Improving Safe Use of Hydromorphone in Electronic Medication Management (eMM) Systems

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Background

Hydromorphone is a potent opioid frequently used to treat moderate to severe, acute or chronic pain. Hydromorphone is 5 to 7 times more potent than morphine. Due to its high potency, errors with this medicine may result in serious adverse patient outcomes. Despite the release of three hydromorphone safety notices and alerts and the addition of a Hydromorphone Standard to the NSW Health High Risk Medicines Policy, serious hydromorphone incidents (including death) continue to occur without a decrease in frequency in NSW public hospitals. Although eMM has been shown to reduce medication errors, new safety risks can also be introduced associated with system use[3,4] and monitoring of emerging safety risks can identify areas for improvement to mitigate risk and streamline clinician workflow[4].

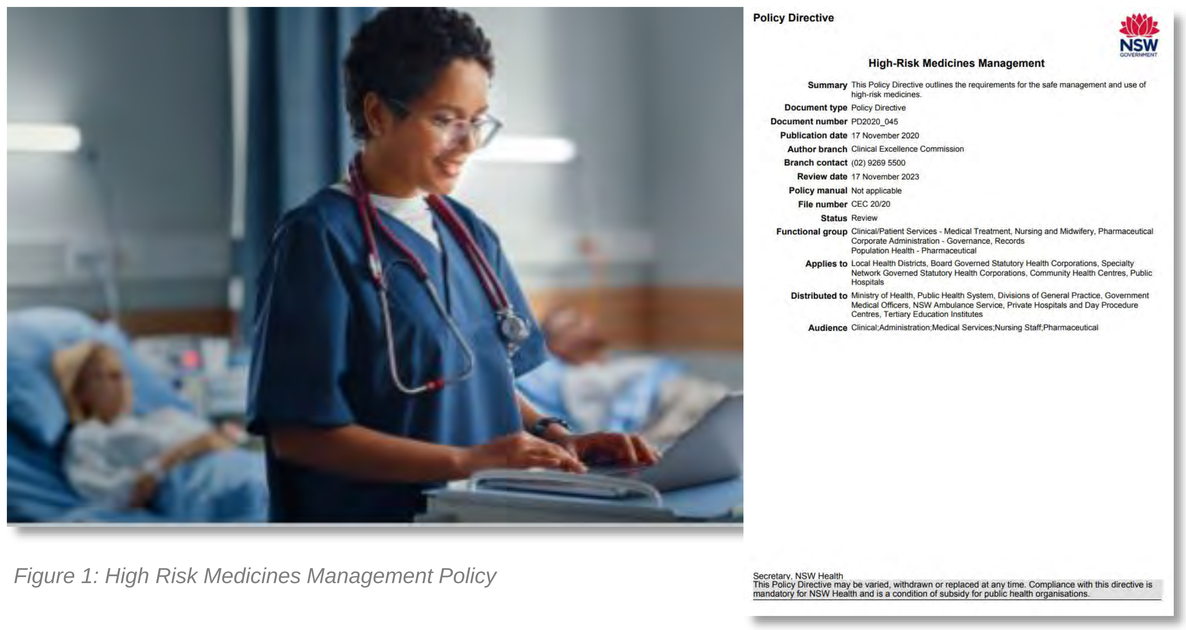

Figure 1: High Risk Medicines Management Policy

Objective

To review the prescribing of hydromorphone within public health facilities to inform state-wide recommended low dose order sentences for safer prescribing.

Methods

A working group was established to explore opportunities to improve hydromorphone prescribing. Proposed elements for low dose order sentences were considered following concerns around starting doses of hydromorphone (Figure 2). When presented for endorsement with relevant networks and expert advisory groups including palliative care and medication safety, conflicting feedback was received prompting a review of prescribing patterns for hydromorphone.

Serious incidents relating to hydromorphone were reviewed and a request sent to all local health districts (LHDs) and Specialty Health Networks (SHNs) to provide information on current prescribing practices over the period between February and April 2022. A list of order sentences built within the system were also received. The information was analysed and used to inform the decision around which low dose order sentences should be included as a state-based recommendation. All other order sentences for hydromorphone via subcutaneous injection were recommended to be removed from EMM systems.

