

Evaluation of Acute Postoperative Pain Management in Elective Total Hip and Knee Arthroplasty



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Background

- Total hip and knee arthroplasties (THA, TKA) are effective surgical procedures for relief of degenerative osteoarthritis
- Postoperative pain and adverse drug reactions can delay patient recovery, prolong hospital stay, and increase costs
- At St. Paul's Hospital (SPH), pre-printed orders for orthopedic postoperative analgesia regimens include either hydromorphone (HM) or oxycodone (OXY), given regularly as short or long-acting formulations, with breakthrough doses as needed
- There is a paucity of literature comparing the efficacy and safety of HM and OXY in post-surgical analgesia

Objectives

- To compare the effectiveness of hydromorphone and oxycodone for postoperative pain control in elective THA or TKA patients
- To review the incidence of side effects (nausea, vomiting, sedation, cognitive changes), mobility, and length of hospital stay in elective THA or TKA patients receiving hydromorphone or oxycodone

Methods

- Design:** Retrospective electronic chart review
- Population:** Random sample of 100 elective THA and TKA patients ≥ 18 years old admitted to the SPH orthopedics unit between July 1st, 2016 and July 1st, 2017
- Exclusion criteria:** Regular opioid use 3 months prior to surgery, history of opioid or substance use disorder, use of IV patient controlled analgesia, opioid intolerance or hypersensitivity

Table 1: Patient Characteristics

	HM (n=38)	OXY (n=62)
Average Age (years, range)	68.7 (44-87)	66.2 (47-88)
Sex (n, %):		
Male	17 (44.7)	27 (43.5)
Type of surgery (n, %):		
Hip	17 (44.7)	25 (40.3)
Knee	21 (55.3)	37 (59.7)
Average Baseline eGFR (ml/min)	87	89
Medications Prior to Admission (% of group using)		
Acetaminophen	34.2	41.9
NSAIDs or COX inhibitors	44.7	40.3
ASA	21.0	21.0

Results

Figure 1: Comparison of Average Numeric Pain Scores on Each Postoperative Day (POD)

