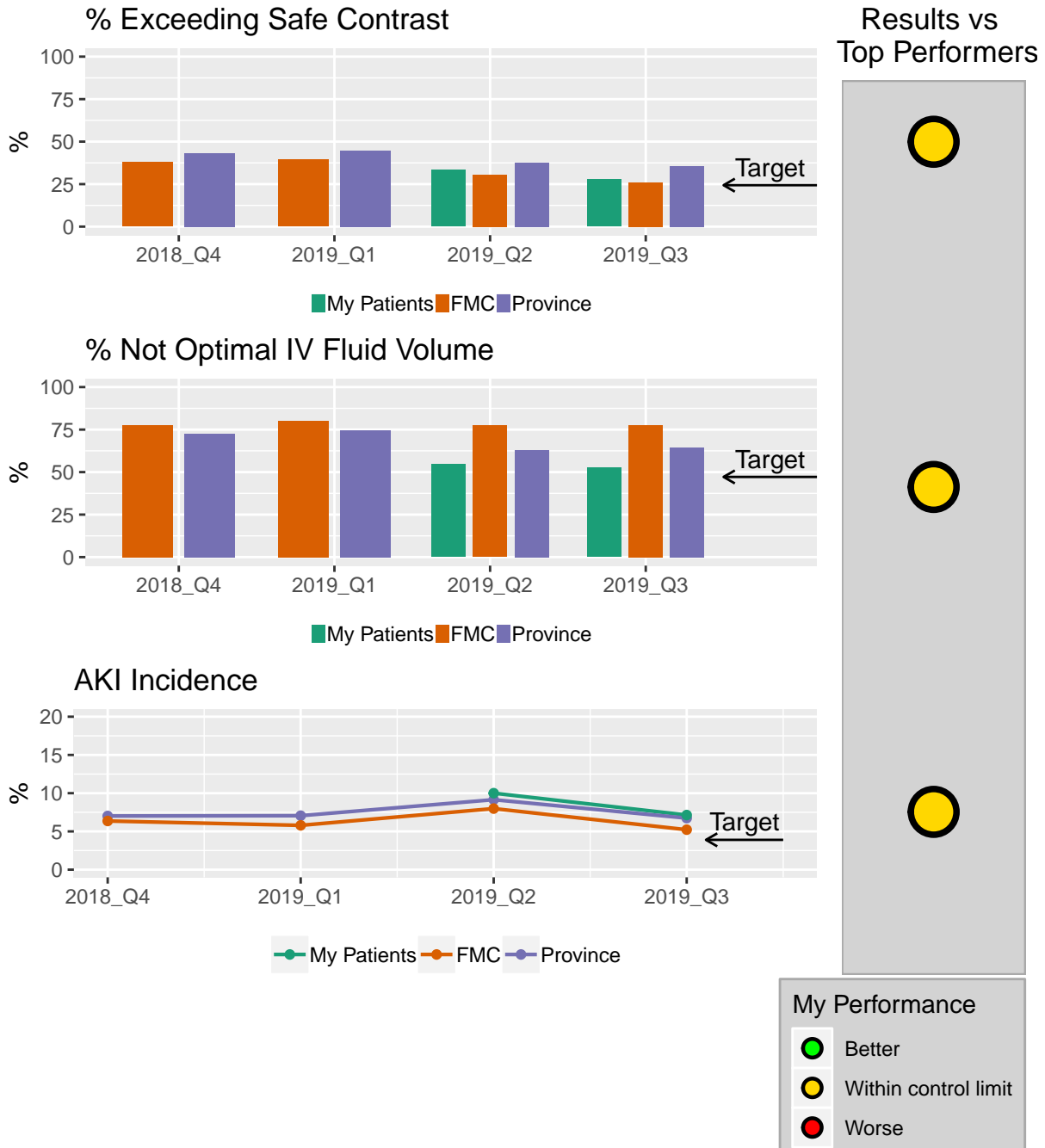


Summary for Physician Quarter 3, 2019



Recommendations

1. Avoiding LV grams is one way to reduce your contrast use
2. Asking staff for the optimal IV fluid recommendations from APPROACH will allow you to optimize your IV fluid volume

By reviewing this document you are eligible for Royal College Maintenance of Certification credits for practice assessment (in the Section 3 Performance Assessment Category <http://www.royalcollege.ca/rcsite/cpd/moc-program/moc-framework-e>).

