

# Preoperative Antidepressant Prescriptions May Influence Primary Anterior Cruciate Ligament Reconstruction Outcomes in a Young Adult Population

Poster number: 93

Natalie Pahapill BS, Peter Monahan BS, S. Bradley Graefe MD, Robert Gallo MD

Penn State College of Medicine, Hershey, PA  
Department of Orthopaedics and Rehabilitation



**PennState Health**  
Milton S. Hershey Medical Center

**Bone and Joint Institute**

# Disclosures

- The authors of no disclosures relevant to this presentation.



- **Objective:** To compare adverse events, postoperative prescribing patterns, healthcare utilization, and revision surgery rates of patients undergoing primary anterior cruciate ligament reconstruction (ACLR) with a preoperative antidepressant prescription within one year of ACLR (ADP) against a propensity matched group with no preoperative antidepressant prescription (NADP) using TriNetX Global Health Research Network.
- **Hypothesis:** ADP patients would use significantly more health care services and receive more post-operative prescriptions compared to a propensity matched group of NADP patients.



# Methods

TriNetX Global Health Diamond network queried

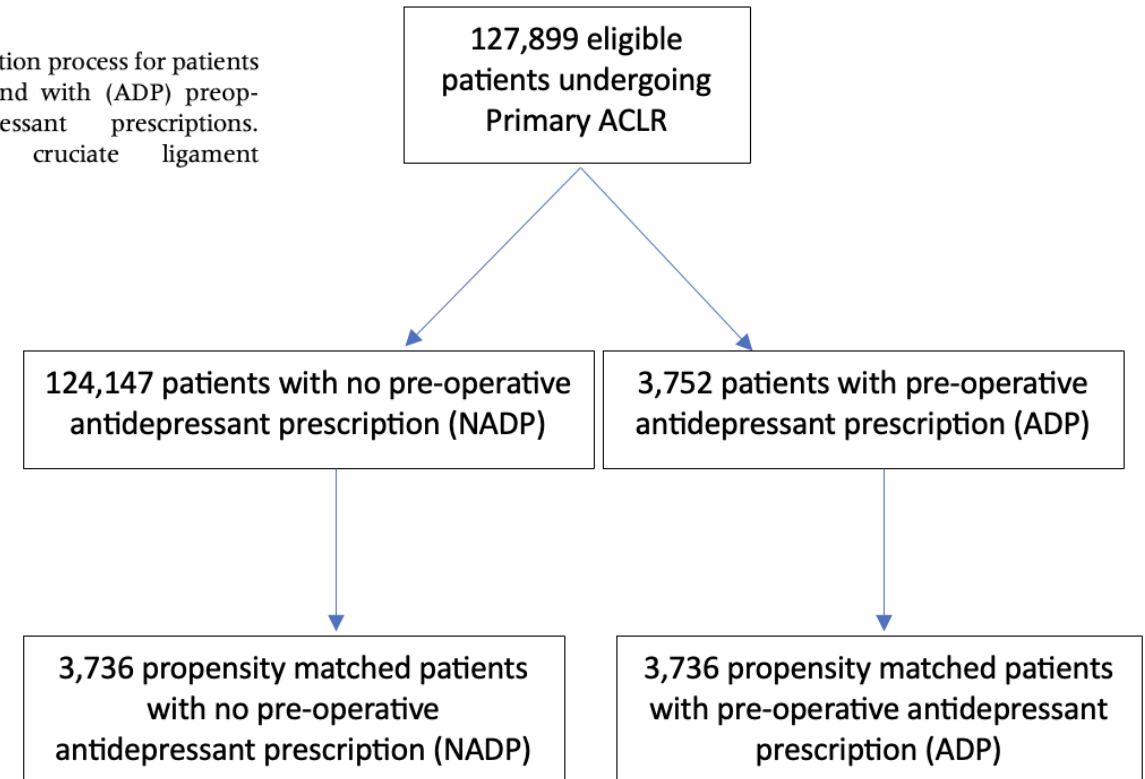
## Inclusion Criteria:

- Patients undergoing primary ACLR (CPT 29888) between 18 and 35 years old
- Diagnosis of Knee injury

## Exclusion Criteria:

- Previous ACLR
- Previous congenital deformity
- Presence of knee malformation

**Fig 1.** Patient selection process for patients without (NADP) and with (ADP) preoperative antidepressant prescriptions. ACLR, anterior cruciate ligament reconstruction.)