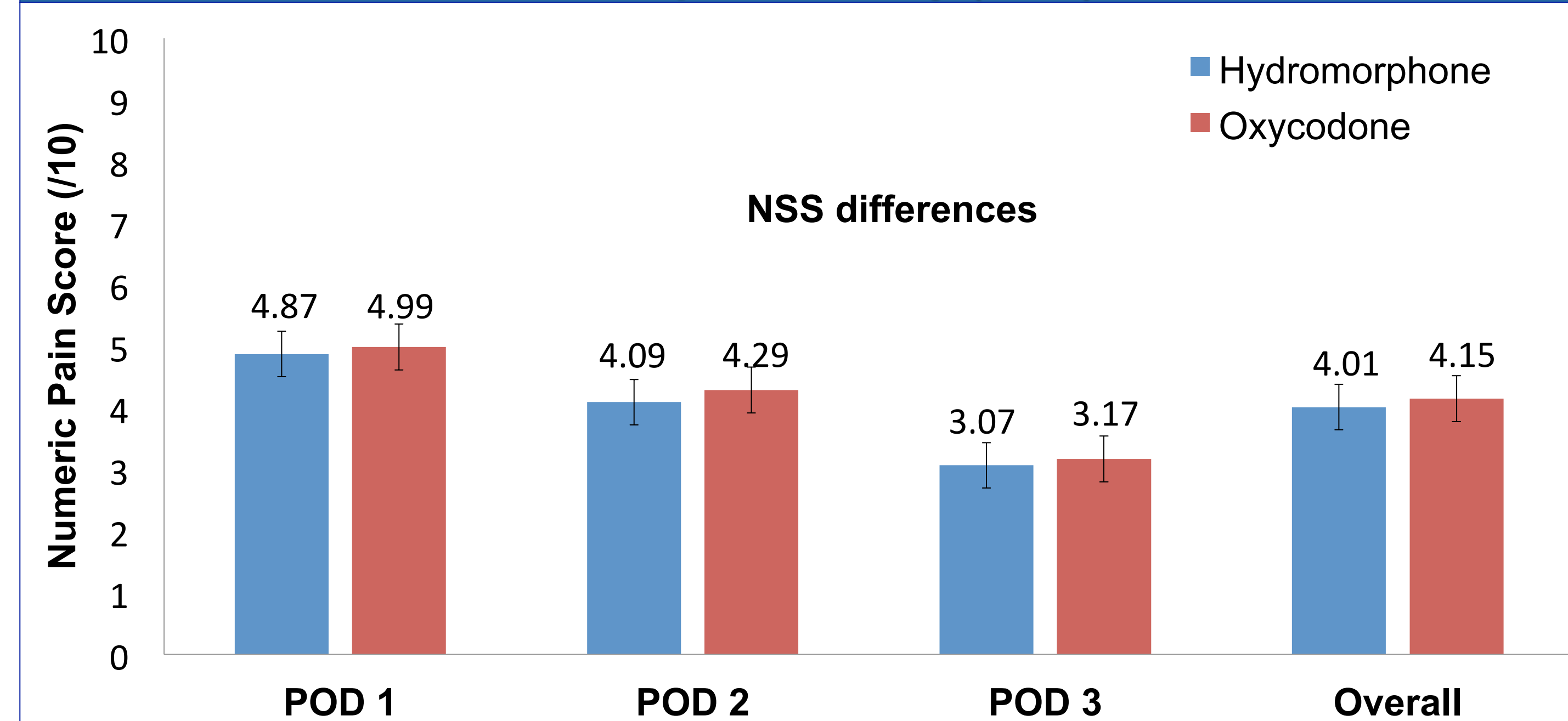


Figure 2: Subgroup Analysis of NPS by Procedure from POD 1 to 3

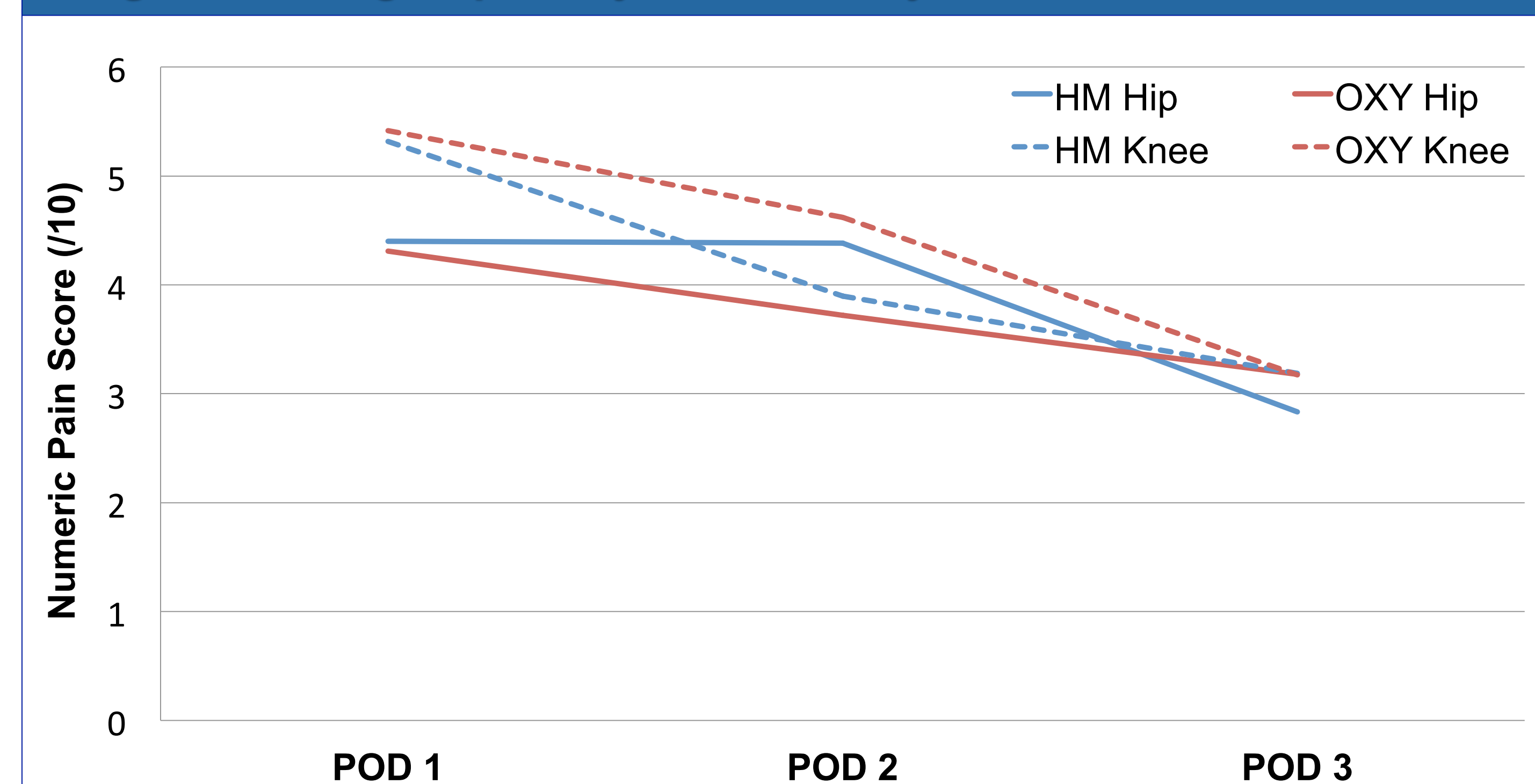


Figure 3: Comparison of Opioid Usage Between HM and OXY

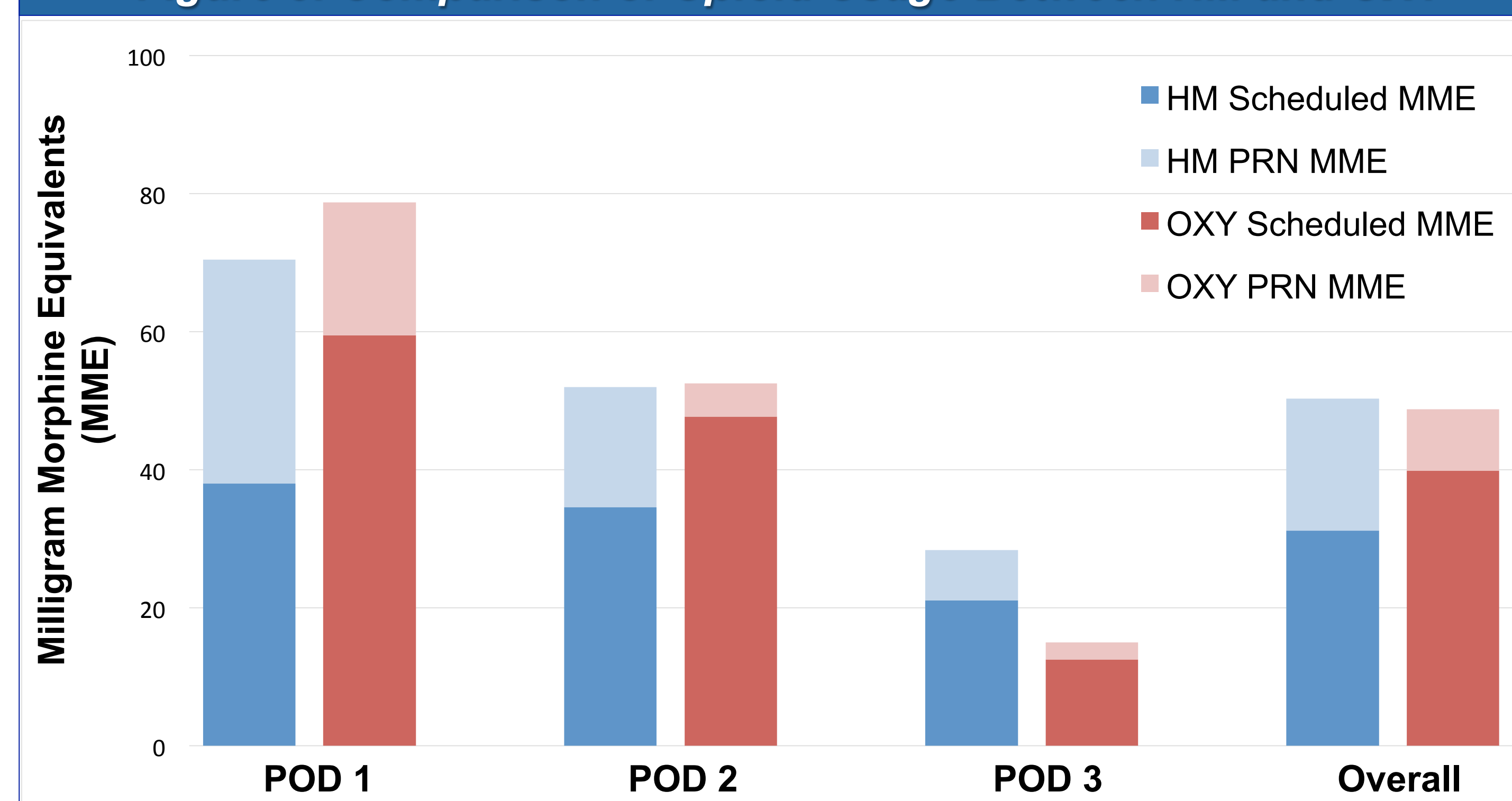


Table 2: Incidence of Adverse Effects on Each POD

	HM (n=38)	OXY (n=62)	P-value
Nausea and Vomiting (%)			
POD1	28.9	50	0.04
POD2	18.4	30.6	NSS
POD3	15.8	12.9	NSS
Overall	21.1	31.2	0.04
Sedation (%)			
POD1	0	11.3	0.03
POD2	5.3	3.2	NSS
POD3	0	1.6	NSS
Overall	1.8	5.4	NSS
Cognitive Changes (%)			
POD1	0	4.8	NSS
POD2	0	3.2	NSS
POD3	0	3.8	NSS
Overall	0	3.9	0.03

Table 3: Mobility and Length of Stay in HM and OXY Groups

	HM (n=38)	OXY (n=62)
Average Mobility Outcome Score (0 = not achieved, 2=fully achieved)		
Overall	1.40	1.47
Length of Stay (days)		
Hips	3.70	2.96
Knees	3.19	3.19
Overall	3.42	3.10

Limitations

- Incomplete documentation in 63% of charts reviewed
- Small sample size of patients
- Prescribing practices differed between the two orthopedic surgeons (preference for HM vs OXY), and formulations differed between groups (patients mainly received OXY IR or HM SR).
- Patients were discharged by POD 3, with fewer documented pain scores and opioid usage on day of discharge

Conclusions

- Post operative pain control was comparable in elective THA and TKA patients receiving hydromorphone or oxycodone, although a higher incidence of nausea and cognitive changes was observed in the oxycodone group
- While overall opioid use was comparable, the majority of patients in the hydromorphone group received long-acting formulations and required more PRN opioids
- Next steps include a review of current pre-printed order sets at SPH to optimize dosing ranges and use of short-acting opioid formulations titrated to effect
- Further research on pain control and opioid use post-discharge will help inform opioid prescribing practices