

DESCRIPTION

Hydromorphone is a semi-synthetic opioid used in the management of moderate to severe acute pain. Due to the unavailability of a lower concentration, Humber River Health (HRH) historically utilized hydromorphone 2 mg/mL injection only, despite internal data indicating that up to 97% of administered doses were 1 mg or less, leading to high amounts of wastage. To better align with actual dosing patterns, HRH introduced the 1 mg/mL formulation in November 2024.

OBJECTIVE

To reduce hydromorphone injectable waste by 50% and waste transactions by 30% through the implementation of a 1mg/mL hydromorphone formulation by May 2025.

ACTIONS TAKEN

PDSA 1: Analysis of Baseline Data

- An automated dispensing unit (Omniceil) transaction report and Meditech orders report was run for all hydromorphone 2mg/mL injectable orders and transactions
- Opportunity noted given mismatch in orders and medication supplied format

PDSA 2: Formulary Update

- Added hydromorphone 1 mg/mL injection with structured implementation tracking and sign-off from stakeholders, stepwise min/max purchasing adjustment, Electronic Medical Record item build and testing, and physical space assessment in each Omnicell.

PDSA 3: Meditech Enhancements

- Updated order sets with integrated Clinical Decision Support (CDS) text.
- Usability testing, it was noted that default route for the new injection was epidural. This was changed to IV.

PDSA 4: Education

- Targeted sessions for physicians, pharmacists, and nurses.
- Situation, Background, Assessment, Recommendation (SBAR) email sent to physicians, in-person education delivered to nurses and pharmacists.

PDSA 5: Audit

- Two-week daily audit of inpatient hydromorphone injectable orders using Meditech reports.
- Review and prospective order verification feedback provided to inpatient pharmacist regarding the product format chosen.
- Feedback provided on 19/82 orders.