Contrast-Induced Acute Kidney Injury Prevention: Audit and Feedback Report

Prepared by Health System Statistics and Analytic Methods

2019-12-03

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Background Information

This report provides information on patients at increased risk of Contrast Induced - Acute Kidney Injury (CI-AKI) that received procedures (cardiac catheterization or PCI) between Aug-01-2019 and Oct-31-2019. Patients at increased risk of CI-AKI include patients that meet the following APPROACH definitions:

- Above Average Risk - above the median risk of CI-AKI (>5% predicted risk of CI-AKI)
- High Risk - above median risk of CI-AKI with a very low safe contrast limit (30 cc; > 25% predicted risk of CI-AKI)

The total number of episodes of care in the province in this time period was 3613. Of these, 30.3% (N=1094) were Above Average Risk of CI-AKI, and 0.5% (N=19) were at High Risk. You performed procedures on 84 patients at the FMC. This report focuses on 22.6% (N=19) of these patients that were at increased risk of CI-AKI after you were stepped in.

Patients receiving dialysis or emergency PCI for STEMI have been excluded from this report.

APPROACH provides tools to guide your practice:

- Safe contrast volumes are provided on the main page of the APPROACH database prior to procedures¹.
- IV fluid recommendations are presented on the procedure data page of the APPROACH database².

Strategies to reduce contrast volume:

- Avoid left ventriculograms
- Use small syringe catheter
- Avoid puff injections
- Use contrast injector
- Consider staging procedures

Strategies to optimize LV fluids:

- Start Normal Saline @3mL/kg for 1 hour prior to procedure
- Adjust IV rate according to LVEDP based recommendation during procedure
- Order LVEDP-based IV @ recommended rate for 4 hours post procedure

Results for Patients at Increased Risk of CI-AKI:

Process and Outcomes Information

Table 1: Process and Outcome Measures

	My Patients	My Site	Province
Process			
% Exceeding Safe Contrast	27.8%	26.0%	35.8%
% Below Optimal IV Fluid Volume	52.6%	77.7%	64.5%
Outcome			
Without AKI Follow-Up	12.5%	12.5%	12.3%
AKI Incidence	7.1%	5.2%	6.7%

Patient Information

Table 2 provides patient information for your episodes of care. You were the sole provider for all of your episodes of care.