ADP patients propensity matched to NADP patients in a 1:1 ratio based on 11 comorbidities.

# Matching Criteria

**Table 1.** Matching Criteria of Patients With ADP and NADP Undergoing Primary ACLR Before and After Propensity Matching

Comorbidity	Code Type	Code	Before Propensity Matching			After Propensity Matching		
			Preoperative ADP	Preoperative NADP	P Value	Preoperative ADP	Preoperative NADP	P Value
Number of patients			3,752	124,145		3,736	3,736	
Age at index, y			21.4 ± 4.5	19.7 ± 4.1	<b>&lt;.0001</b>	21.3 ± 4.5	21.5 ± 4.5	.279
Female sex			2,301 (61.3)	55,507 (44.7)	<b>&lt;.0001</b>	2,288 (61.2)	2,310 (61.8)	.601
Anxiety disorders	ICD-10	F40-F48	566 (15.1)	1,517 (1.2)	<b>&lt;.0001</b>	550 (14.7)	554 (14.3)	.869
Major depressive disorders	ICD-10	F33	165 (4.4)	267 (0.2)	<b>&lt;.0001</b>	150 (4.0)	125 (3.3)	.125
Nicotine dependence	ICD-10	F17	174 (4.6)	1,517 (1.2)	<b>&lt;.0001</b>	171 (4.6)	165 (4.4)	.738
Overweight and obesity	ICD-10	E66	148 (3.9)	1,837 (1.5)	<b>&lt;.0001</b>	147 (3.9)	144 (3.9)	.858
Emergency department visits	CPT	1,013,711	763 (20.4)	18749 (15.1)	<b>&lt;.0001</b>	752 (20.1)	779 (20.9)	.439
Hospital inpatient services	CPT	1,013,659	42 (1.1)	370 (0.3)	<b>&lt;.0001</b>	40 (1.1)	43 (1.2)	.226
Physical therapy evaluations	CPT	1,029,677	235 (6.3)	5,871 (4.7)	<b>&lt;.0001</b>	314 (8.4)	301 (8.1)	.741
Outpatient visits	CPT	1,013,626	2,553 (68.0)	77,359 (62.3)	<b>&lt;.0001</b>	25,38 (67.9)	2,534 (67.8)	.921
Opioid prescriptions	VA	CN101	1,083 (28.9)	14,412 (11.6)	<b>&lt;.0001</b>	1,070 (28.6)	1,061 (28.4)	.818

NOTE. Values are presented as n (%) or mean ± SD.

NOTE. Statistical significance is noted in bold if  $P < .05$ .

ACLR, anterior cruciate ligament reconstruction; ADP, antidepressant use; CPT, Current Procedural Terminology; ICD-10, *International Classification of Diseases, Tenth Revision*; NADP, no antidepressant use; SD, standard deviation; VA, Veterans Administration.



# Results: Adverse events

**Table 2.** Thirty-Day Postoperative Adverse Events of Patients With ADP and ADP Undergoing Primary ACLR After Propensity Matching

	Preoperative ADP	Preoperative NADP	Odds Ratio	95% CI	<i>P</i> Value
Adverse events					
Risk, n (%)	25 (0.7)	36 (1.0)	0.692	(0.42-1.16)	.157
Number of instances	2.76 ± 4.37	1.64 ± 1.15			.146

NOTE. Values presented as mean ± standard deviation unless otherwise noted.