One Day Audit of Daily Hydromorphone Doses Administered Total Orders: 158

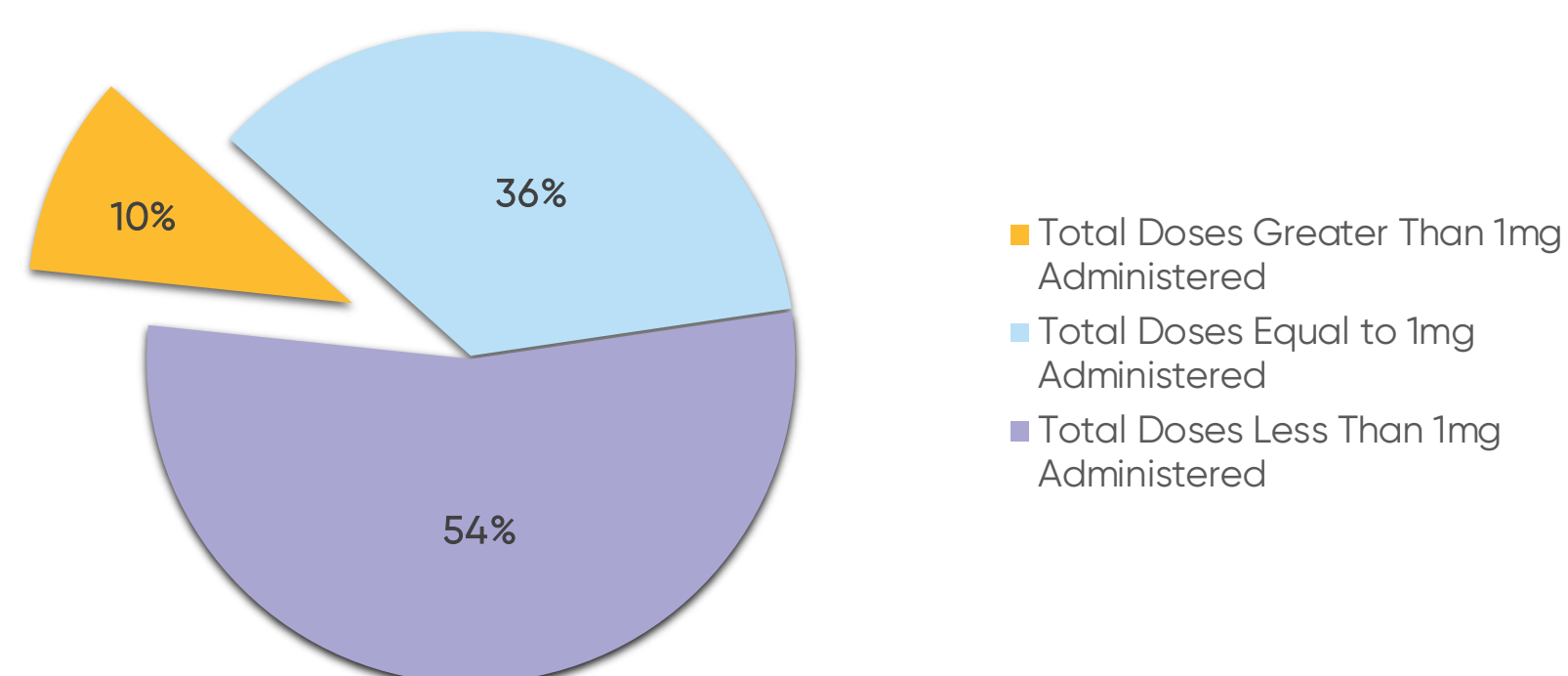


Figure 1. One day pre-implementation audit was conducted highlighting opportunities where a hydromorphone 1mg/mL formulation could have been used.

