Estimating the Impact of Prescribing Limits on Prolonged Opioid Use Following Surgery

Jessica C. Young, MSPH, PhD

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Disclosures

- The project was funded from the following sources:
  - NIH/NIDA R36 DA04588501(PI: Young)
  - This research was partially supported by a National Research Service Award Post-Doctoral Traineeship from the Agency for Healthcare Research and Quality sponsored by The Cecil G. Sheps Center for Health Services Research, The University of North Carolina at Chapel Hill, Grant No. T32-HS000032.
  - The database infrastructure used for this project was funded by the Department of Epidemiology, UNC Gillings School of Global Public Health; the Cecil G. Sheps Center for Health Services Research, UNC; the CER Strategic Initiative of UNC's Clinical & Translational Science Award (UL1TR002489); and the UNC School of Medicine.
- Co-authors:
  - ND's effort was supported by the US Food and Drug Administration (HHSF223201810183C).
  - MJF receives consulting fees via UNC from GlaxoSmithKline.

Background

Opioids for Surgical Pain

Opioids play an important role in management of postsurgical pain

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Clinical challenge of striking the balance between safe and adequate pain management

Older Adults: An Understudied Population

- Increasing number of surgeries in older adults
- High prevalence of comorbidity, polypharmacy, cognitive impairment, physiologic changes
- More likely to receive higher dosages than recommended
- Minimal research conducted in vulnerable older population

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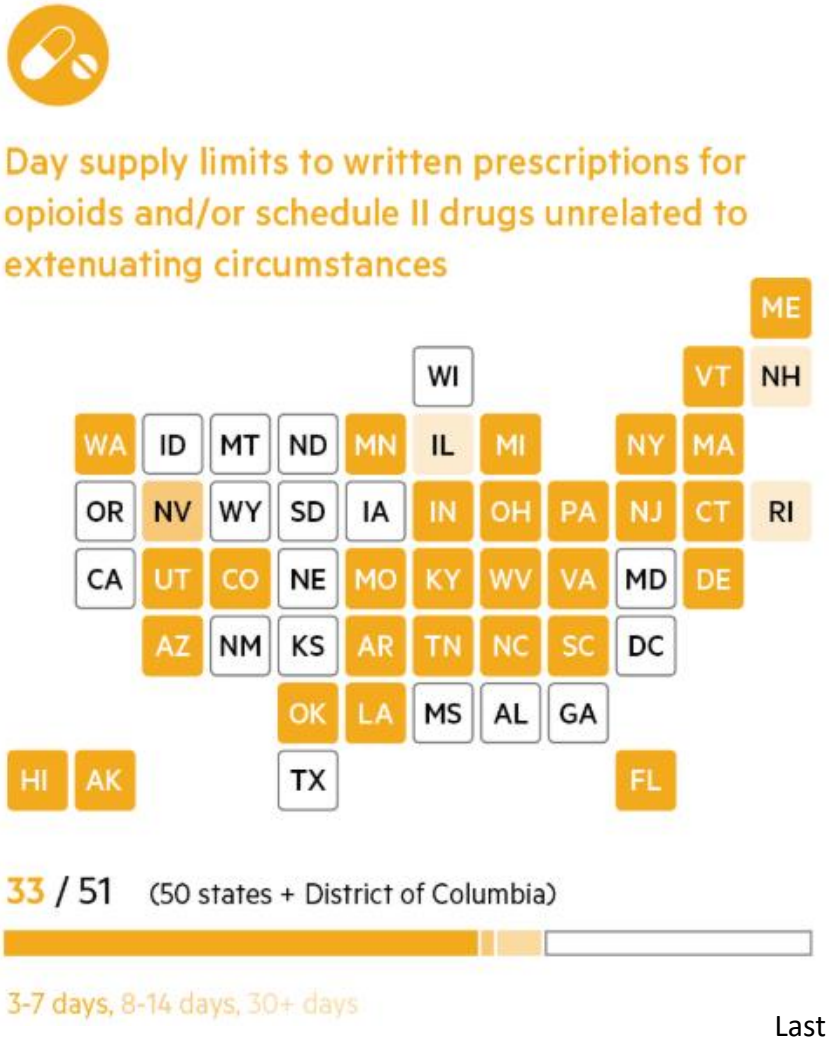
Day Supply Prescribing Limits

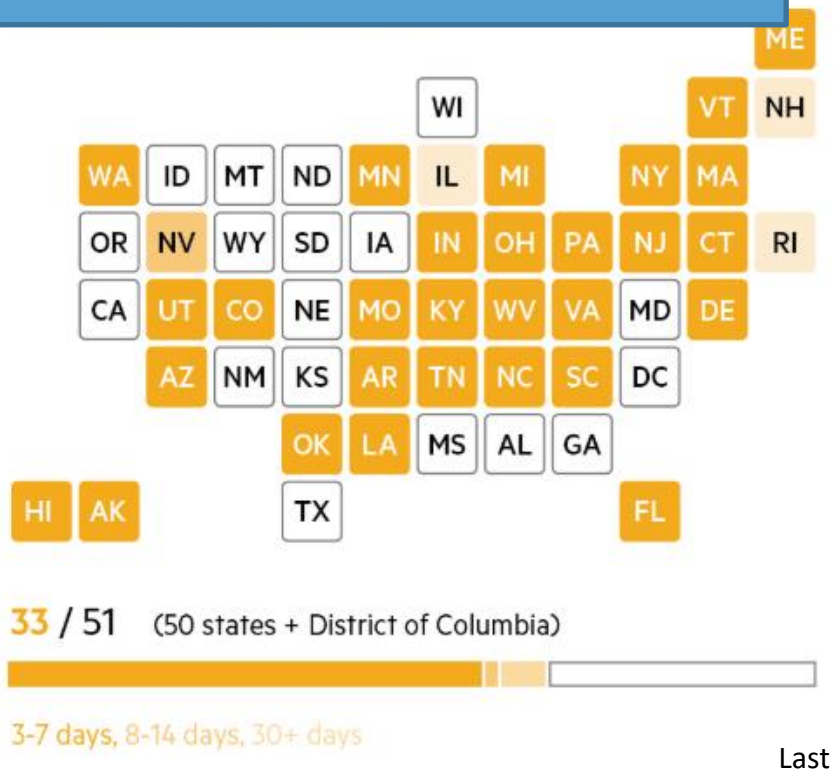


Last Updated: April 2019

https://www.athenahealth.com/insight/infographic-opioid-regulations-state-by-state

Day Supply Prescribing Limits

- Policies vary state by state
- Little evidence informing limits



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Objectives

Among a broad cohort of opioid-naïve surgical patients in the US, estimate the:

1) Risk of prolonged opioid use associated with initial number of days supplied

2) Impact of hypothetical prescribing limits on prolonged opioid use

Methods

Data Source

Data Source: Medicare Claims, 2007-2016, 20% Sample

Study Population

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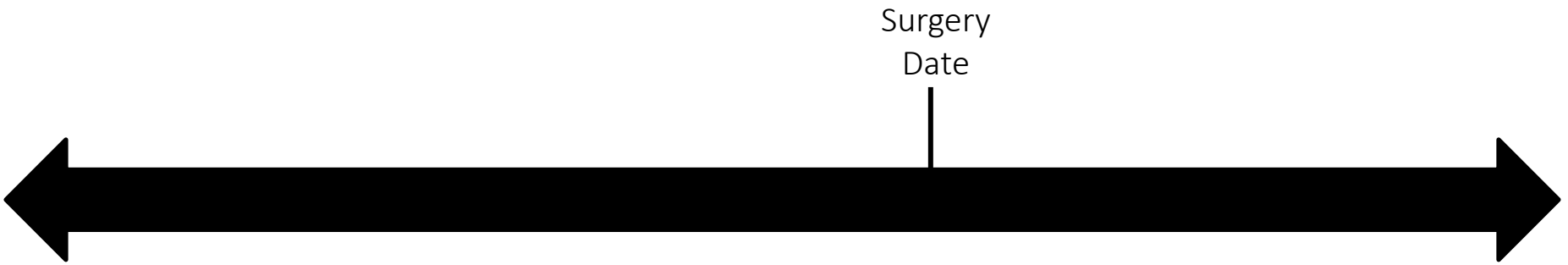

Study Population: Invasive Surgery (Agency for Healthcare Research and Quality)

- Identified using Current Procedural Terminology (CPT) codes
- Required CPT for General Anesthesia