Formulation	Dose	Route of administration	Frequency
HYDROmorphone (dilaUDID) 2 mg/mL solution for injection	0.25 mg	Subcutaneous injection	4 hourly (regular)
HYDROmorphone (dilaUDID) 2 mg/mL solution for injection	0.25 mg	Subcutaneous injection	4 hourly (if required), with maximum dose in 24 hours as a mandatory field

Figure 2: Initial Proposed Low Dose order Sentences

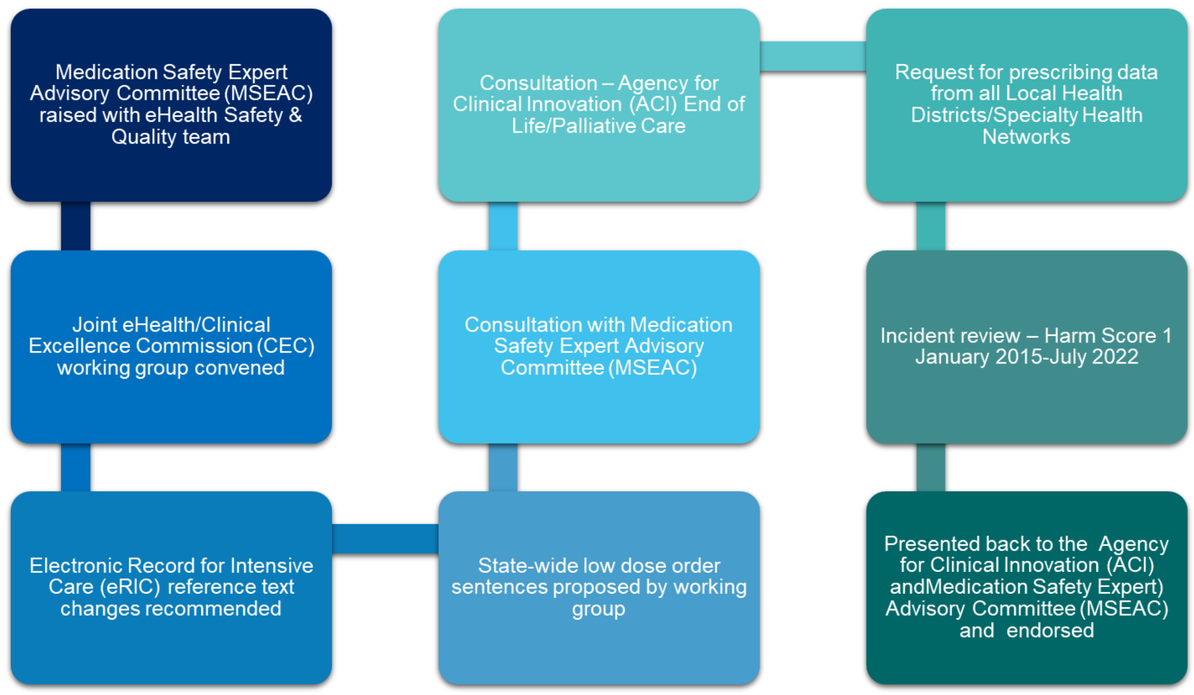

Figure 3: Consultation and Review Process to Define Low Dose Order Sentences

Results and Key Findings

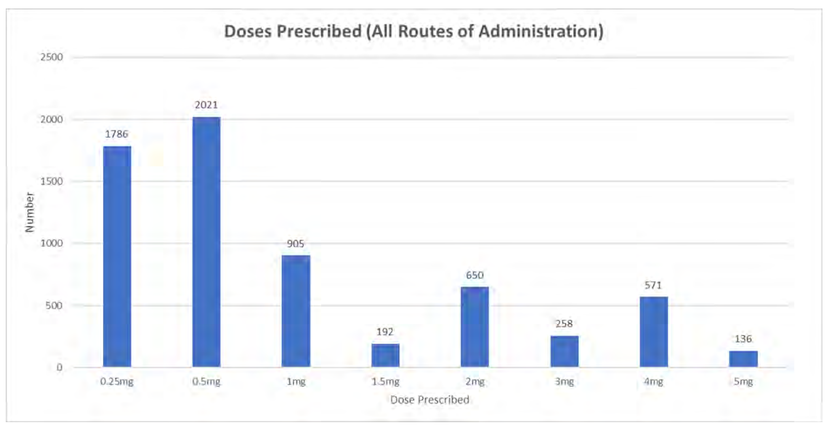

Figure 4: Hydromorphone Doses Prescribed Across all Routes of administration.

