Discipline Efficiency Study

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Agenda

- Background

- Methodology

- Results

- Key Takeaways

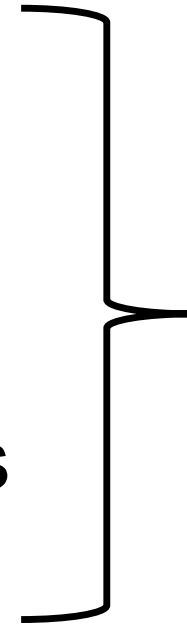# Background

- Population aging

- Workforce shortages

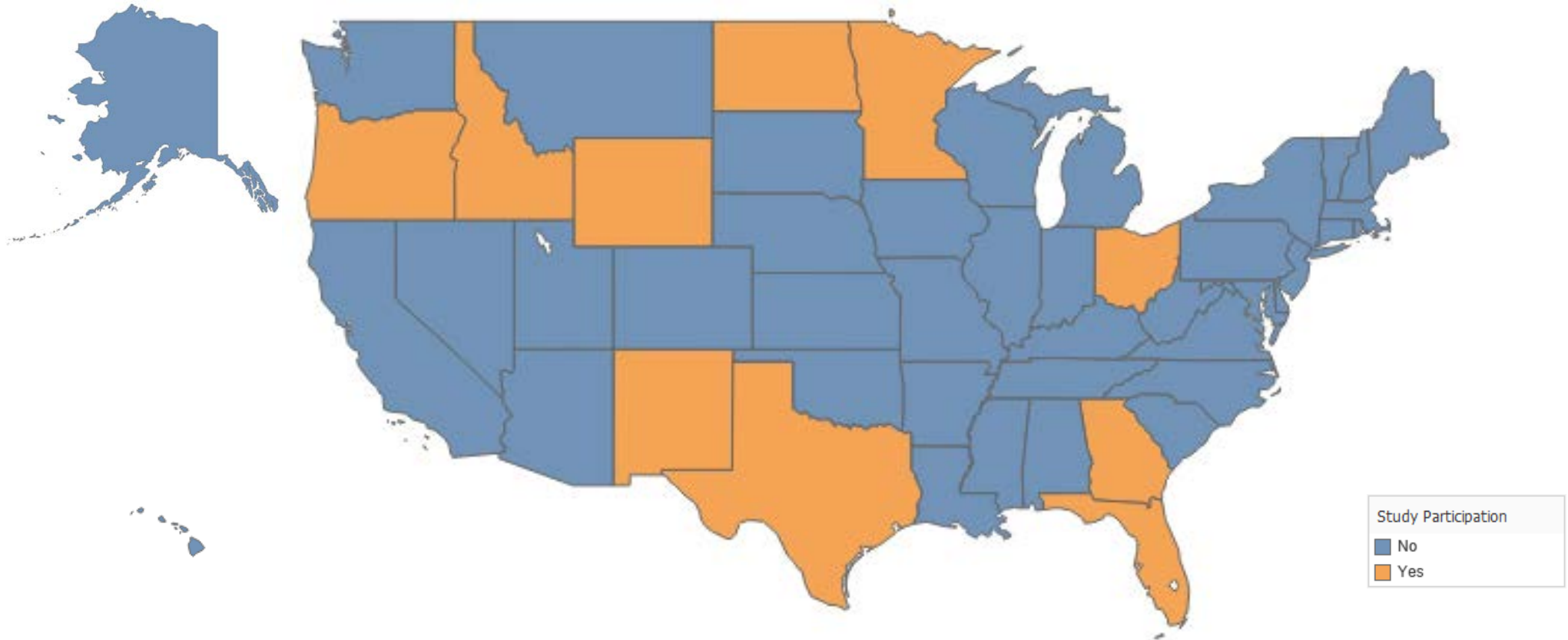- Mobile professional class

Agile regulatory systems

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Objectives

1) Identify efficient and effective models for case management

2) Develop evidence-based guidelines

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Methodology

- **Design:** Cohort study

- **Sample:** 10 nursing regulatory bodies

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Participating States

Study Participation
- No
- Yes

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Methodology

- **Data Collection:** Microsoft Forms

- **Analysis:** GEE & NLP
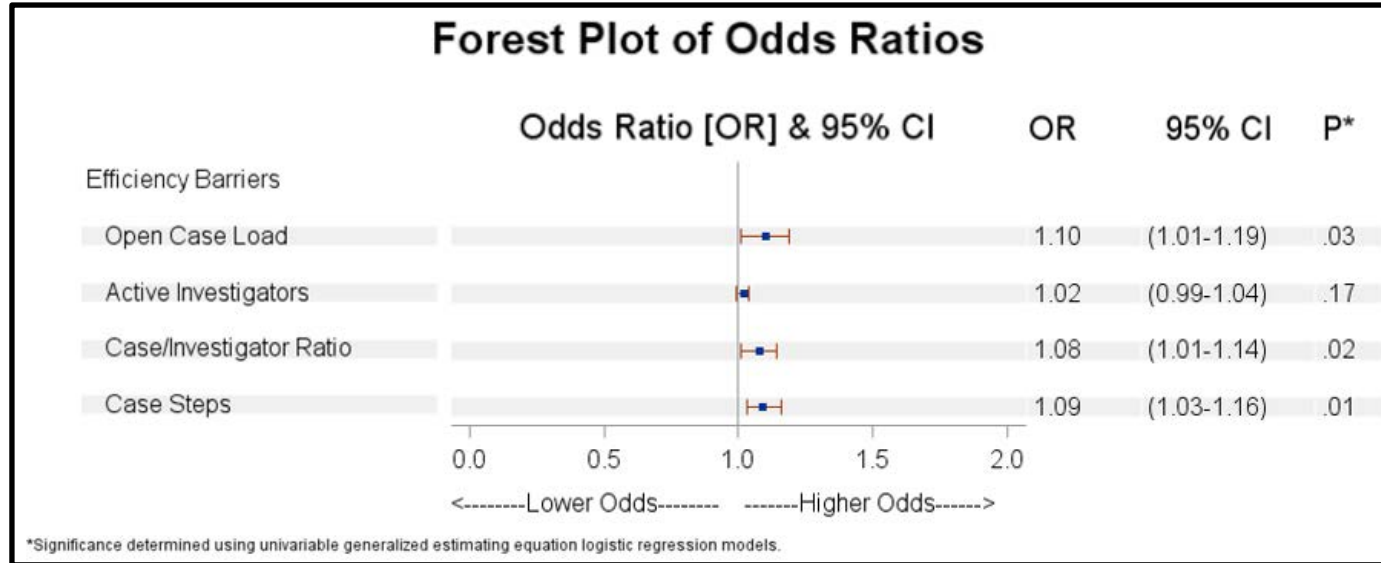
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Demographics

- Participants were only asked to provide data on up to five cases.

- Some voluntarily exceeded this total (MN, GA, OR), while one (NM) fell just short.

Case Characteristics	Total
Participating States	
Oregon	9 (16.3%)
Georgia	6 (10.9%)
Minnesota	6 (10.9%)
Florida	5 (9.1%)
Idaho	5 (9.1%)
North Dakota	5 (9.1%)
Ohio	5 (9.1%)
Texas	5 (9.1%)
Wyoming	5 (9.1%)
New Mexico	4 (7.3%)
Case Category	
Professional Conduct	20 (36.4%)
Impairment/Diversion	13 (23.6%)
Practice Error	12 (21.8%)
Criminal	10 (18.2%)
Case Resolution	
Yes	40 (72.7%)
No	15 (27.3%)
Open Case Load (Median, IQR)	494 (125 – 787)