Table 2: Patient characteristics and AKI risk score components

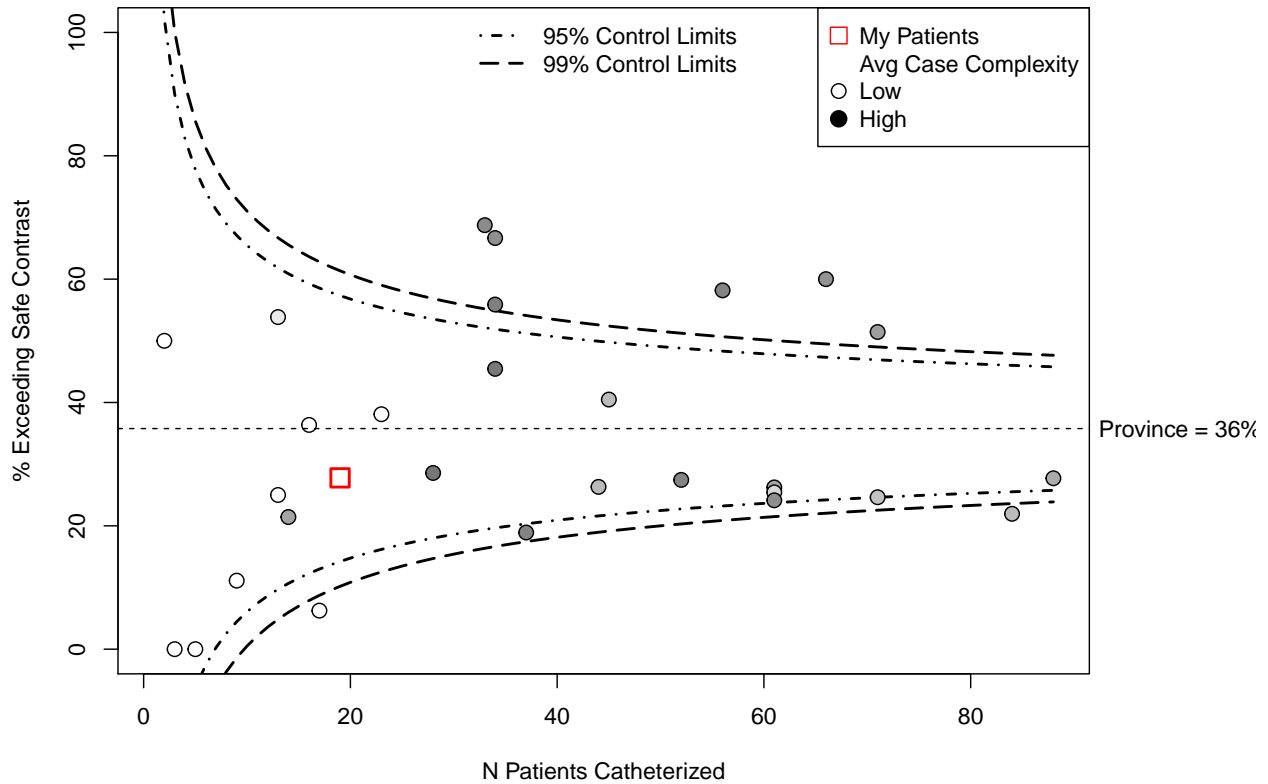
	My Patients	My Site	Province
Patient Characteristics			
N	19	467	1094
Coronary Disease Anatomy			
Normal/<50%	31.6%	14.3%	14.8%
1 Vessel Disease	26.3%	20.3%	21.0%
2 Vessel Disease	21.1%	19.7%	20.9%
3 Vessel Disease	5.3%	30.8%	32.1%
Left Main	15.8%	14.8%	11.3%
Procedure			
Cath only	100.0%	73.2%	59.7%
Crossover (Cath to PCI)	0.0%	1.9%	3.2%
Direct (Cath to PCI)	0.0%	19.7%	29.7%
PCI only	0.0%	5.1%	7.4%
LVEDP (mean)	19.0	14.8	13.8
Risk Score Components			
Age (years)	69.4	70.7	70.4
Female Sex	36.8%	34.7%	34.1%
Anemia	21.1%	7.9%	8.6%
eGFR (mL/min/1.73m ²)	50.2	60.6	60.1
Cerebrovascular Disease	15.8%	14.3%	8.5%
Heart Failure in last 2 weeks	15.8%	9.2%	10.1%
Heart Failure	31.6%	20.8%	21.6%
Diabetes	52.6%	63.0%	57.6%
Indication			
NSTEMI	33.3%	49.0%	52.4%
STEMI	0.0%	11.6%	22.8%
Unstable Angina	66.7%	39.4%	24.8%
Mean AKI Risk (%) based on risk score	7.16%	8.07%	8.37%

Contrast Dye

Funnel plot of the proportion exceeding safe contrast limits

Each dot in the following plot shows the proportion of catheterizations that exceeded the safe contrast limit among patients at increased risk CI-AKI for each Alberta cardiologist in the report time period. The horizontal x-axis indicates the number of patients treated by each cardiologist, and the vertical y-axis shows the proportion of the procedures that exceeded the safe contrast limits. The red square in the plot shows the proportion of your procedures that exceeded the safe contrast limits. The closer your red square is to zero, the better your contrast use relative to recommendations.

We have set a target of below the current provincial average of 35.8% for the proportion exceeding the safe contrast limits. This provides cardiologists with some leeway to exceed the safe contrast limits. The 95% and 99% Control Limits are based on the target. These indicate where the proportion of those exceeding safe contrasts are greater (or less) than expected due to chance if cardiologists were using dye according to the target.



