Boosting Peri-Operative Pain Care:

Mixed Results (and Myriad Implications) from the NOHARM Pragmatic Trial

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Collaboratory Grand Rounds

November 6, 2026

***N**on-pharmacological **O**ptions in **H**ospital **A**nd **R**ehabilitation pain **M**anagement*

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NOHARM at a Glance

- NIH (NIA) UG3/UH3 (started 2019), 2nd NCE completed August 31
  - AG67593
- Step-wedge, Cluster-randomized
  - 6 campuses, 4 - 6 procedures/campus
  - Using “constrained” randomization
  - Pragmatic, standard of care trial – pt consent waived
- Bundled Pain Education & Decision Support Intervention
  - Portal-based conversation guide
  - Epic Clinical decision support (CDS)
  - Enhanced patient ed support
  - Non-Pharm pain self-management materials
- Outcomes
  - Pain and function (co-primary)
  - anxiety, opioid Rxs (secondary)

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Goals

1. **Support patient education and decision-making** around options for non-pharmacologic options for pain management in the post-operative setting
2. **Support patients in their pursuit** of non-pharmacologic pain care (NPPC) modalities

(NOT to deny patients access to necessary or helpful opioids or other pharmacologic options)

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Why nonpharmacologic pain care?

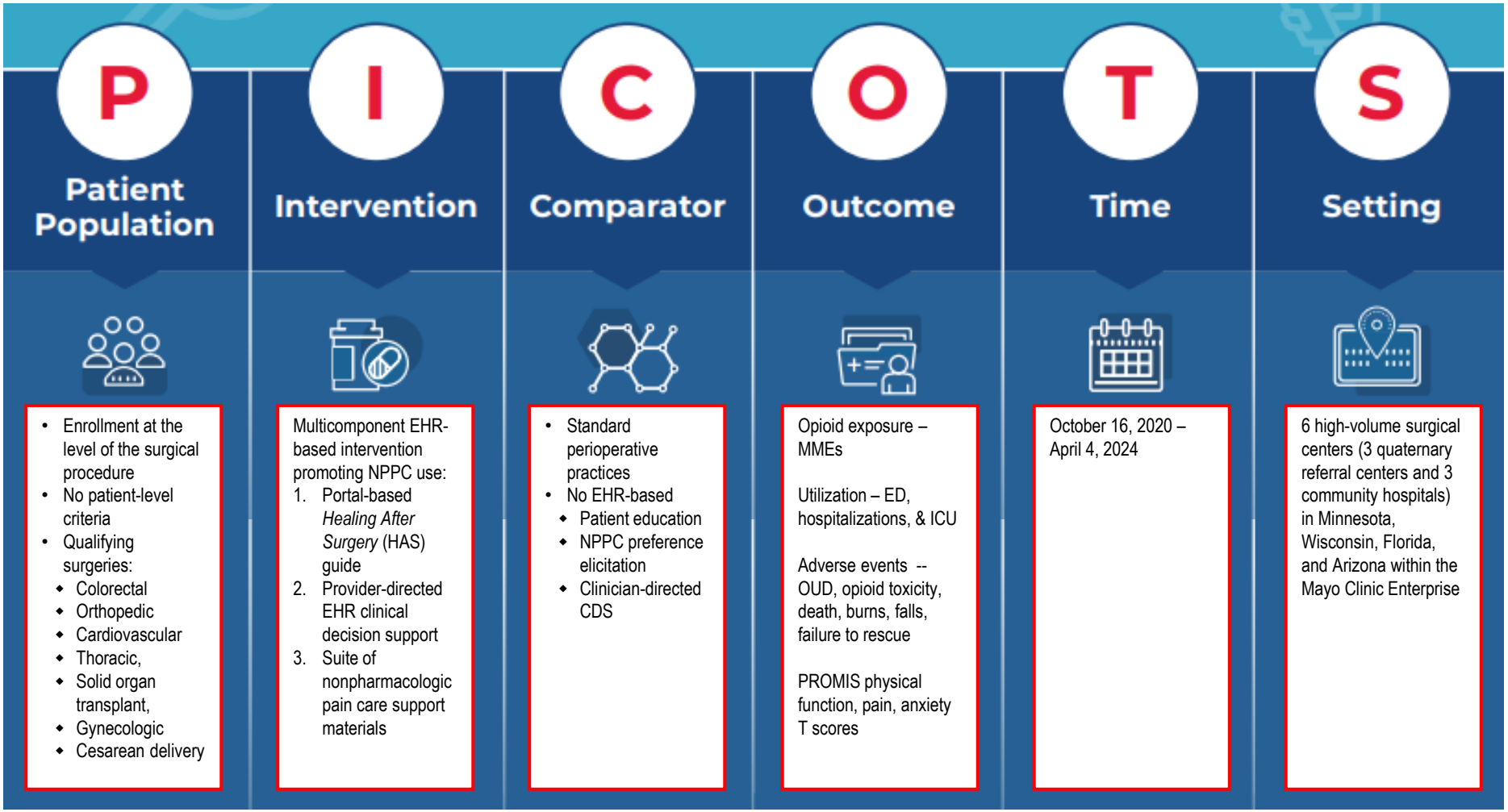
- Effective across numerous pain conditions
- Low toxicity and few adverse effects
- Addresses pain and co-occurring symptoms
- Often inexpensive and accessible
- Universally recommended by clinical guidelines
- Patient receptivity

