Stability of Unit Dose Preparations of Sublingual Nitroglycerin Tablets in the Health System Setting

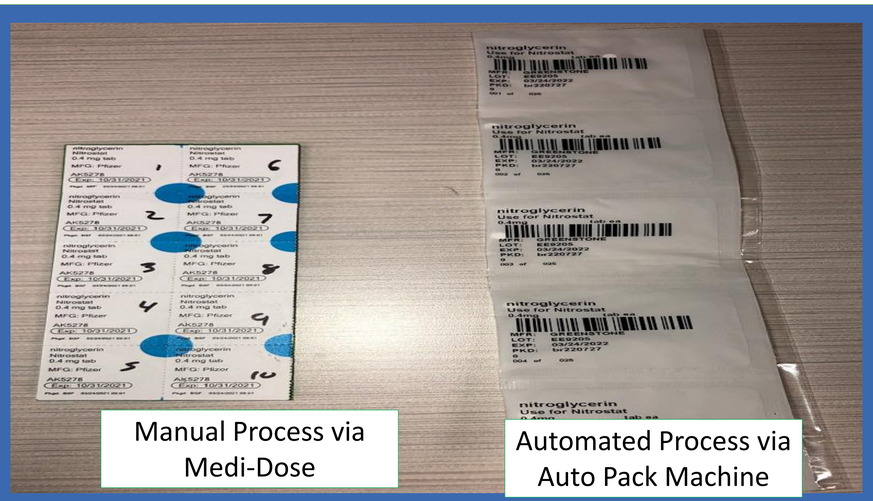
Matt Bilhimer, Pharm.D.[1], BCPS, Yezan Salamoun, Pharm.D. Candidate 2023[2] ,
Phil Schneider, Pharm.D., FASHP[1], Jim Backes, Pharm.D.[2,3], Ryan Funk, Pharm.D., Ph.D.[2,3]

Background

- Limited data are available on the stability of sublingual nitroglycerin (SLN) tablets., including no data within the inpatient environment.
- The package insert recommends SLN tablets be stored in the original glass vial container due to degradation in the presence of moisture and air.
- In 2018, Nawarskas et al demonstrated that SLN tablets retained potency when stored in simulated "real-life" conditions (e.g., 25°C/40% relative humidity, 40°C/60% humidity, purse, pocket) over at least a 12 month period. These results suggest modern preparations may be preserved outside the original container for extended periods.
- In the inpatient setting, accurate inventory control of SLN tablets in automated dispensing cabinets (ADC) is difficult due to misplaced/lost vials.
- SLN is required in certain emergent situations including acute coronary syndrome.

Methods

- For this open-label study, SLN tablets were packaged at Olathe Medical Center into two separate preparations:
  - Manual process utilizing Medi-Dose system blister cards
  - Automated process with Talyst® JVM Auto Pack Machine
- After packaging, preparations will be stored within a Cerner RxStation® ADC. Compartment humidity and temperature will be checked three times weekly.
- Two common manufacturer products Pfizer ([PZR] - branded, Greenstone Labs [GSL] - generic) are being tested to increase generalizability.
- Purity testing on Days 0, 30, 90, 180, and 365 after packaging will occur via ultra-performance liquid chromatography with ultraviolet detection (UPLC-UV) at the University of Kansas Medical Center.
- Potency assessment to occur along a 5 point calibration curve from 25 – 125% resulting in an average coefficient of variation of 2.5%.



Purpose

We seek to investigate the stability of two SLN tablet products using two different unit-dose packaging methods over a 12 month timespan.

ESTIMATED PROJECT COMPLETION:
MARCH 2022

Preliminary Results

- Forced Degradation Control
  - 48% loss of potency over 43 hours at 50°C in open container
- Day 0 (Packaging Day): Relative Standard Potency
  - PZR: 99 +/- 2.2%
  - GSL: 100 +/- 3.2%
  - Day 0 ADC storage conditions: 31% humidity, 76.6°F

Day 30 Results

Process	GSL	Pfizer
Control	101 ± 4.4%	98 ± 4.4%
Automated	42 ± 3.1%	39 ± 3.6%
Manual	92 ± 3.8%	92 ± 3.9%

Possible Future Implications

- If tablet stability can be demonstrated in unit-dose packaging preparations, commercial packaging solutions will be warranted.
- Unit-dose packaging may allow for tighter inventory control throughout the inpatient medication use system.
- Cost savings may be possible through overall decreased purchase of drug/wastage.

References

Nawarskas J, Koury J, Lauber DA., et al. Open-Label Study of the Stability of Sublingual Nitroglycerin Tablets in Simulated Real-Life Conditions. 2018. Am J Cardiol. 122: 2151-2156

Disclosure: Nothing to Disclose
Contact: Matthew Bilhimer, Pharm.D., BCPS at mhbilhimer@gmail.com
Author Affiliations: 1. Department of Pharmacy, Olathe Medical Center, Olathe, KS; 2. University of Kansas School of Pharmacy, Lawrence, KS; 3. University of Kansas School of Pharmacy, Department of Pharmacy Practice