ACLR, anterior cruciate ligament reconstruction; ADP, antidepressant use; CI, confidence interval; NADP, no antidepressant use.

No significant differences between groups.



# Results: Post-operative Opioid prescriptions

**Table 3.** Postoperative Opioid Prescriptions for Patients With ADP and NADP Undergoing Primary ACLR After Propensity Matching

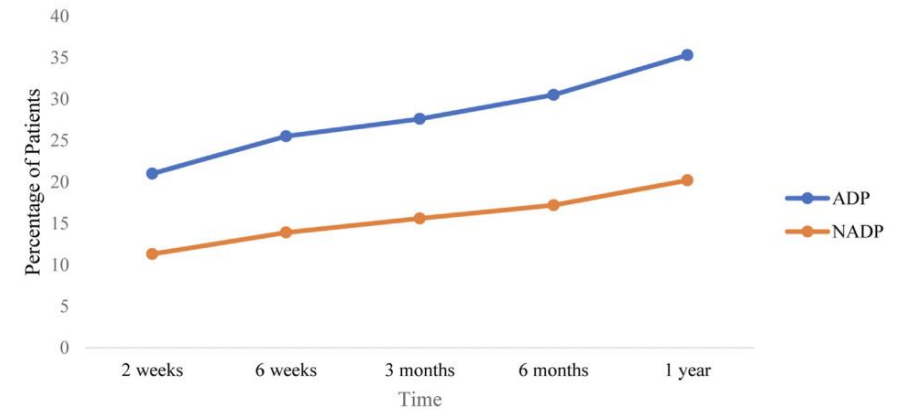
	Preoperative ADP	Preoperative NADP	Odds Ratio	95% CI	P Value
<b>Opioid analgesics</b>					
<b>2 weeks</b>					
Risk, n (%)	785 (21.0)	423 (11.3)	2.08	(1.83-2.37)	<b>&lt;.0001</b>
Prescriptions per person	1.21 ± 0.48	1.21 ± 0.51			.796
<b>6 weeks</b>					
Risk, n (%)	954 (25.5)	519 (13.9)	2.13	(1.89-2.39)	<b>&lt;.0001</b>
Prescriptions per person	1.49 ± 0.92	1.41 ± 0.84			.09
<b>3 months</b>					
Risk, n (%)	1,031 (27.6)	582 (15.6)	2.07	(1.84-2.32)	<b>&lt;.0001</b>
Prescriptions per person	1.72 ± 1.37	1.56 ± 1.29			<b>.02</b>
<b>6 months</b>					
Risk, n (%)	1,134 (30.5)	643 (17.2)	2.1	(1.88-2.34)	<b>&lt;.0001</b>
Prescriptions per person	1.97 ± 2.08	1.69 ± 1.63			<b>.004</b>
<b>1 year</b>					
Risk, n (%)	1,319 (35.3)	753 (20.2)	2.16	(1.95-2.4)	<b>&lt;.0001</b>
Prescriptions per person	2.36 ± 3.37	1.88 ± 1.99			<b>.0004</b>

NOTE. Values presented as mean ± standard deviation unless otherwise noted.

NOTE. Statistical significance noted in bold if  $P < .05$ .

ACLR, anterior cruciate ligament reconstruction; ADP, antidepressant use; CI, confidence interval; NADP, no antidepressant use.

**Fig 2.** Cumulative Rates of Postoperative Opioid Prescriptions for Propensity Matched ADP and NADP Cohorts



**Fig 2.** Cumulative percentage of patients with ADP and NADP receiving postoperative opioid prescription within specified time point following primary ACLR. (ACLR, anterior cruciate ligament reconstruction; ADP, antidepressant use; NADP, no antidepressant use.)

Significant increase in postoperative opioid prescriptions at all time points in ADP group.