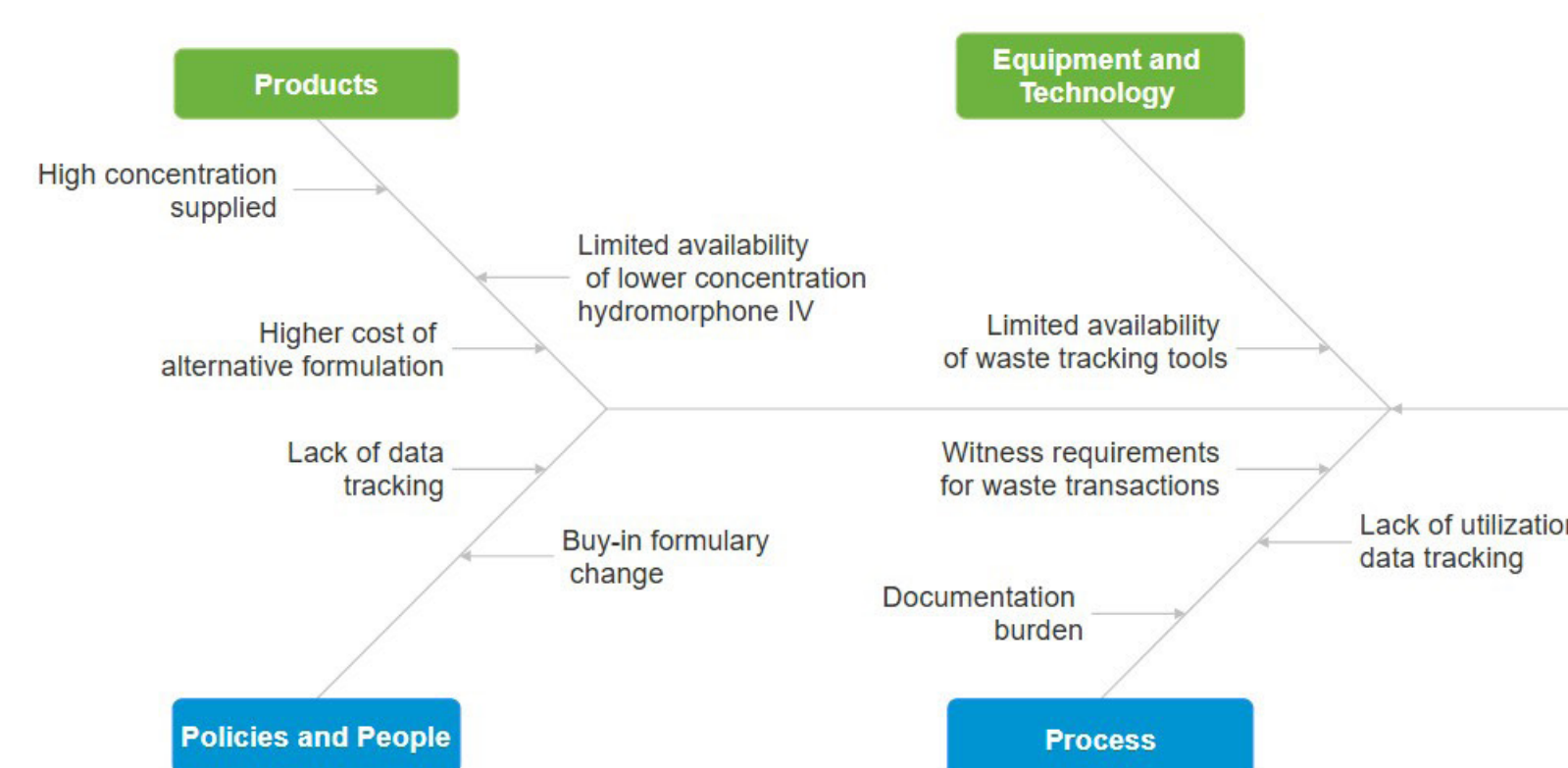
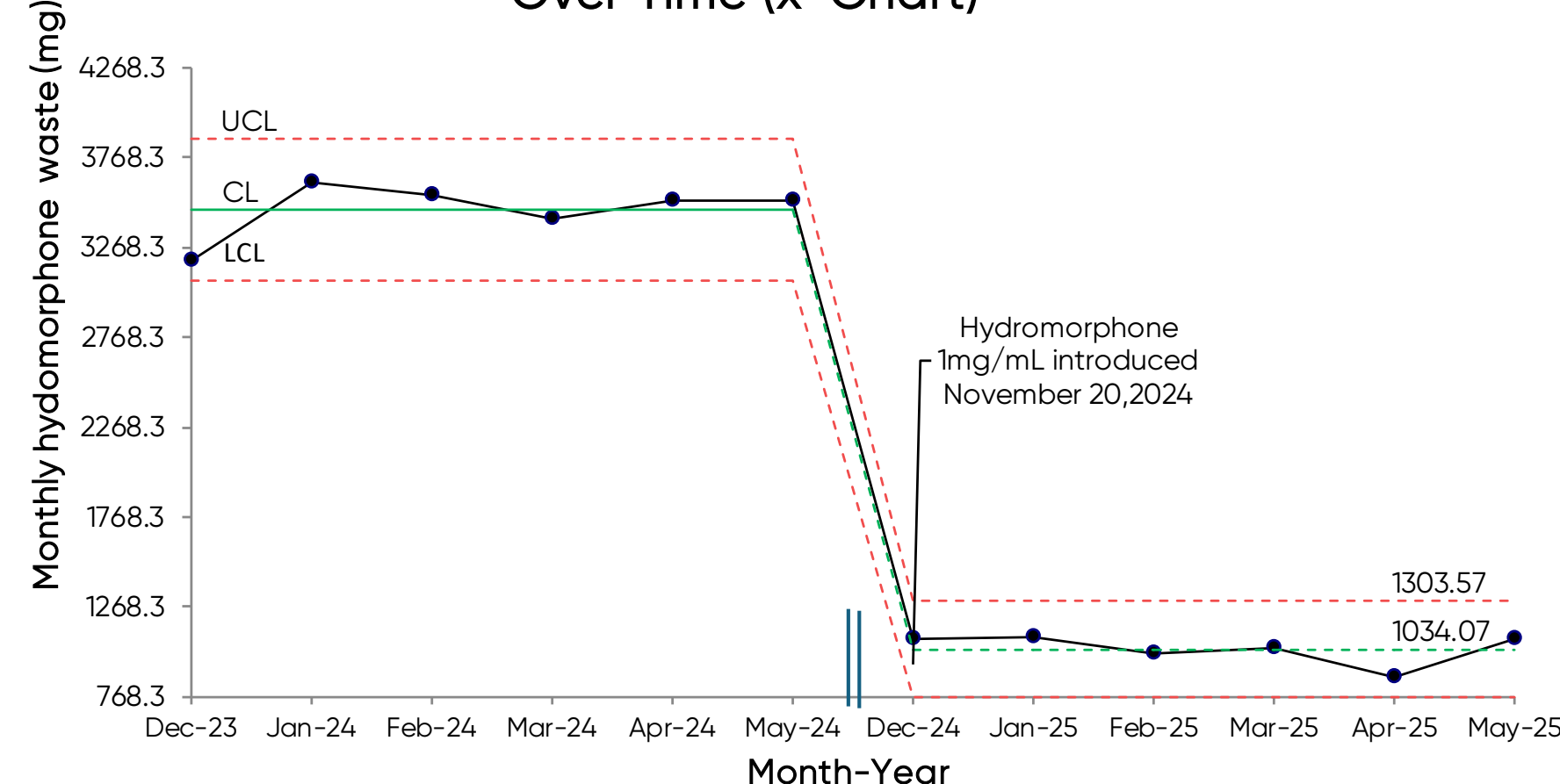


Figure 2. Fishbone diagram visualizing the multitude of factors that led to excessive hydromorphone IV waste and operational inefficiency.