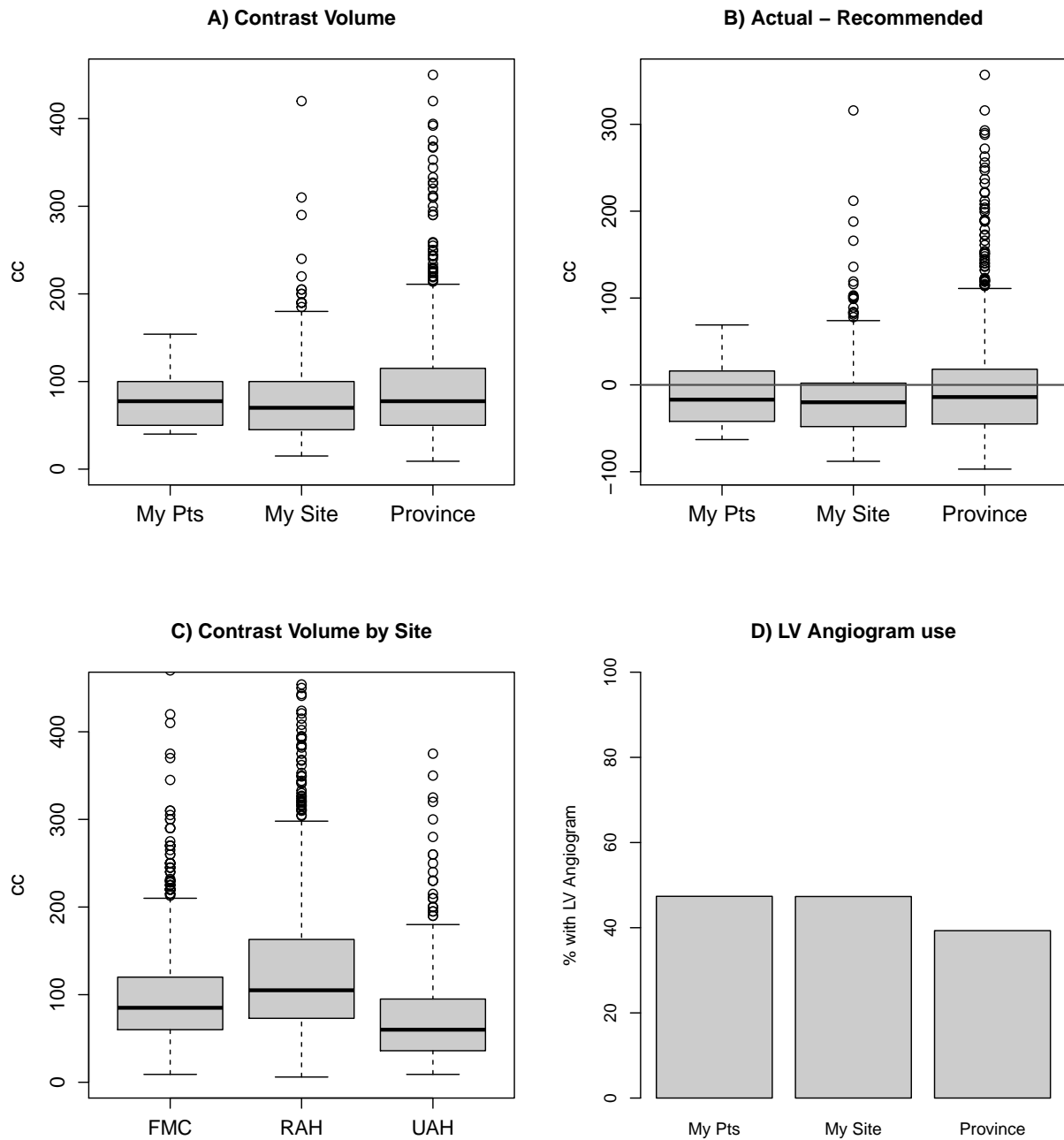
- Case complexity refers to the percentage of your patients with two procedures (Cath to PCI, either directly or with a crossover from diagnostic to interventional cardiologist).

Table 3: % of episodes of care receiving procedures that increase dye volume requirements

	My Patients	My Site	Province
LV Angiogram	47.4%	47.3%	39.3%
Aortic Root	0.0%	1.9%	3.3%
Aortogram	0.0%	1.5%	0.9%

Contrast Dye Volumes

Patients at increased risk of AKI should receive ideally lower volumes of contrast dye. Panel A) distribution of the volume of contrast dye that you used on patients at increased risk of CI-AKI; Panel B) the difference in the amount of dye you used in excess of the recommended maximum safe dye volume for these patients. Negative values indicate that you used less than the recommended safe volume. Panel C) contrast dye volumes for each site; Panel D) Percentage of patients at each site that had an LV angiogram during their episode of care.

