# Opportunities for Improving Perioperative Urinary Catheter Use in the State of Michigan

Ana C De Roo MD[1,2], Samantha Hendren MD MPH[1,2], Jessica M Ameling MPH[3], Jennifer Meddings MD MSc[3,4,5]

[1]Institute for Healthcare Policy and Innovation, University of Michigan [2]Department of Surgery, University of Michigan [3]Department of Internal Medicine, University of Michigan
[4]Department of Pediatrics and Communicable Diseases, University of Michigan [5]Center for Clinical Management Research, Veterans Affairs Ann Arbor Healthcare System

## BACKGROUND

**OBJECTIVE:** Assess opportunities for reducing perioperative urinary catheter use, by comparing recent patterns to Michigan Appropriate Perioperative Criteria.

Urinary catheters can be **helpful** perioperatively:
- Measure urine output
- Decompress bladder for visibility
- Prevent over-distension of bladder
- Prevent incontinence

Urinary catheters can be **harmful**:

Infectious harms:
- Urinary tract infection
- Sepsis

Noninfectious harms:
- Bladder spasms
- Pain and burning

### Michigan Appropriate Perioperative (MAP) Criteria

an expert panel applied the RAND/UCLA Appropriateness Method to categorize the need for perioperative urinary catheters by operation and appropriate postoperative day of removal

**CATEGORY A**
Avoid catheter if possible

e.g. laparoscopic cholecystectomy

**CATEGORY B**
Consider removing catheter on postoperative day (POD) 0 or 1

e.g. laparoscopic hemicolectomy

**CATEGORY C**
Appropriate until at least day 1, with upper limit POD 4

e.g. abdominoperineal resection

## METHODS

**Study design:** Retrospective cohort study, 2014-2015
**Data Source:** Michigan Surgical Quality Collaborative – 64 hospitals
**Exposure:** Patients ≥18 years undergoing selected procedures
**Outcomes:** Catheter use, date of catheter removal
**Statistical Analysis:** Descriptive statistics, chi-squared, univariate analysis of *a priori* factors associated with catheter use and duration of use informed a logistic regression model of predicted catheter use and linear regression model of expected duration of use
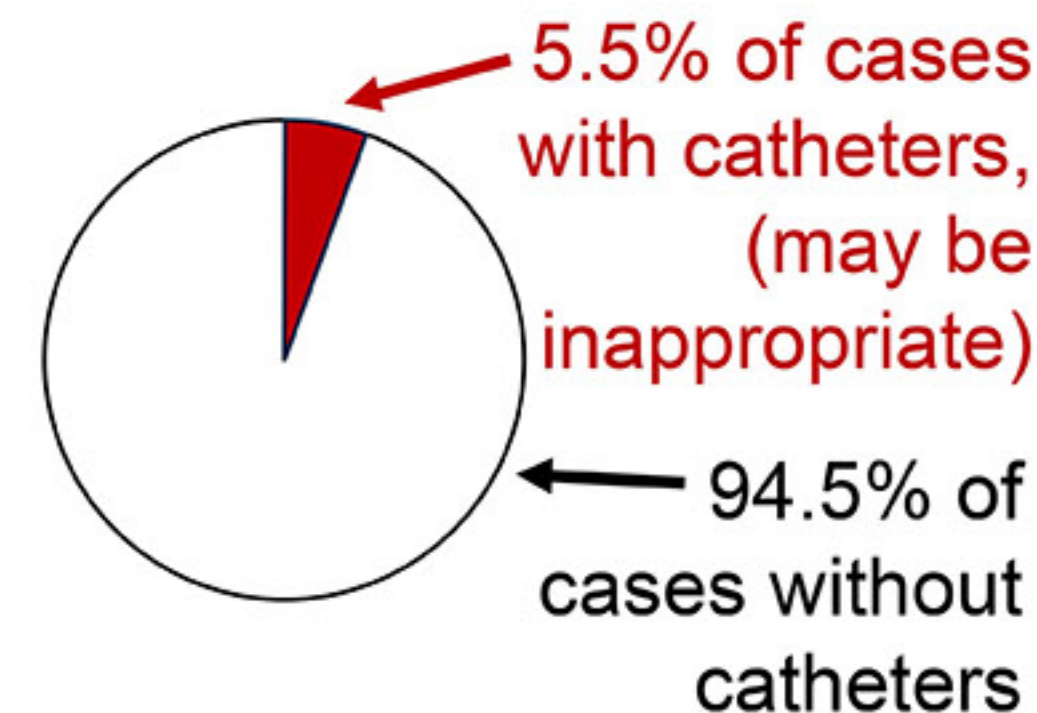
## RESULTS