The implementation challenge

- Barriers include:
  - Clinician time
  - Limited familiarity
  - Skepticism
  - Heterogeneous patient preferences
  - Need for reinforcement over time
  - Difficulty integrating into routine workflow

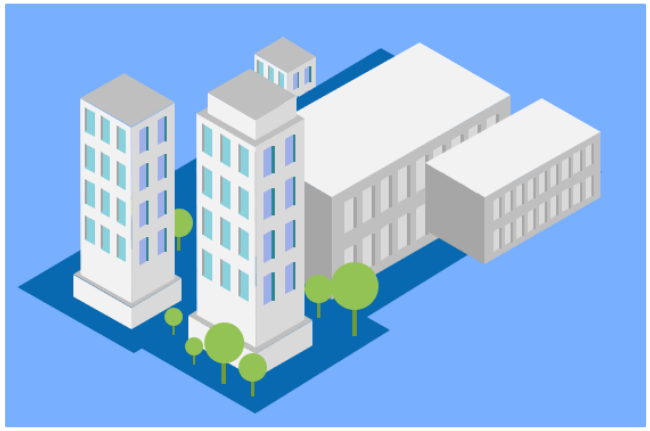
How can health systems deliver guideline-concordant nonpharmacologic pain care at population scale?

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Leverage EHR to integrate NPPC use across perioperative trajectory



Pre-Op Visit

Pre-Op Classes & Assessments

Hospitalization

Day of Surgery Check-In

Hospital Dismissal

Outpatient Follow-Up

First Opioid Refill

Second Opioid Refill

Challenges:

- Encompasses diverse:
  - Clinicians
  - Settings
  - Workflows
- Accommodate patients diverse NPPC preferences

Non-Pharmacological Pain Care (NPPC)

Movement

- Walking
- Yoga
- Tai Chi

Relaxation

- Meditation
- Relaxed Breathing
- Music Listening
- Guided Imagery
- Muscle Relaxation
- Aromatherapy

Physical

- Acupressure
- Massage
- Cold or Heat
- TENS

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NOHARM (Healing After Surgery)

PAIN CARE PLANNNG ACROSS THE CARE CONTINUUM

All care team members work collaboratively with patients to ensure non-pharmacologic options are presented, considered, and supported.



Choosing Surgery

Ambulatory care team members prepare patients to engage with the NOHARM intervention and a portal-based decision tool.



Pre-operative Planning

Patients review non-pharmacologic pain management options and inform care team of selections via portal-based decision tool.



The Inpatient Stay

Inpatient staff notice, acknowledge, discuss, and support provision of non-pharmacologic pain management modalities.