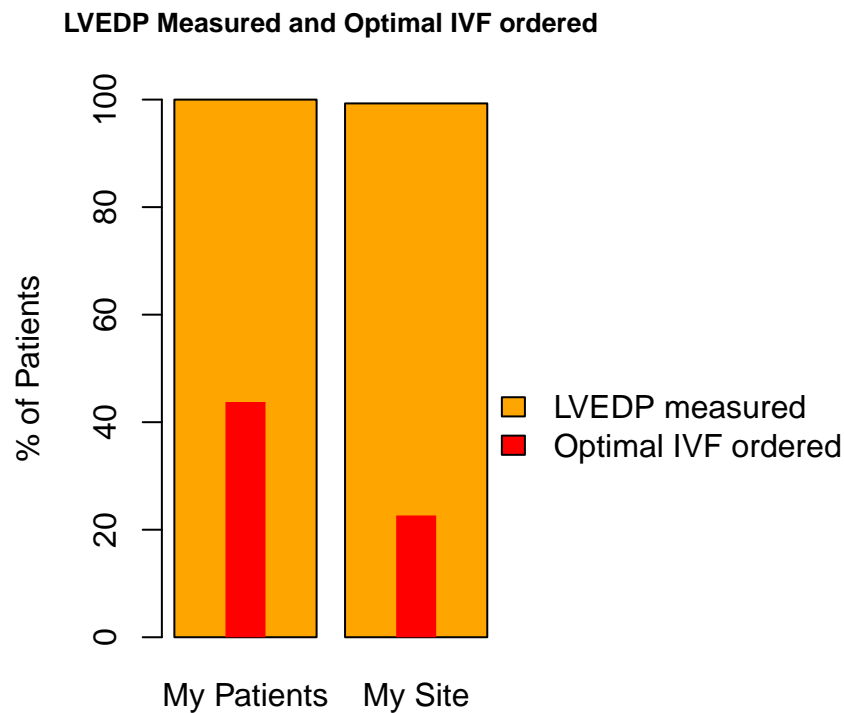


IV Fluid Optimization

Patients without aortic stenosis, active or recent heart failure can safely receive larger volumes of IV fluids and achieve a lower incidence of CI-AKI when IV fluid orders are tailored to weight and LVEDP.

The optimal IV fluid rate for CI-AKI prevention is calculated for each patient in APPROACH when weight and LVEDP has been obtained. Physician discretion is recognized as important with use of higher rates of IV fluids in patients with heart failure at risk of pulmonary edema.

The following plot shows LVEDP measurement and IVF use for above average and high risk patients treated after physicians had been stepped into the Contrast Risk program. Patients with aortic stenosis and heart failure in the preceding two weeks have been excluded.

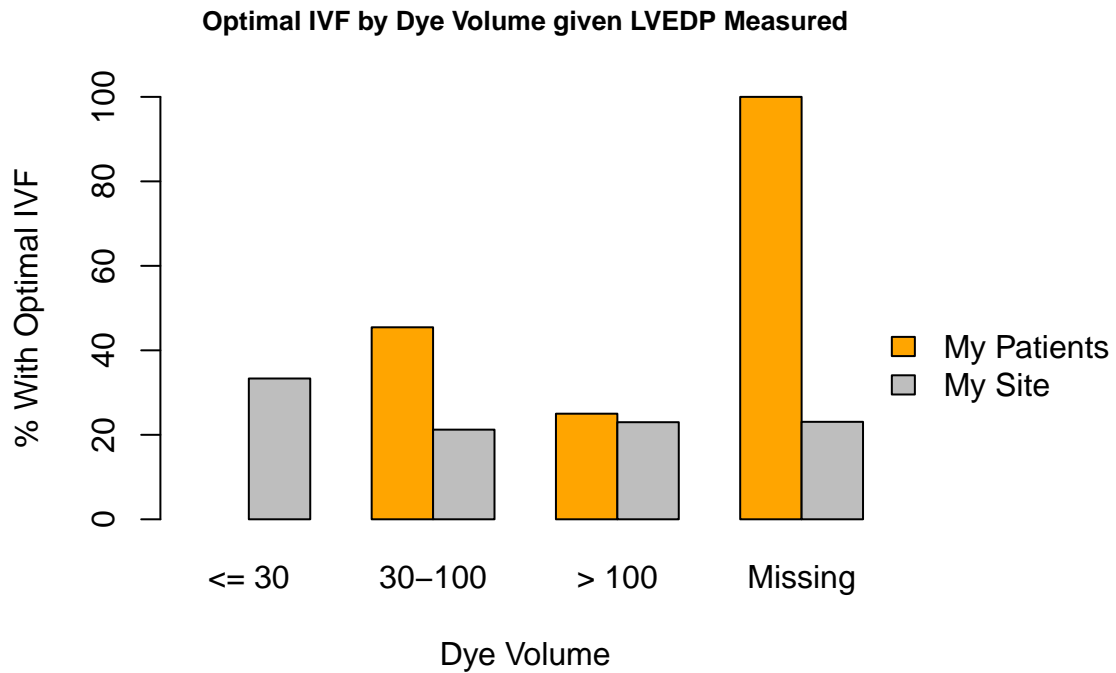


IVF Optimization by Contrast Dye Volume

The following table and figure shows the percentage of patients with optimal IVF volume by the contrast dye volume for the episode of care. As above, these are for above average and high risk patients treated after physicians had been stepped into the Contrast Risk program, and they only include patients with an LVEDP measurement.