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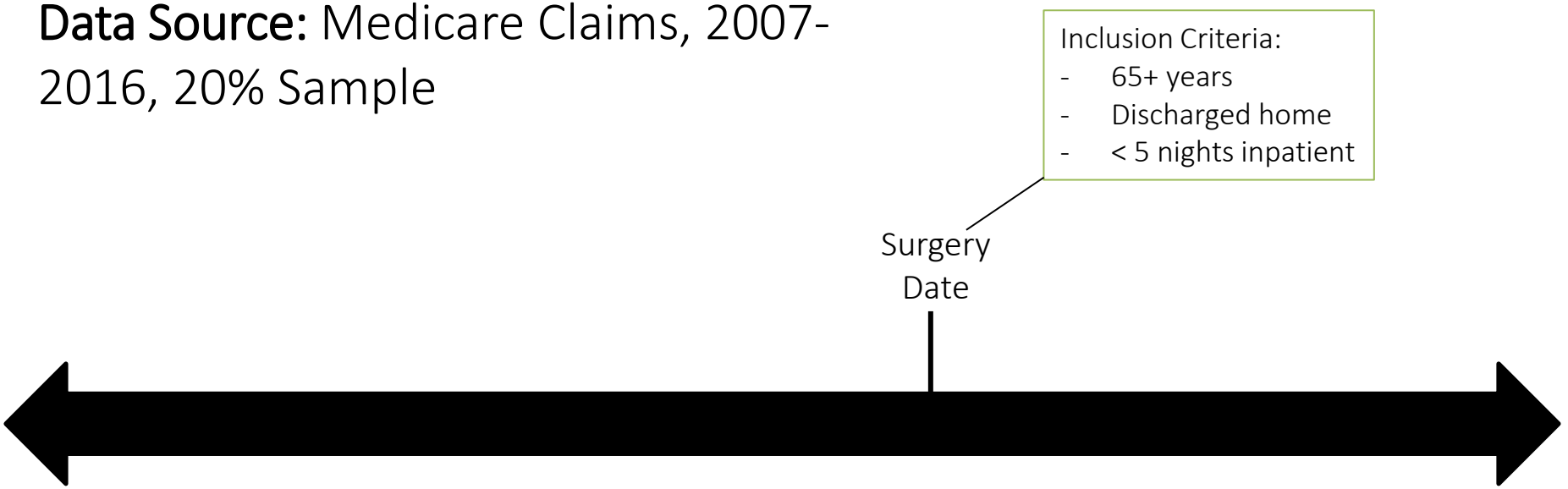

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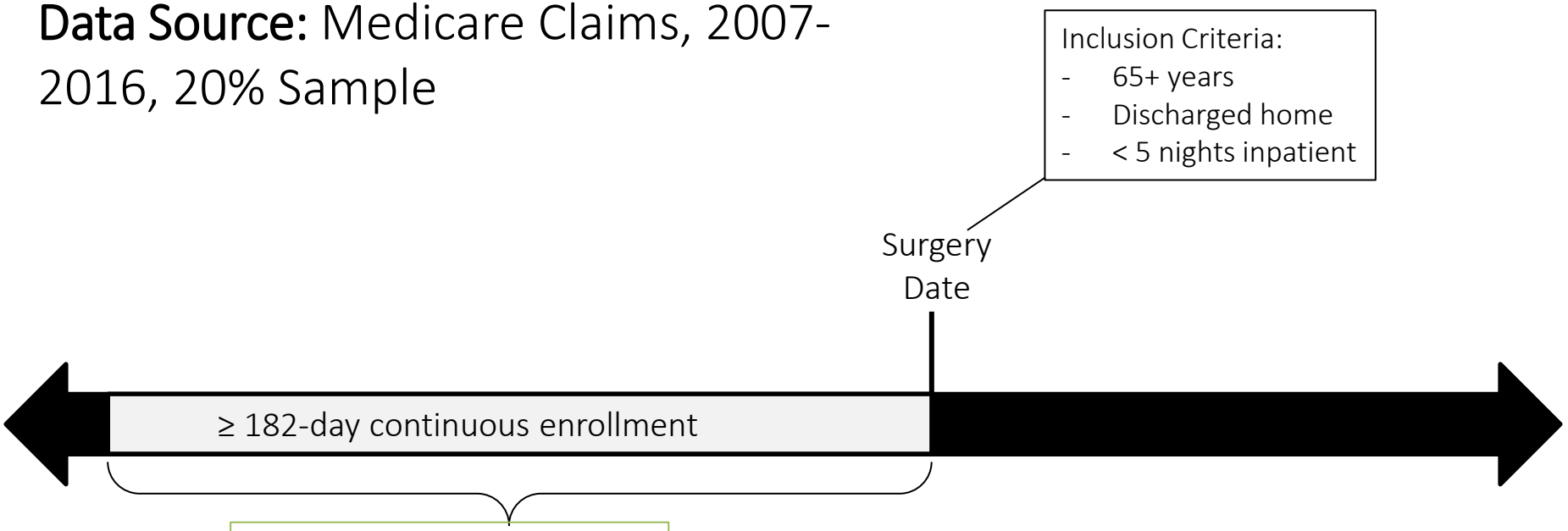

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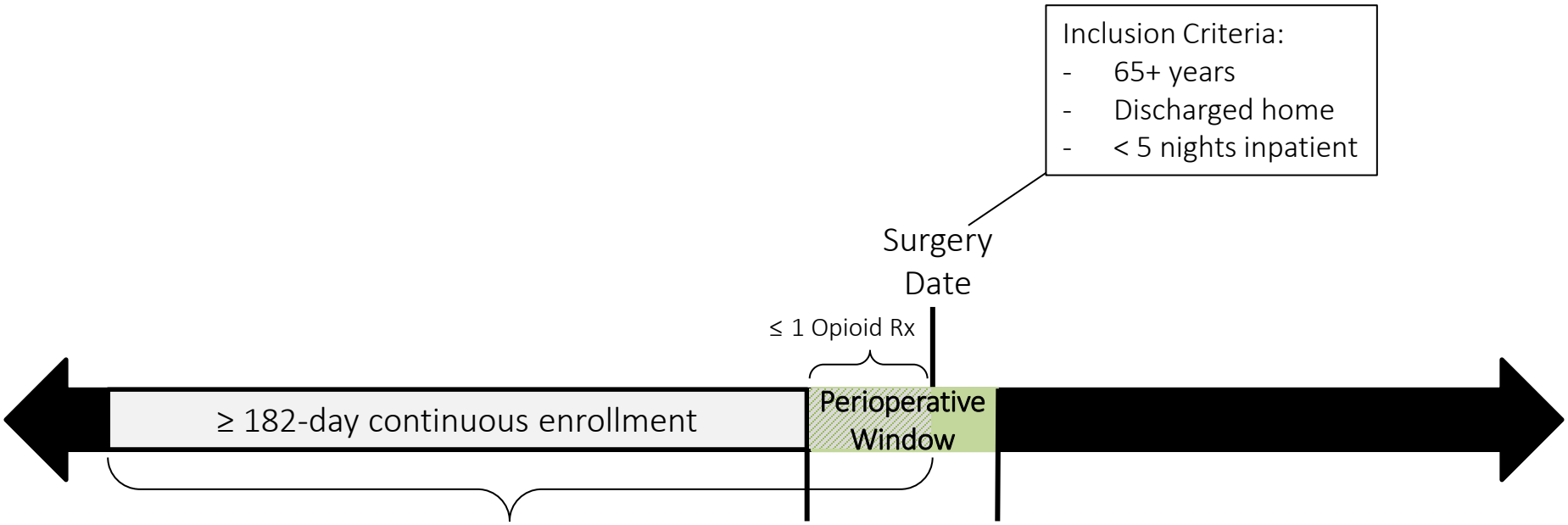

Baseline exclusions:
- No hospice care
- No surgery
- No addiction / poisoning
- No naloxone Rx
- No opioid Rx (-14 days)

