulin Pens[1]

ADVANTAGES of using insulin pens in a LTCF include:

⇩ **Med error potential** as pens are already labeled by the manufacturer with product name and product barcode (whereas syringes of insulin prepared on the patient care unit from vials run the risk of being unlabeled).

⇩ **Med error potential** as pens can be individually labeled with the patient's name (and ideally a barcode).

⇩ **Nursing time** as pens provide the patient's insulin in an administration-ready form and doses do not need to be drawn up from a vial with a syringe and needle.

⇩ **Waste** that can occur when dispensing 10 mL-sized insulin vials (versus the standard 3 ml-sized pen).

⇧ **Ease of use,** evidenced by anecdotal & published reports that needlestick injuries may be less common with pen use.[5]

- Patients tend to prefer insulin pens based on ⇧ **patient satisfaction scores** and ⇧ **ease of use**.
- While potentially initially ⇧ costly than insulin vials, insulin pens may ⇩ **overall healthcare utilization rates** & **costs**.[6]

ISMP notes that while pens offer distinct advantages, **using pens like vials** (withdrawing insulin from them with a syringe) and **using pens for multiple patients** (retrograde flow of blood/tissue into the pen means **cross-contamination** risk exists even if pen tips are replaced) are realistic disadvantage concerns.

Insulin Pen errors reported to ISMP include **pen design flaws, not inverting and rolling insulin pens** to properly mix the insulin, **injection technique** errors (e.g., not keeping pen needle under the skin for 6 seconds to prevent leakage from the injection site), **misreading the dose**, and **measurement errors** (such as twisting the dosing dial back down to zero instead of pressing the injection button on a pen to administer a dose).

Check out PharMerica's DYK on Prefilled Insulin Pen Devices to avoid these common pitfalls and promote the correct use of insulin pens to minimize medication errors!

1. ISMP. Guidelines for Optimizing Safe Subcutaneous Insulin Use in Adults. 2017.
2. ISMP. A clinical reminder about the safe use of insulin vials. ISMP Medication Safety Alert! 2013;18(4):1-4
3. American Nurses Association. Medication errors and syringe safety are top concerns for nurses according to new national study. June 18, 2007. http://www.nursing-world.org/FunctionalMenuCategories/MediaResources/PressReleases/2007/SyringeSafetyStudy.aspx
4. ISMP. Perilous infection control practices with needles, syringes, and vials suggest stepped-up monitoring is needed. ISMP Medication Safety Alert! 2010;15(24):1-3
5. Ward LG, Aton SS. Impact of an interchange program to support use of insulin pens. Am J Health-Syst Pharm. 2011;68(14):1349-52
6. American Society of Health-System Pharmacists (ASHP). Promoting safe use of insulin pens in the hospital setting. ASHP Advantage. 2014