**CATEGORY A**

13032 procedures
721 (5.5%) cases used catheter – though rates varied by procedure:
- 3.1% laparoscopic cholecystectomy
- 8.9% laparoscopic appendectomy
- 26.9% open appendectomy

5.5% of cases with catheters, (may be inappropriate)
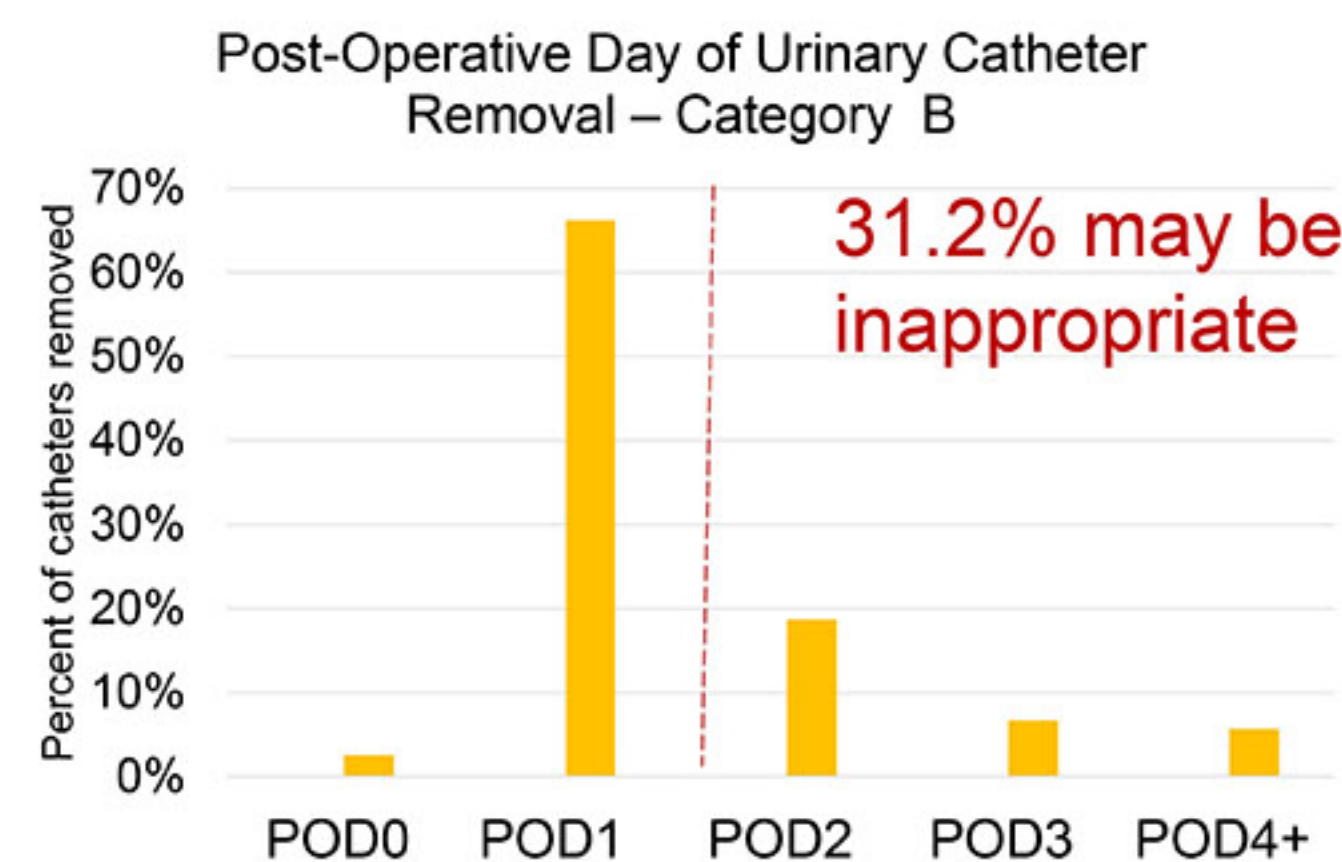
94.5% of cases without catheters