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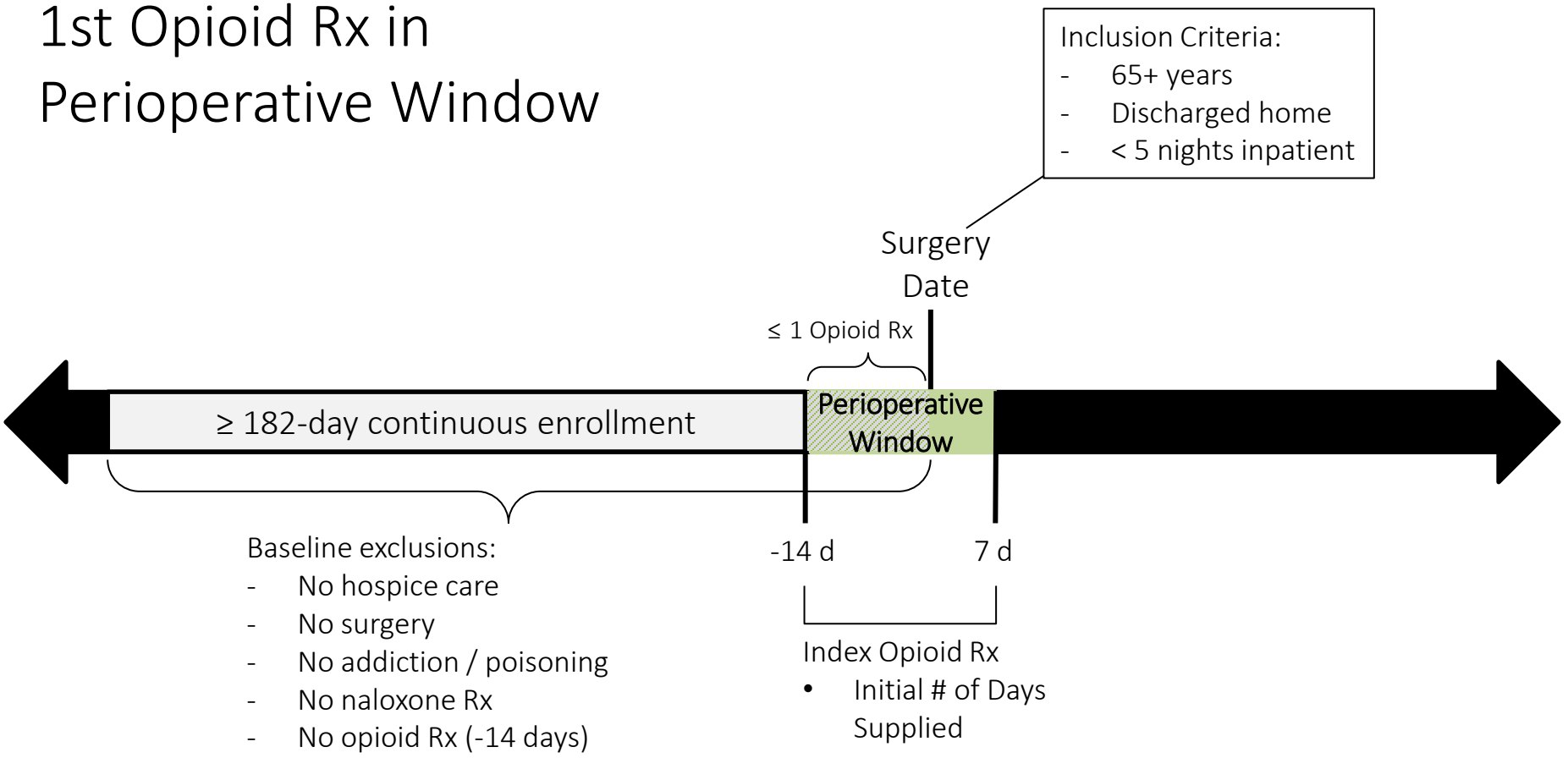
Exposure: Initial Perioperative Opioid Rx

1st Opioid Rx in Perioperative Window



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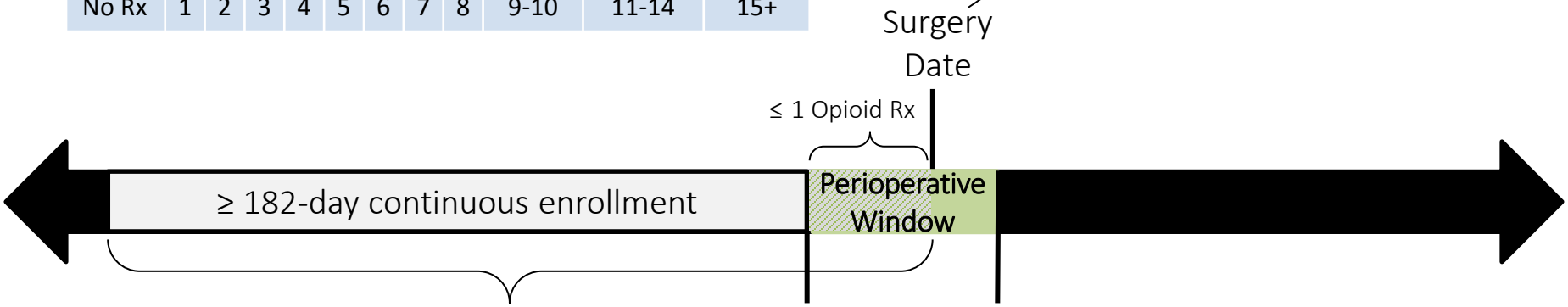
Initial # of Days Supplied Categorizations										
No Rx	1	2	3	4	5	6	7	8	9-10	11-14	15+

Inclusion Criteria:
- 65+ years
- Discharged home
- < 5 nights inpatient



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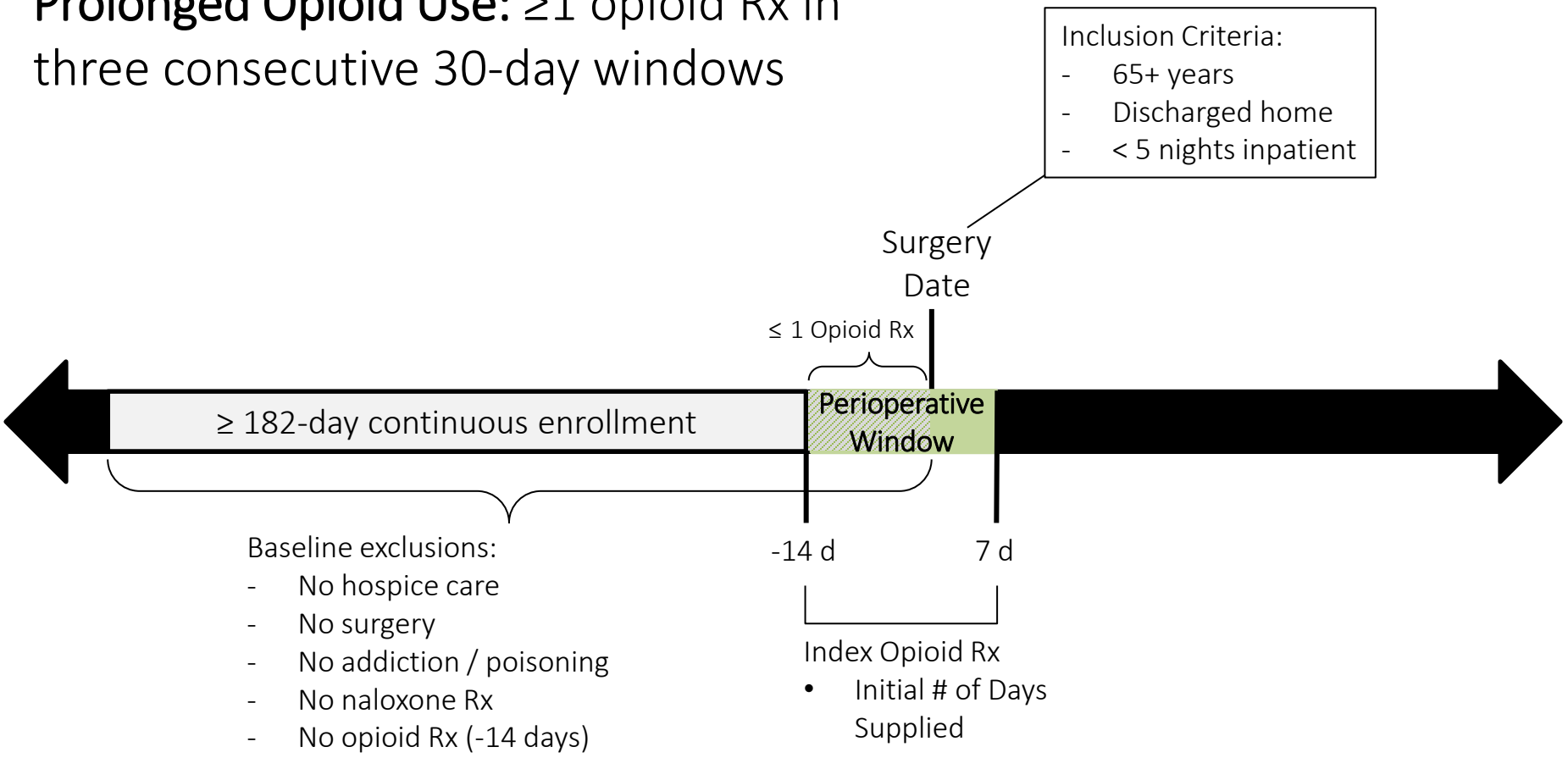
Index Opioid Rx
- Initial # of Days Supplied