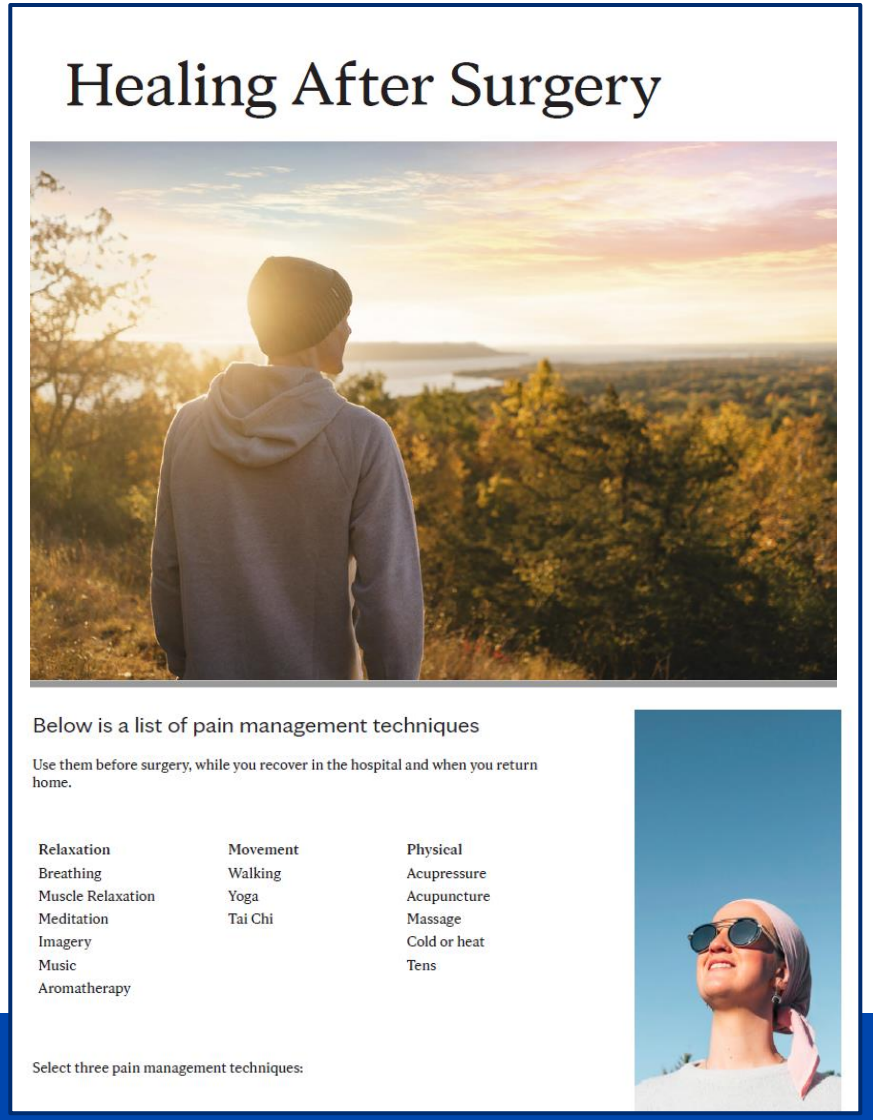
Post-operative Recovery

Patients continue to access and use non-pharmacologic pain management resources and modalities.

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Integrated, flexible, multicomponent system

- Intentionally diverse
  - Delivery modes
  - NPPC modalities
  - Educational content
  - Support
- Engagement per patient discretion
- Align with changing needs across surgical trajectory



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Original Investigation | Health Policy

Integrating Nonpharmacological Options Into Perioperative Pain Care

A Cluster Randomized Clinical Trial

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» Author Affiliations | Article Information

Consort Diagram
(Surgeries)

	Period 1	Period 2	Period 3	Period 4	Period 5
Sequence 1	1899	2378	1265	721	840
Sequence 2	3228	3854	2112	1147	1726
Sequence 3	3130	3660	1902	1157	1500
Sequence 4	3394	4038	2035	1145	1715
Sequence 5	3486	4328	2054	1233	1715
Sequence 6	3526	4131	2017	1171	1635
Totals	18,663	22,389	11,385	6574	9131

Cohort	Usual Care	NOHARM
N	25,088	43,054

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NOHARM cohort at a glance

- **68,141** surgical procedures among **62,892** patients
- **25,088** procedures during usual care and **43,053** during NOHARM
- Across procedures, **56%** involved patients older than 60, **60%** involved men, and **90%** involved White patients
- **29%** of procedures involved patients living outside urban areas

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NOHARM surgical procedures

- **6** surgical sites, with about half of procedures at Rochester **(49%)**
- Orthopedic surgery was most common **(42%),** followed by gynecologic **(16%),** colorectal **(12%),** and cardiac **(12%)** surgery
- **32%** were laparoscopic, **24%** were same-day procedures, and **86%** of patients went home after surgery