**CATEGORY B**

1718 procedures
94.5% used catheters

66.2% of cases with catheter removal by POD1
2.7% of cases with removal by POD0
*Could some POD1 removals shift to POD0?*
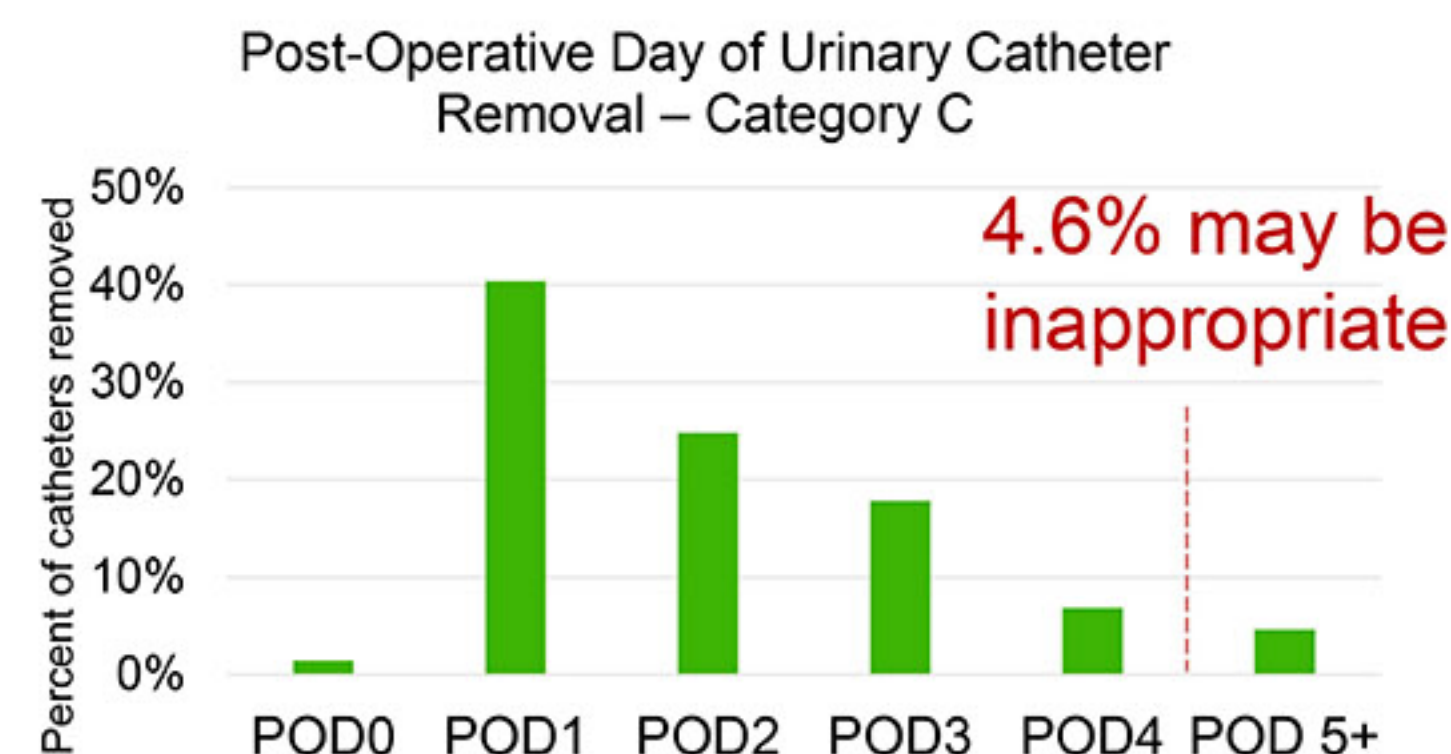
Post-Operative Day of Urinary Catheter Removal – Category B

31.2% may be inappropriate

(bar chart: Percent of catheters removed vs POD0, POD1, POD2, POD3, POD4+)

**CATEGORY C**

700 procedures
98.1% used catheters

*69% of cases removed catheter by POD2 – possible for others to shift POD removal earlier?*

Post-Operative Day of Urinary Catheter Removal – Category C

4.6% may be inappropriate

(bar chart: Percent of catheters removed vs POD0, POD1, POD2, POD3, POD4, POD 5+)

## CONCLUSIONS

**Meeting criteria in majority of cases**

**But there may be room for improvement:**

- Category A procedures: 5.5%
- Category B procedures: 31.2%
- Category C procedures: 4.6%

**Goal: reduce catheter use → reduce both urinary tract infection and non-infectious catheter harms**

### Next Steps:

- Increase awareness of MAP criteria
- Assess impact of MAP criteria on perioperative outcomes
- Consider application of urinary catheter appropriateness, such as MAP criteria, to inform National Healthcare Safety Network's measure of urinary catheter use: the Standardized Utilization Ratio

References:
Meddings J, Skolarus TA, Fowler KE, et al. Michigan Appropriate Perioperative (MAP) criteria for urinary catheter use in common general and orthopaedic surgeries: results obtained using the RAND/UCLA Appropriateness Method. *BMJ Qual Saf.* 2019;28(1):56-66.
Saint S, Trautner BW, Fowler KE, et al. A Multicenter Study of Patient-Reported Infectious and Noninfectious Complications Associated With Indwelling Urethral Catheters. *JAMA Intern Med.* 2018;178(8):1078-1085.

Contact: aderoo@med.umich.edu