Outcome: Prolonged Opioid Use

Prolonged Opioid Use: ≥1 opioid Rx in three consecutive 30-day windows



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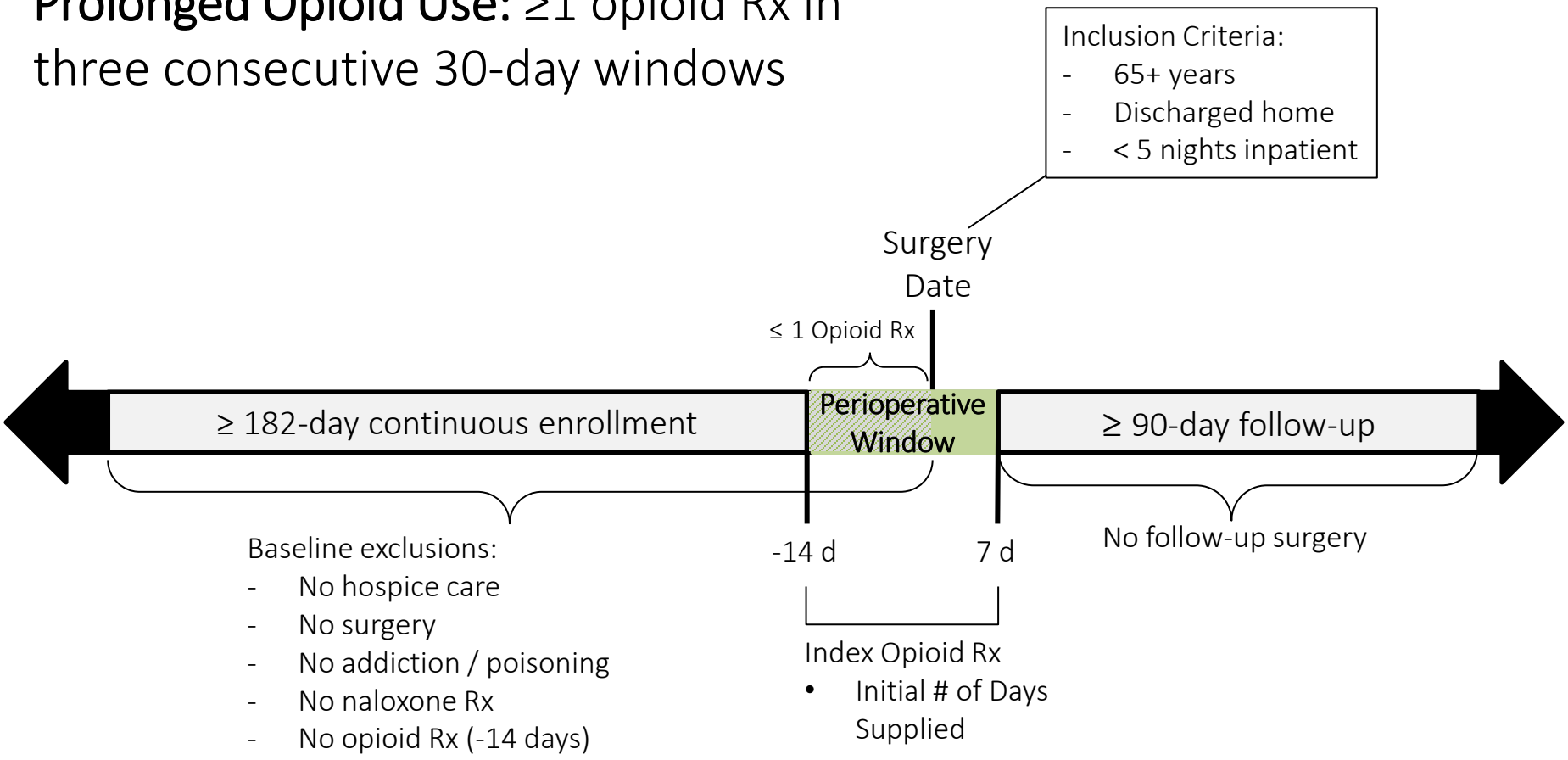

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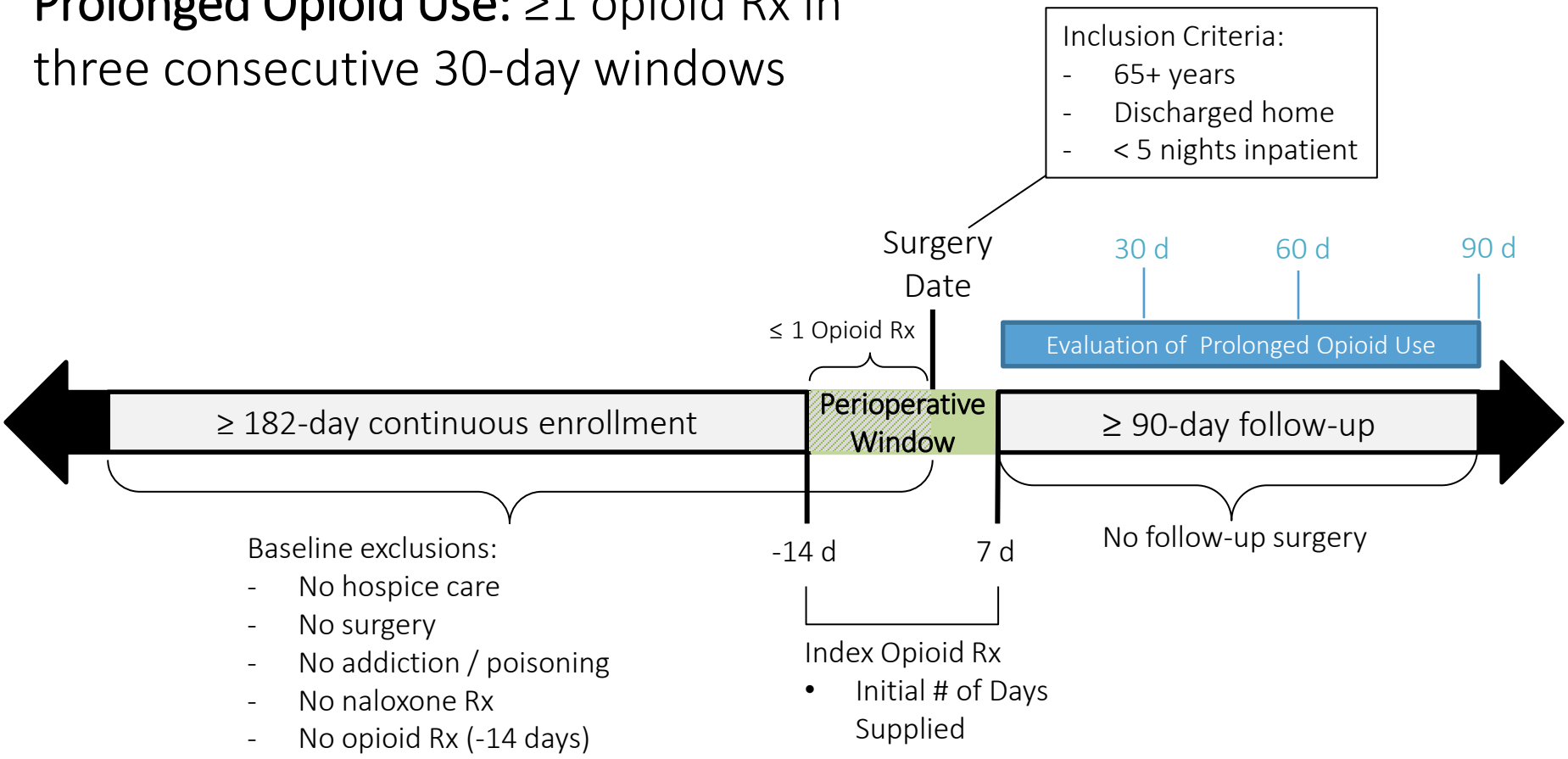