# Results: Health Care Utilization

**Table 4.** Ninety-Day Postoperative Health Care Use of Patients With ADP and NADP undergoing Primary ACLR After Propensity Matching

	CPT Code	Preoperative ADP	Preoperative NADP	Odds Ratio	95% CI	P Value
Emergency department visits	1013711					
Risk, n (%)		361 (9.7)	267 (7.1)	1.39	(1.18-1.64)	<b>&lt;.0001</b>
Number of Visits		1.31 ± 0.64	1.40 ± 1.1			.186
Inpatient hospitalizations	1013659					
Risk, n (%)		44 (1.2)	31 (0.8)	1.42	(0.898-2.26)	.131
Number of visits		6.00 ± 11.7	3.45 ± 3.49			.245
Outpatient appointments	1013626					
Risk, n (%)		1057 (28.3)	814 (21.8)	1.42	(1.26-1.57)	<b>&lt;.0001</b>
Number of visits		1.82 ± 1.23	1.74 ± 1.23			.173
Physical therapy appointments	1029677					
Risk, n (%)		718 (19.2)	680 (18.2)	1.07	(0.952-1.20)	.26
Number of visits		1.26 ± 0.86	1.22 ± 0.57			.296

NOTE. Values presented as mean ± standard deviation unless otherwise noted.

NOTE. Statistical significance noted in bold at  $P < .05$ .

ACLR, anterior cruciate ligament reconstruction; ADP, antidepressant use; CI, confidence interval; CPT, Current Procedural Terminology; NADP, no antidepressant use.

At 90 days, significant increase in emergency department visits at and outpatient appointments in ADP group.





# Results: Secondary Surgery

**Table 5.** Postoperative Rates and Instances of Secondary Surgery for Patients With NADP and NADP Undergoing Primary ACLR After Propensity Matching

	Preoperative ADP	Preoperative NADP	Odds Ratio	95% CI	<i>P</i> Value
Secondary surgery					
1-year rate	145 (3.9)	160 (4.3)	0.9	(0.727-1.13)	.381
2-year rate	201 (5.4)	239 (6.4)	0.83	(0.686-1.009)	.062

NOTE. Values presented as mean  $\pm$  standard deviation unless otherwise noted.

NOTE. Statistical significance noted in bold if  $P < .05$ .

ACLR, anterior cruciate ligament reconstruction; ADP, antidepressant use; CI, confidence interval; NADP, no antidepressant use.

No significant difference in secondary surgery at 1 and 2 years.



# Discussion

- ADP patients had significant increase in postoperative opioid prescriptions at all time points and utilized more emergency department resources and outpatient services 90 days postoperatively.
- No significant difference in adverse events and secondary surgery rates between groups.



# Limitations

- Database limitations
  - Screening for concomitant injuries and procedures such as meniscal and cartilage injuries.
  - Surgical factors: technique, graft type
  - Could not ensure secondary surgery was performed on ipsilateral knee
  - Database population may not be generalizable
  - Could not assess functional outcomes and activity levels pre or post-operatively



# Conclusions & Significance

- Depression is an important factor to consider in the context of ACLR.
- Data from this study may help identify ACLR patients who may present more frequently to the emergency department and develop strategies to reduce opioid use following primary ACLR.
- Future research warrants continued exploration to investigate the relationship between depression and ACLR outcomes and potential interventions to support those suffering from depression.



# Thank You Questions?

[npahapill@pennstatehealth.psu.edu](mailto:npahapill@pennstatehealth.psu.edu)



**PennState Health**  
Milton S. Hershey Medical Center

**Bone and Joint Institute**

# References

- Pahapill, N. K., Monahan, P. F., Graefe, S. B., & Gallo, R. A. (2024). Preoperative Antidepressant Prescriptions Are Associated With Increased Opioid Prescriptions and Health Care Use but Similar Rates of Secondary Surgery Following Primary Anterior Cruciate Ligament Reconstruction in a Young Adult Population. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*.