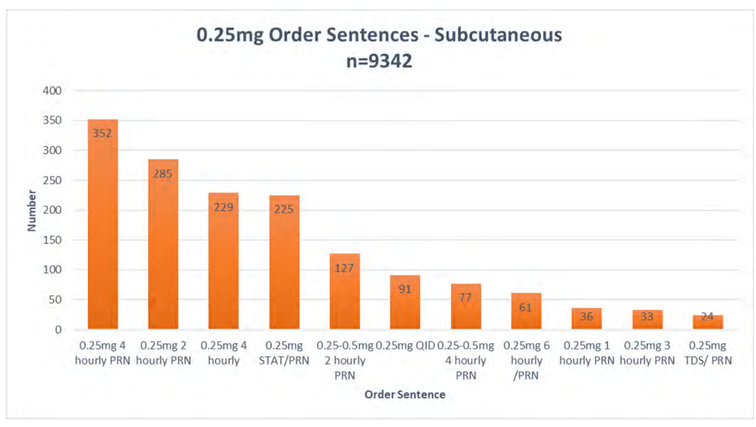

Figure 5: Frequency of Hydromorphone 0.25mg Order Sentences Prescribed

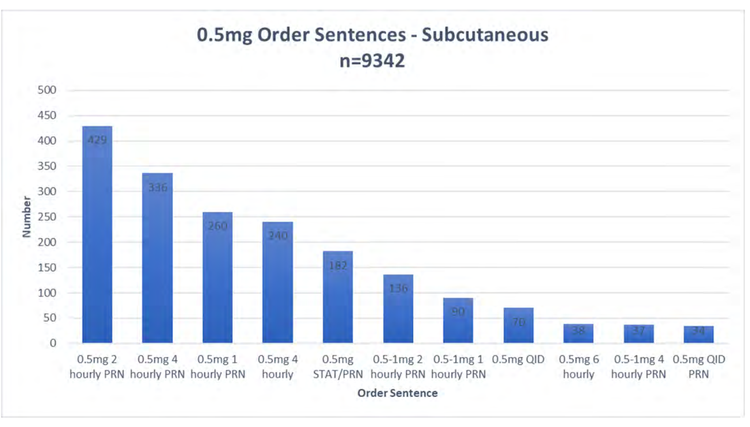

Figure 6: Frequency of Hydromorphone 0.5mg Order Sentences Prescribed.

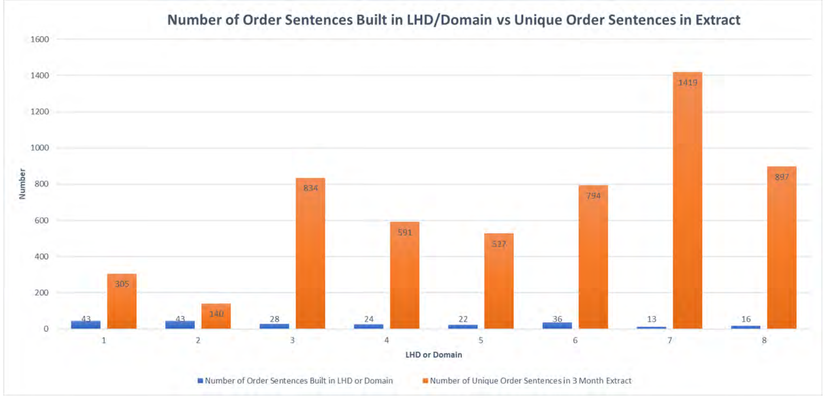

Figure 7: Number of Order Sentences Build in LHD/SHN Domain compared to unique order sentences seen in the extracts.

Formulation	Dose	Route of administration	Frequency
HYDROmorphone (dilaUDID) 2 mg/mL solution for injection	0.25 mg	Subcutaneous injection	2 hourly (if required), with maximum dose in 24 hours as a mandatory field
HYDROmorphone (dilaUDID) 2 mg/mL solution for injection	0.25 mg	Subcutaneous injection	4 hourly (if required), with maximum dose in 24 hours as a mandatory field
HYDROmorphone (dilaUDID) 2 mg/mL solution for injection	0.5 mg	Subcutaneous injection	2 hourly (if required), with maximum dose in 24 hours as a mandatory field
HYDROmorphone (dilaUDID) 2 mg/mL solution for injection	0.5 mg	Subcutaneous injection	4 hourly (if required), with maximum dose in 24 hours as a mandatory field

Figure 8: Number of Order Sentences Build in LHD/SHN Domain compared to unique order sentences seen in the extracts.

The prescribing data included 9342 unique order sentences, with 74% of orders via the subcutaneous route. On average each LHD had 28 order sentences pre-built in the system (Figure 7). Analysis demonstrated that the initial low dose orders sentences proposed would only account for 17% of current prescribing, but by representing the two most common doses and frequencies, this expanded to 41% of orders commonly prescribed. The amended proposal only includes PRN order sentences, prompting an active decision to prescribe regular doses, or amend an available order sentence if another dose or frequency is required.

Conclusion/Discussion

Of the serious incidents reviewed, 50% would be addressed by the creation of standardised low dose order sentences within the eMM system, with 50% occurring at the point of administration. This approach should also minimise the risk associated with prescribers amending field(s) to prescribe a dose or frequency outside of the available order sentences. Optimisation of eMM systems is an ongoing process and monitoring of the system to identify areas for system improvement, coupled with the use of real time eMM data and transparent reporting will maximise the benefits an electronic system can provide and improve patient care.

References:
1. NSW Health. (2020). PD2020_045. High Risk Medicines Management. 2. NSW Clinical Excellence Commission, (2020). Hydromorphone Standard Checklist. 3. Westbrook et al., (2013) JAMIA. 4. Kinlay et al., (2021) Appl Clin Inform.