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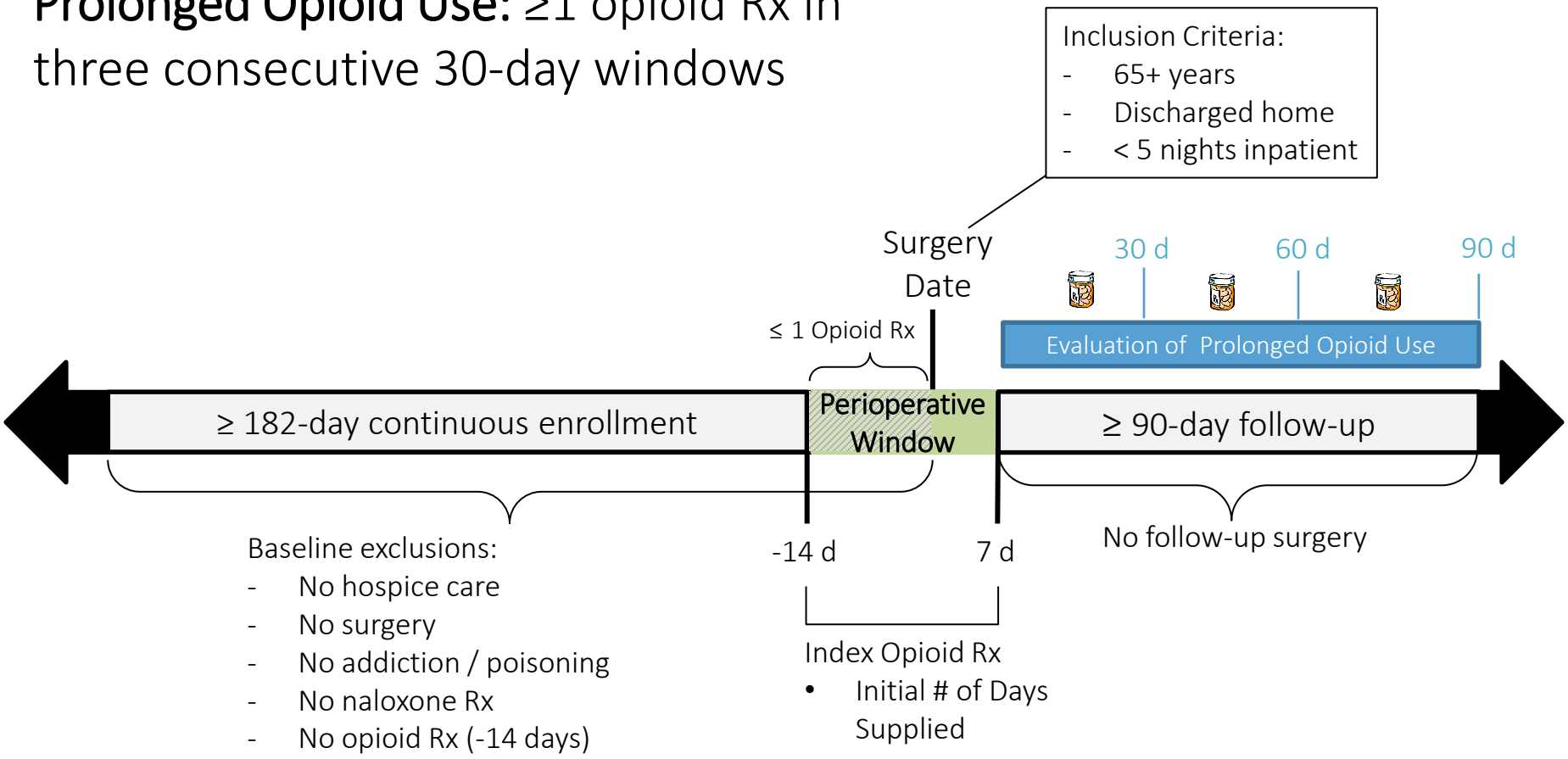

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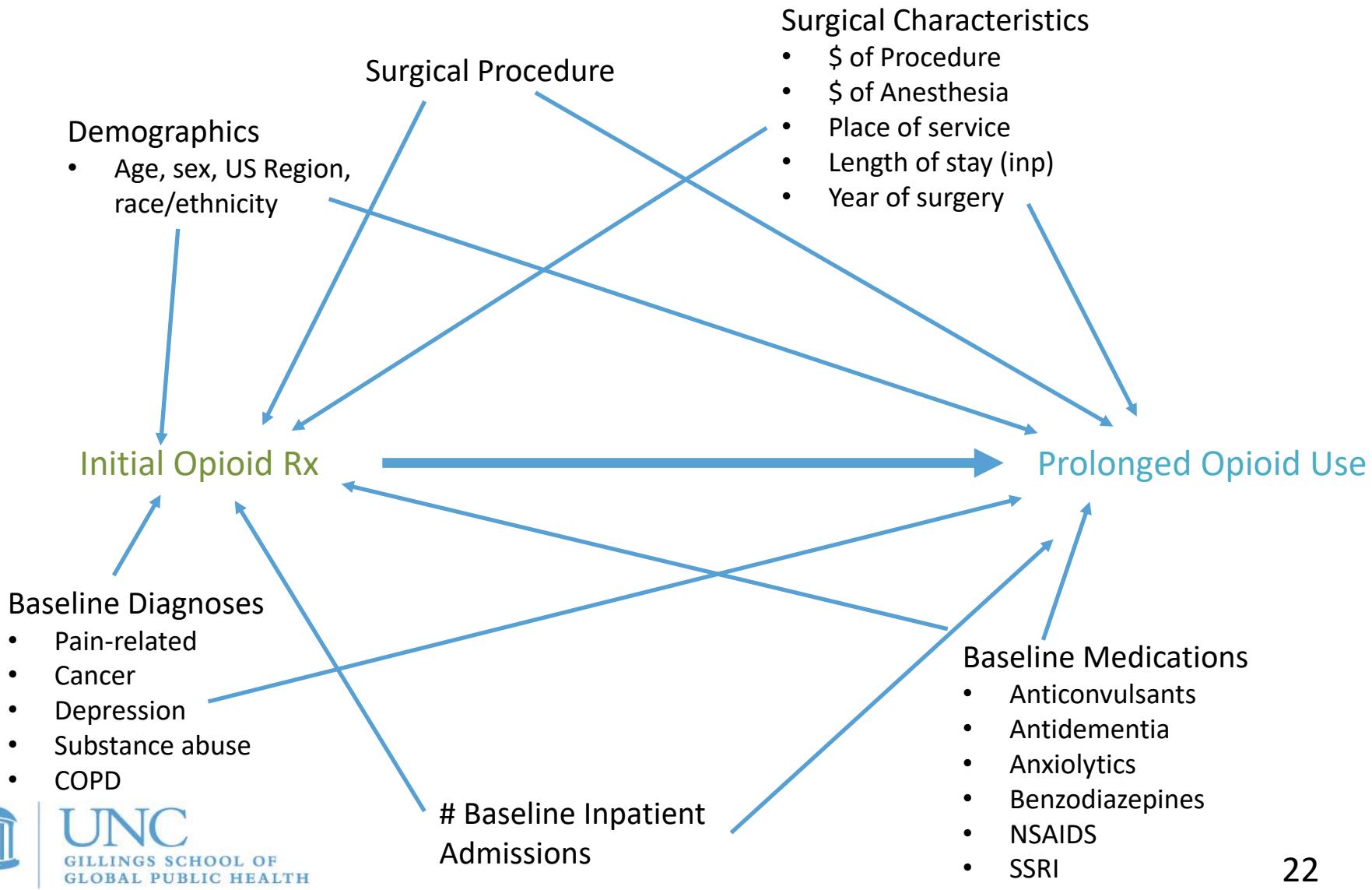
Covariates: Conceptual Model



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Statistical Estimates

G-Computation

- Logistic regression predicting prolonged opioid use at varying values of initial days supply
- 95% Confidence Intervals – 200 bootstraps, normal approximation

Estimate impact of varying prescribing limits based on days supply

9 Most Common Initial Day Supply Values								
2	3	4	5	6	7	8	10	15
- Risk difference
- Number impacted
- Number of cases avoided

Results

Study Population

Total Population: 941,563

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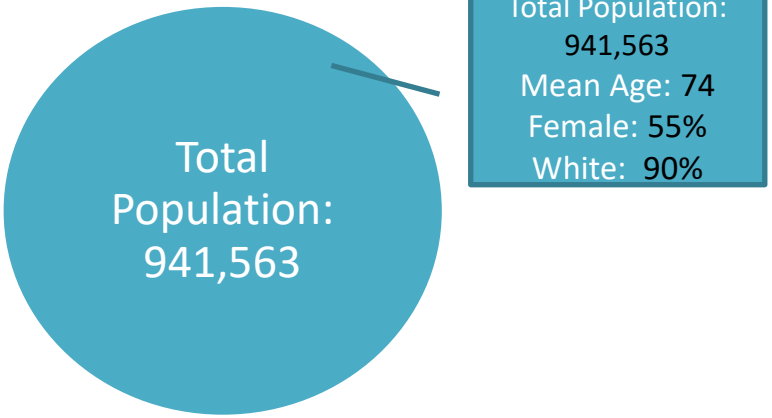