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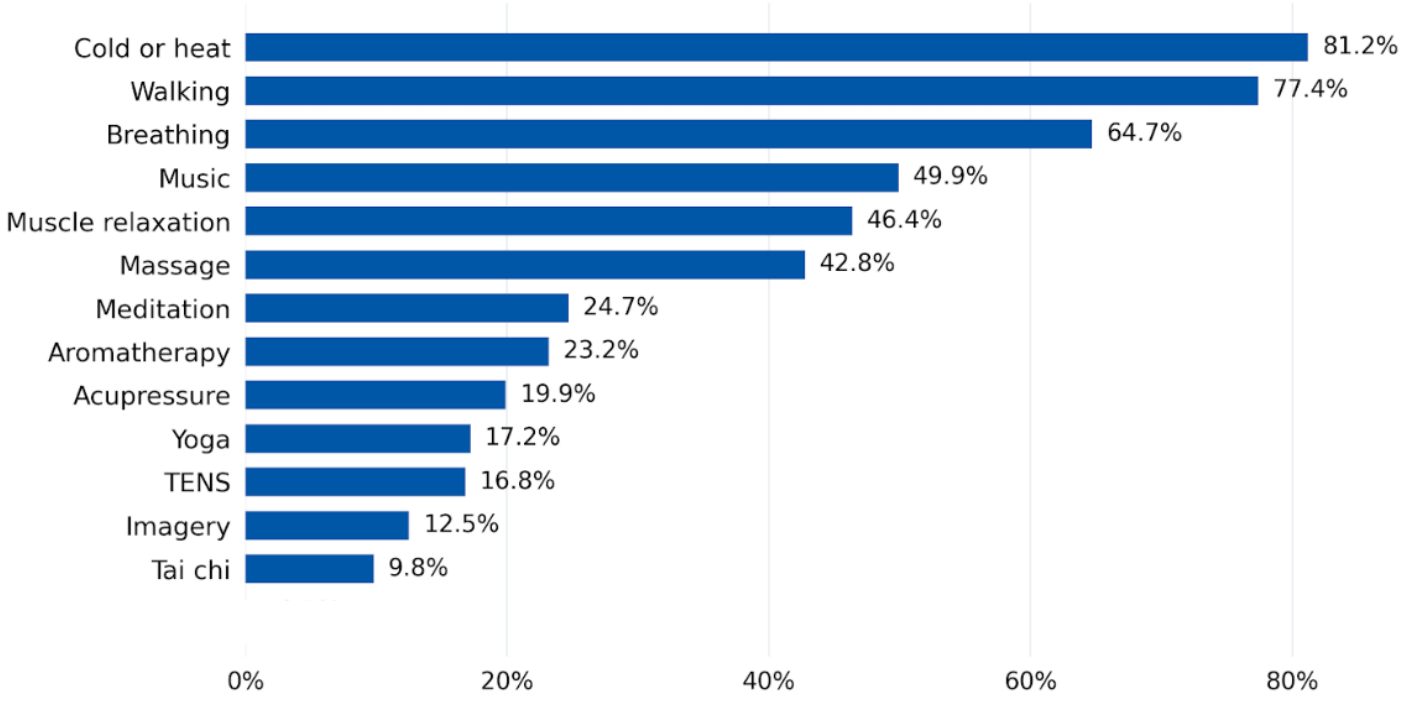
Intervention participant engagement

- **68.0% (29278/43053)** reviewed the Healing After Surgery guide preoperatively
- **88.7% (38179/43053)** selected NPPC options
- **50.4% (21692/43053)** used NPPC during hospitalization
- **52.8% (22758/43053)** reported NPPC use after discharge

NPPC Use

Nonpharmacologic pain care modality use

91.7% had at least one modality selected or administered



Inpatient stay • Modalities selected by the patient or administered; multiple modalities possible.

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Primary Outcomes

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Intervention Effects on Patient-Reported Outcomes

Total N = 68,141 surgeries, including 62,892 index procedures in unique patients

Symptom	Adjusted Mean Difference (Intervention vs Control), β (95% CI)	P-value
Pain Interference*	0.090 (-0.176, 0.357)	0.506
Physical Function†	0.149 (-0.114, 0.412)	0.267
Anxiety‡	-0.073 (-0.435, 0.289)	0.692

All models adjusted for baseline symptom score, study site, study step, age, rural status, and (if imbalanced with SMD > 0.1 for that symptom cohort): laparoscopic status, GI/Hip surgery, surgery hours, prior prescription, and study step. Models also include random effects for cluster (care team) and patient (to account for multiple surgeries).