Hydromorphone Injection Cumulative Waste Over Time (x-Chart)



Hydromorphone Injection Cumulative Waste Over Time (mR-Chart)

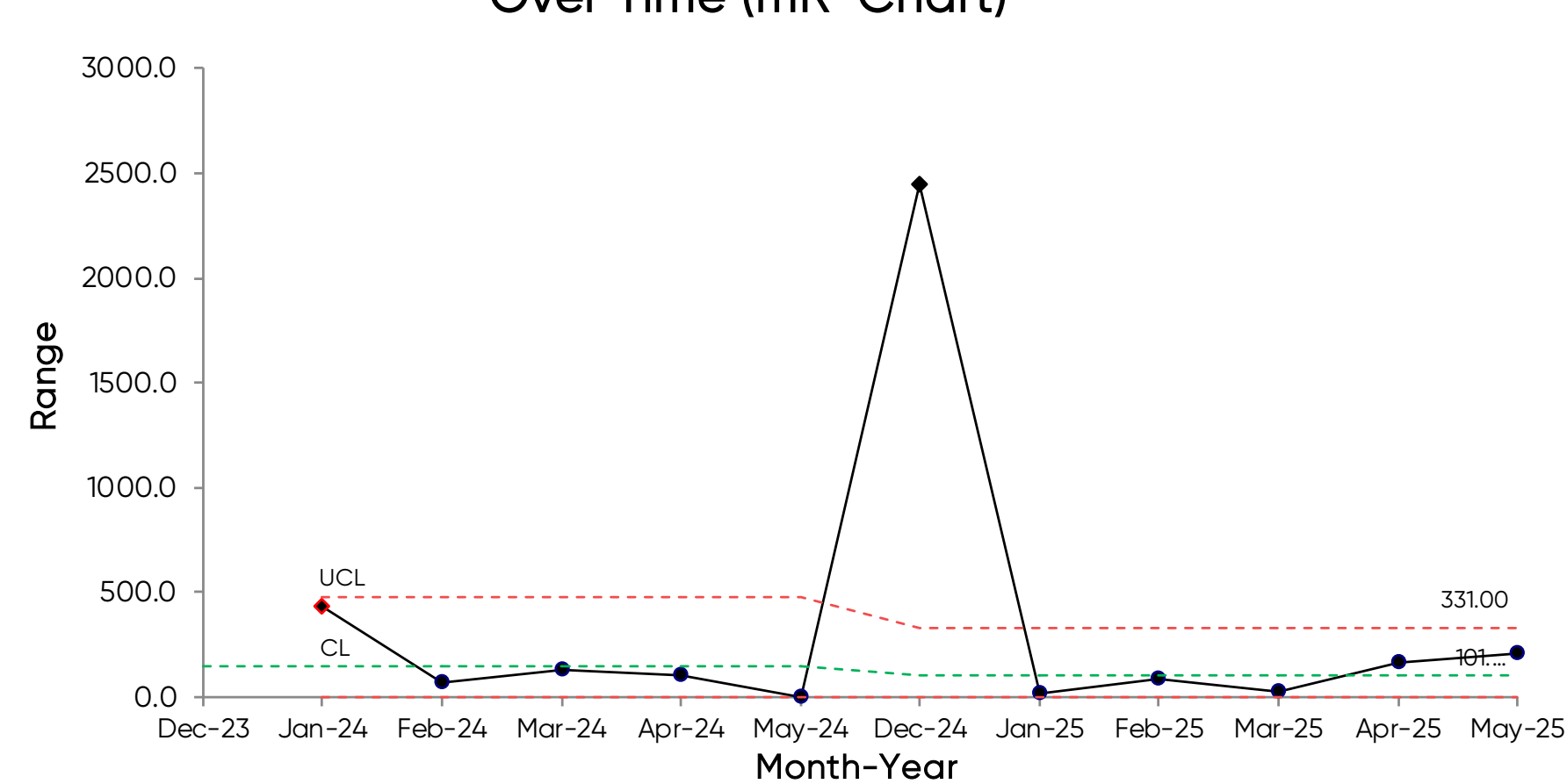


Figure 3. Control chart analysis indicated a 70% drop in cumulative wastage. Note: the outlier on the mR chart is a result of implementation efforts in December 2024.