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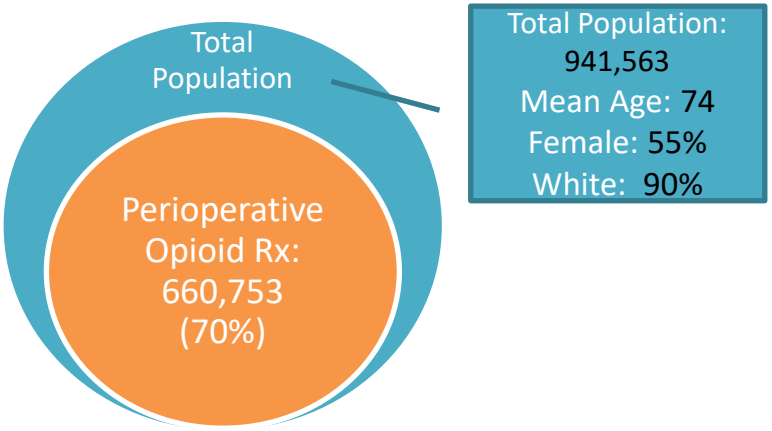

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Mean Age: 74
Female: 55%
White: 90%

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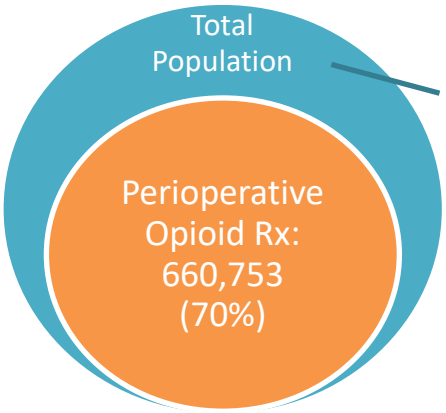

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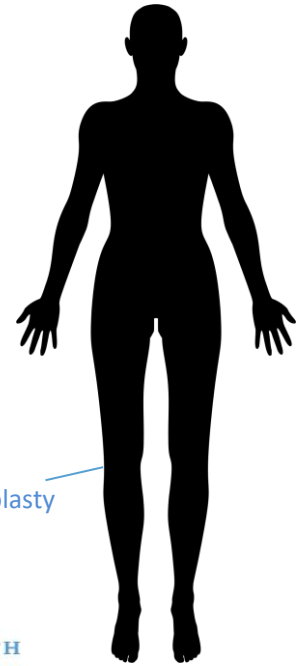

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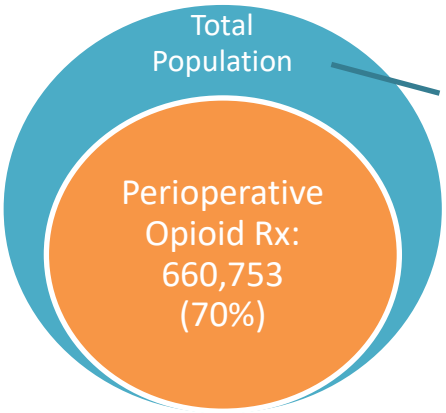

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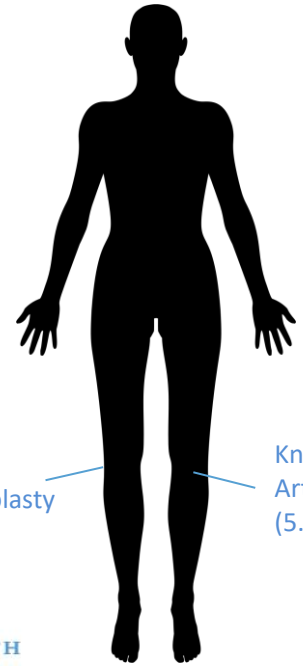

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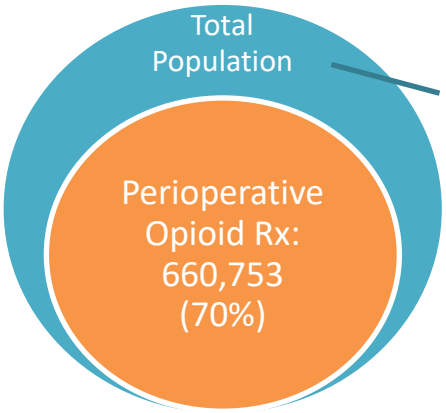

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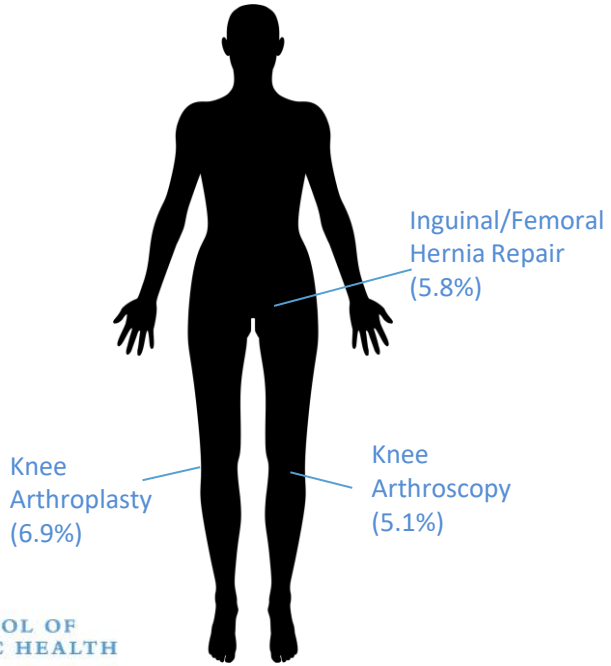

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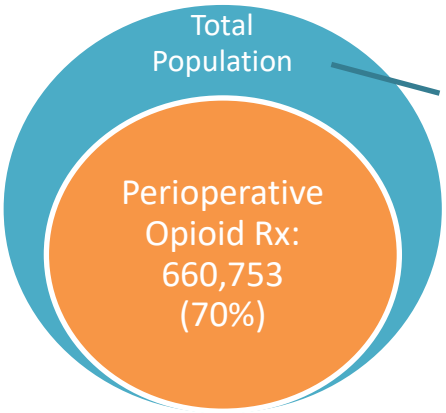

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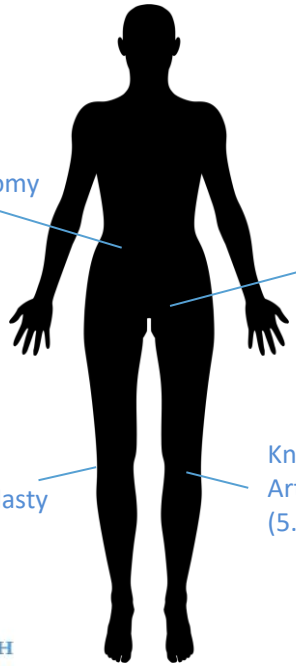

Laparoscopic Cholecystectomy (5.3%)

Inguinal/Femoral Hernia Repair (5.8%)

Knee Arthroplasty (6.9%)

Knee Arthroscopy (5.1%)

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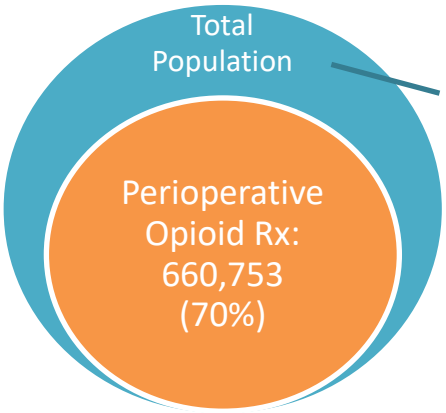