* Sample of Pain Interference PROMIS CAT responders: Intervention N=25981, Usual care N=15807
† Sample of Physical Function PROMIS CAT responders: Intervention N=25563, Usual care N=15520
‡ Sample of Anxiety PROMIS CAT responders: Intervention N=15227, Usual care N=11195

Secondary Outcomes

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Intervention Effects Opioid Exposure

Total N = 68,141 surgeries, including 62,892 index procedures in unique patients

Metric	UC MME	NOH MME	Adjusted UC[a] MME	Adjusted NOH* MME	RR (95% CI)	P-value
Total opioids						
Opioid total MME	398 (135.0,1140.0)	400 (135.0,1110.0)	2633.81 (1671.85,3595.77)	2373.56 (1520.99,3226.13)	**0.901 (0.822,0.988)**	**0.03**
Administered opioids						
During index hospitalization[b]	90 (0.0,500.0)	60 (0.0,503.0)	1305.82 (977.61,1634.02)	1220.58 (914.03,1527.13)	**0.935 (0.897,0.974)**	**0.001**
During subsequent hospitalization [c,d]	0 [0.0,100.0]	0 [0.0,60.0]	160.19 (132.61,187.77)	153.09 (126.88,179.30)	0.956 (0.898,1.017)	0.15
Prescribed opioids						
Discharge from index hospitalization [e]	113 (60.0,225.0)	113 (38.0,250.0)	99.87 (51.94,147.81)	88.85 (46.24,131.46)	**0.890 (0.844,0.937)**	**<0.001**
Following index hospitalization [c,d]	0 (0.0,0.0)	0 (0.0,0.0)	148.49 (113.15,183.83)	156.40 (119.39,193.40)	1.053 (0.946,1.173)	0.34

Utilization

Outcome	UC %	NOH %	IRR (95% CI)	P-value
Inpatient stays	31.29 (20.69,41.89)	29.88 (19.79,39.97)	0.955 (0.872,1.047)	0.325
ED visits	36.75 (29.75,43.75)	36.46 (29.69,43.23)	0.992 (0.917,1.073)	0.843
ICU stays	4.62 (2.66,6.59)	3.79 (2.17,5.42)	0.820 (0.652,1.033)	0.092

- Opioid-related adverse events were uncommon and similar between groups

- New opioid use disorder:
  - 320 participants (0.74%) intervention periods
  - 203 participants (0.82%) UC periods,
- Opioid poisoning or toxic effects:
  - 3 (0.01%) intervention periods
  - 4 (0.02%) UC periods
- All-cause mortality
  - 559 participants [1.30%] intervention periods
  - 320 participants [1.28%] UC periods

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Why did opioid exposure fall while patient-reported outcomes were similar?

- **Low-touch implementation.** Patient discretion in how to use NCCP, and pandemic staffing shortages limited reinforcement.
- **Limited room for improvement.** The broad surgical mix included many minimally invasive procedures with rapid recovery and low postoperative symptom burden.
- **Timing and missing data.** Assessments began at 1 month and may have missed early benefits. If patients with greater symptom burden were less likely to respond, incomplete follow-up may have obscured effects.

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NOHARM as a scalable primary prevention strategy

- **Reduce exposure.** Surgery is a potentially high-risk interval.
- **Make stewardship part of routine care.** NOHARM used existing EHR workflows and care teams
- **Complement other strategies.** NOHARM can reach surgical populations at scale alongside more intensive perioperative pathways and programs that address established opioid use or opioid-related harm.

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Myriad Implications

- Pragmatic Trials, Decision-makers, thresholds
- Trial & analysis completion
- Sustainment
- Decision-maker engagement
- What's worth sustaining and at what cost?

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Essential Sustainment Elements

- Minimal sustaining infrastructure
  - Education support
    - Patient Ed
    - Allied Health training materials
    - Opioid Stewardship
    - PM&R
  - Epic functionality
    - ERIS team assignments
    - Fit with Epic upgrades

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Thank You!

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