Hydromorphone Injectable Waste Transactions Over Time (c-Chart)

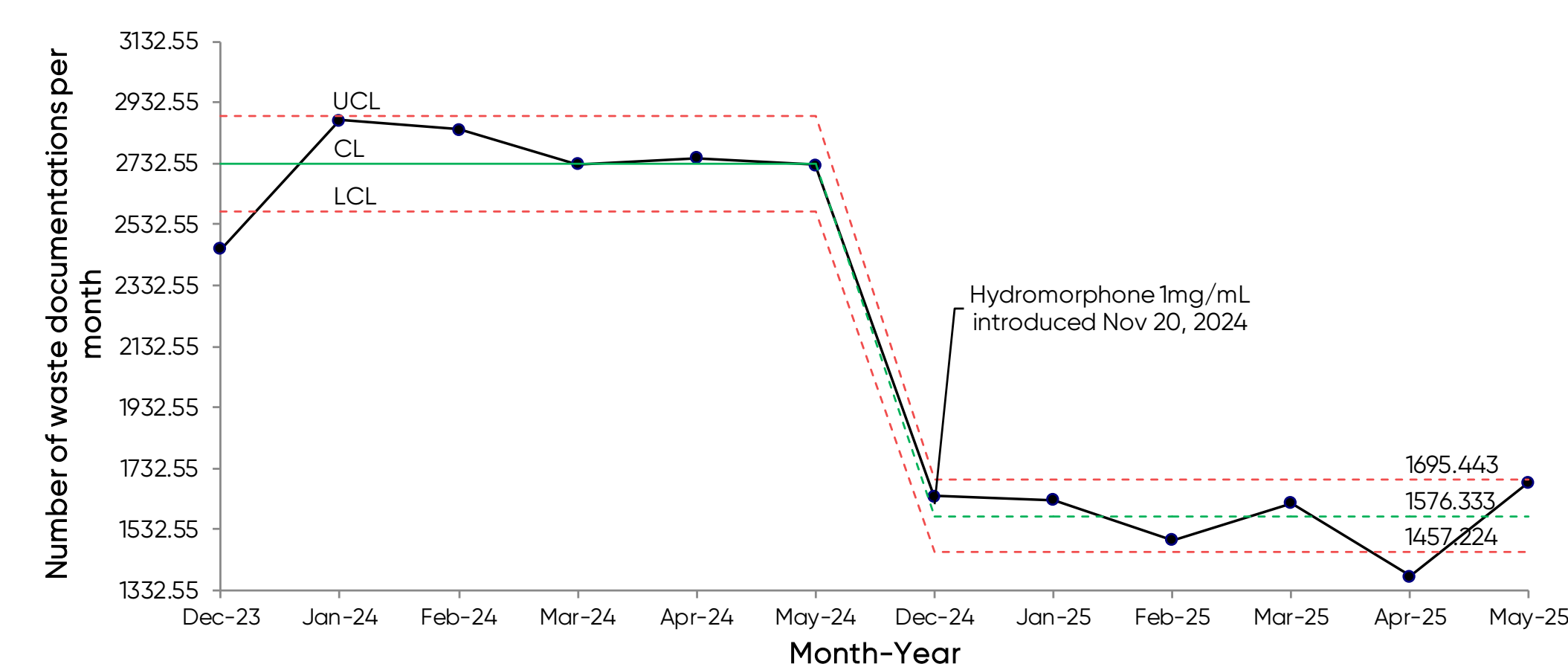


Figure 4. Control chart analysis indicated a 49% drop in transactions, potentially indicating improved workload efficiencies.

SUMMARY OF RESULTS

The hydromorphone 1 mg/mL formulation was successfully implemented on November 20, 2024. Cumulative hydromorphone injection waste significantly dropped from 20,872.75 mg to 6,402.40 mg over six months since the implementation, which is a 70% reduction (14,470.35 mg). Waste transactions decreased from 643 to 328 per 1,000 doses dispensed, leading to a 49% reduction.

LESSONS LEARNED

Reducing waste and removing excess Hydromorphone from clinical areas potentially improved safety and streamlined nursing workflow by reducing waste documentation and witness coordination. Future analysis will assess workload impacts and cost management.