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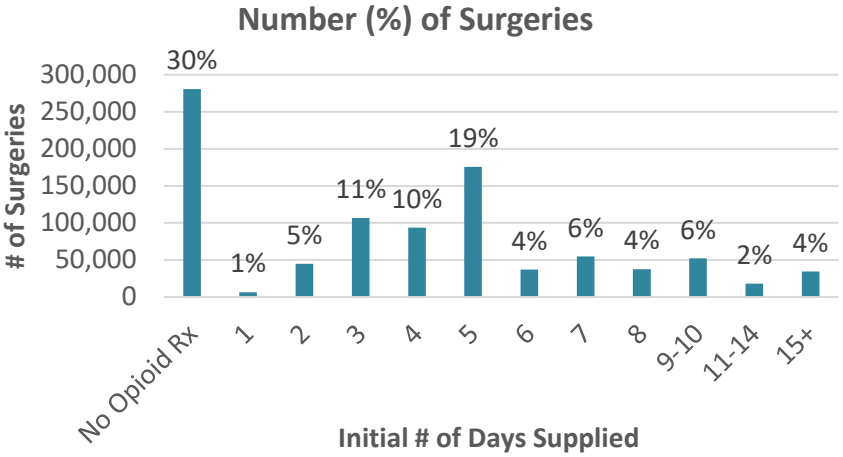

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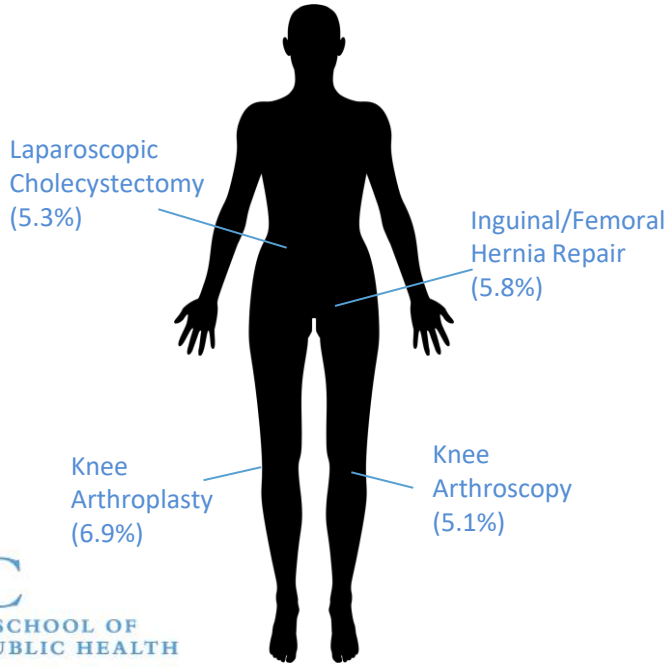

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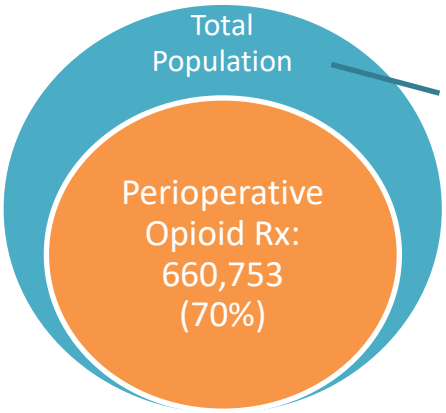

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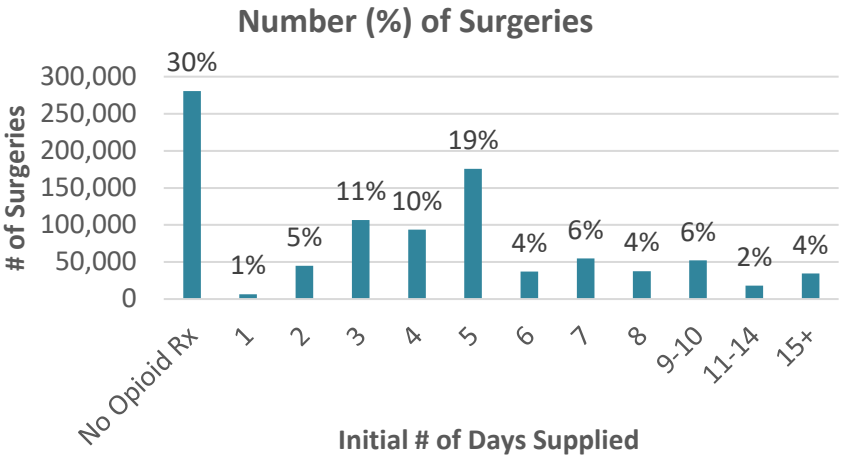

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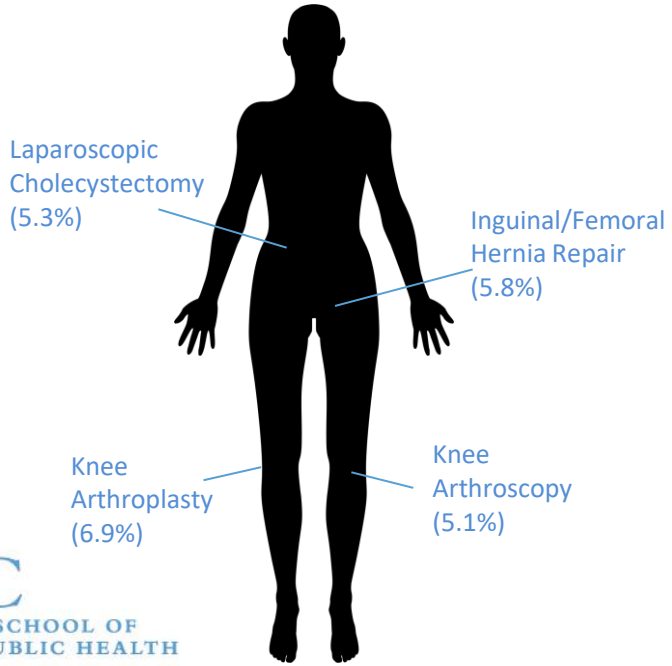