Table 4: % with Optimal IVF by Dye Volume

Dye Volume	My Patients	My Site
<= 30	0/0	11/33(33.3%)
30-100	5/11(45.5%)	59/278(21.2%)
> 100	1/4(25.0%)	20/87(23.0%)
Missing	1/1(100.0%)	6/26(23.1%)

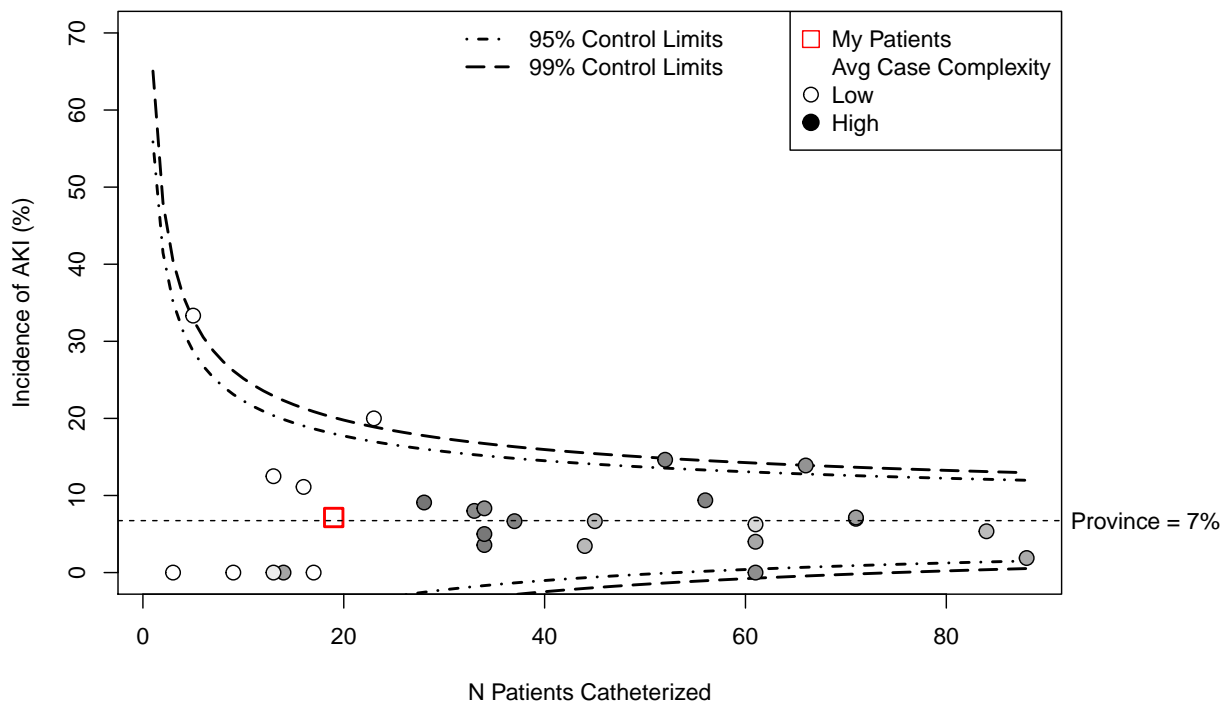


AKI Incidence

Each dot in the following plot shows the incidence of CI-AKI for patients at increased risk of CI-AKI treated by an Alberta cardiologist in the report time period. The horizontal x-axis indicates the number of high-risk patients treated by each cardiologist, and the vertical y-axis shows the proportion of patients with CI-AKI. The red square in the plot shows the proportion of your procedures that had CI-AKI.

The 95% and 99% Control Limits are based on the target incidence for above average and high risk patients in the report time period. These indicate where the proportion of CI-AKI events are greater (or less) than expected due to chance if patients experienced CI-AKI at the provincial average for above average and high risk patients of 6.7%.

Funnel plot of AKI Incidence



- Case complexity refers to the percentage of your patients with two procedures (Cath to PCI, either directly or with a crossover from diagnostic to interventional cardiologist).

Footnotes

1. The safe volume is determined as the maximum volume of contrast to administer during a procedure to reduce the risk of AKI by 15%.
2. IVF recommendations are provided in mL/Min x 4 hours for patients without heart failure and are based on LVEDP.