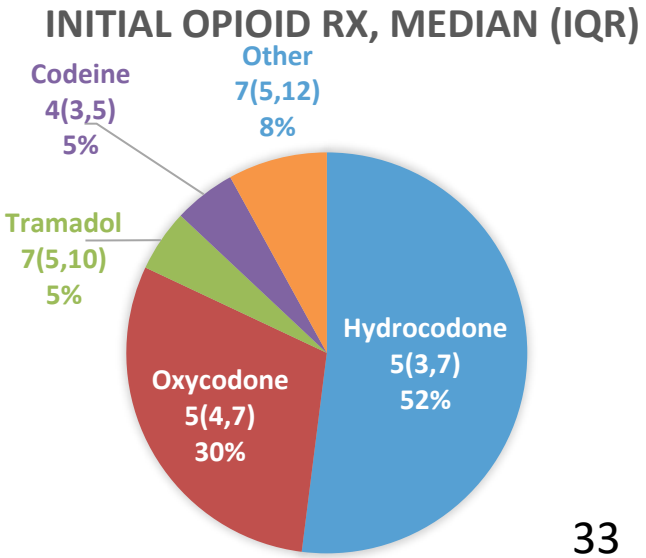

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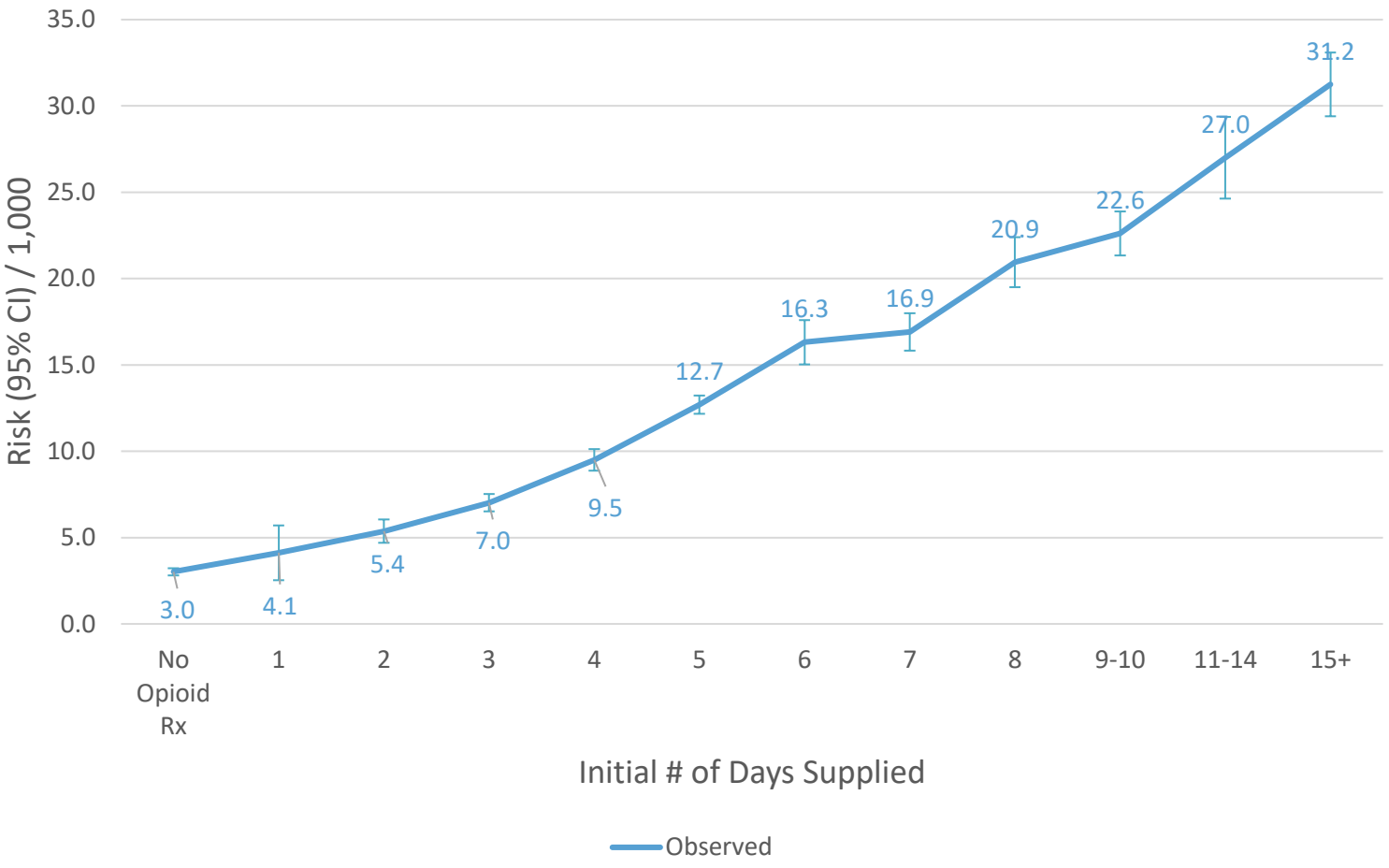
Risk of Prolonged Opioid Use



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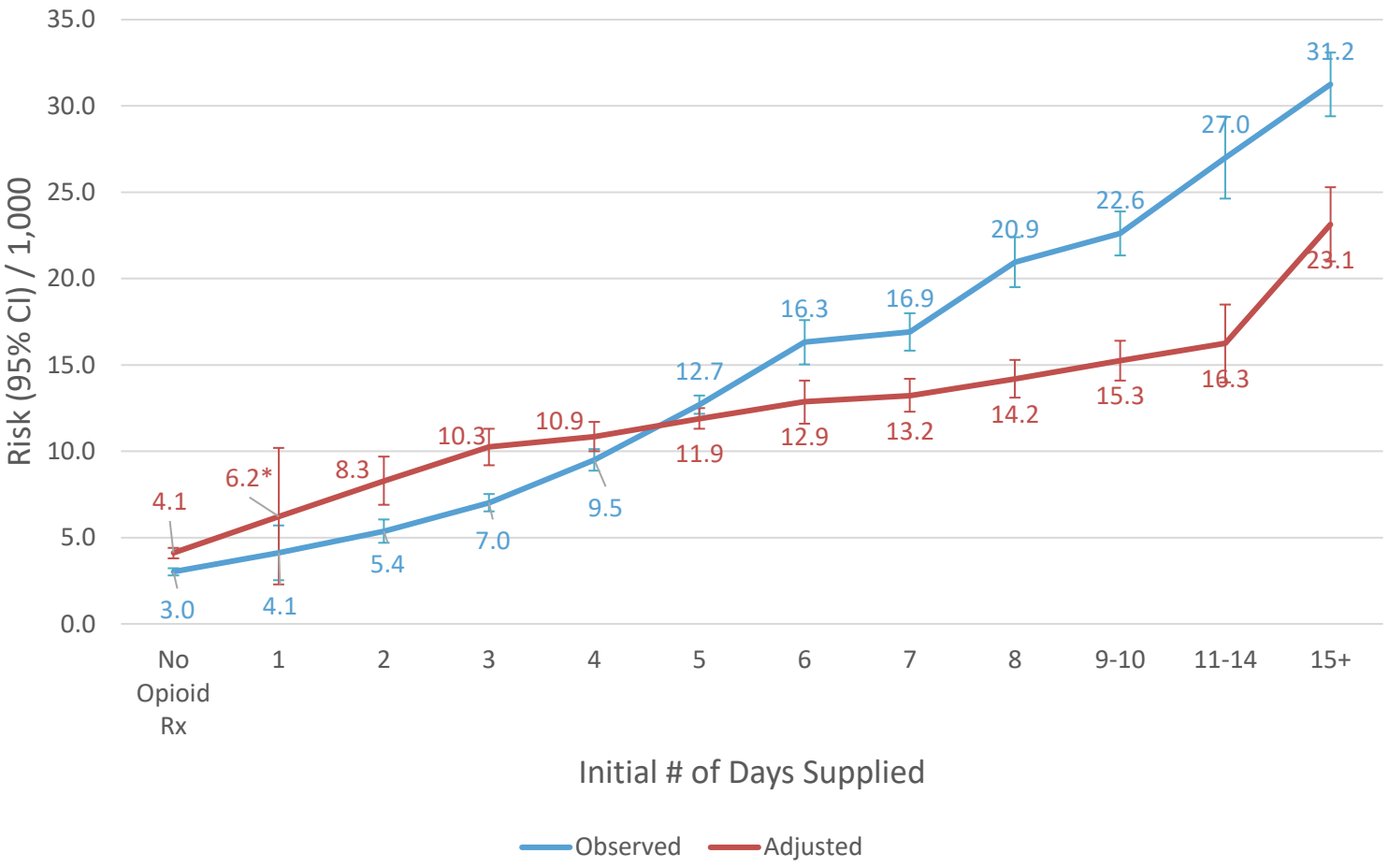

* Did not converge in 39 (20%) of iterations

Prescribing Limits Analyses

Day Supply Prescribing Limit	Population: Initial Day Supply Exceeded	No. (%) of Surgeries above Cutoff	Observed Risk/1,000 Above Limit	Predicted Risk/1,000 At Limit[a]	Risk Difference (95% CI)	# of Reduced Prolonged Opioid Use Cases[b]
2	≥3 DS	609,782 (92.3%)	14.6	9.9	4.76 (3.99,5.53)	2,903
3	≥4 DS	502,991 (76.1%)	16.3	13.2	3.09 (2.51,3.67)	1,557
4	≥5 DS	409,514 (62.0%)	17.8	14.8	3.00 (2.35,3.66)	1229
5	≥6 DS	233,821 (35.4%)	21.6	19.1	2.52 (1.74,3.30)	590
6	≥7 DS	196,618 (29.8%)	22.6	20.4	2.19 (0.84,3.54)	431
7	≥8 DS	141,869 (21.5%)	24.8	23.4	1.39 (0.12,2.66)	197
8	≥9 DS	104,390 (15.8%)	26.2	24.6	1.66 (-0.21,3.53)	173
10	≥11 DS	52,354 (7.9%)	29.8	28.1	1.64 (-0.29,3.57)	85
15	≥16 DS	21,121 (3.2%)	34.1	31.8	2.34 (-1.25,5.93)	49

[a]Risk calculated using g-computation methods with 200 bootstrapped resamples, estimating risk of prolonged use if all patients above the limit had instead received a prescription equal to that limit.
[b]# of surgeries above cutoff / NNT.

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- Common prescribing limits (7 days) may have limited impact on reduction in prolonged opioid use

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Future Directions

- Dosage and Quantity Dispensed

- Adequate pain management
  - Functional improvements
  - Improved quality of life
  - Refill rates

- Linkage to Electronic Health Records

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  - Must have a pain management plan in place
- Currently implemented prescribing limits
  - Alter clinical care for many
  - Have limited impact on reducing prolonged opioid use
  - Need for procedure specific guidelines

Acknowledgements

Co-Authors

- Nabarun Dasgupta
- Brook Chidgey
- Til Stürmer
- Virginia Pate
- Michael Hudgens
- Michele Jonsson Funk

Funding Support

- R36 NIDA

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Questions?

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Related Presentations

OR-2516: Two-stage G-computation: Estimating Effects of Treatment Policies From Observational Data when Treatment Information is Missing
Presenting Author: Tiffany Breger

OR-3743: Electronic Medical Records Vs Insurance Claims: Comparing the Magnitude of Opioid Use Prior, During, and Following Surgery
Presenting Author: Jessica C Young