Active Investigators (Median, IQR)	3 (2 – 13)
Case/Investigator Ratio (Median, IQR)	60 (29 – 131)
Case Steps (Median, IQR)	10 (6 – 15)
Days to Close (Median, IQR)	177 (113 – 271)
Nurse Age (Mean, SD)	42.6 (12.7)
Nurse Sex	
Female	34 (82.9%)
Male	7 (17.1%)

Data Notes: Valid N for each item varies based on observed non-response rates; all proportions are reported based on item-level Valid N.
Abbreviations: SD = standard deviation, IQR = interquartile range

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Univariable Case Resolution

Case Characteristics	Case Resolution	
	OR (95 CI)	*p*
Case Type Frequency		.31
Most Common	0.41 (0.16 – 1.05)	.06
Second Most Common	1.00 (0.40 – 2.49)	.99
Third Most Common	0.82 (0.21 – 3.19)	.77
Fourth Most Common (*Ref*)	-	
Case Category		.55
Professional Conduct	0.62 (0.21 – 1.82)	.38
Impairment/Diversion	1.11 (0.31 – 4.03)	.87
Practice Error (*Ref*)	-	
Criminal	1.33 (0.20 – 8.74)	.76
Open Case Load (*Unit = 100*)	1.10 (0.98 – 1.22)	.08
Active Investigators	1.13 (0.99 – 1.28)	.07
Case/Investigator Ratio (*Unit = 10*)	0.93 (0.82 – 1.05)	.21
Case Steps	1.13 (0.94 – 1.37)	.13
Nurse Age	0.96 (0.90 – 1.03)	.23
Nurse Sex		
Female	0.84 (0.12 – 6.00)	.86
Male (*Ref*)	-	
Data Notes: The unit of increase for all continuous predictors was defaulted to 1 unless otherwise noted. **Abbreviations:** OR = odds ratio; CI = confidence interval; Ref = referent		

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Univariable Inefficient Case Resolution

Forest Plot of Odds Ratios

Efficiency Barriers	Odds Ratio [OR] & 95% CI	OR	95% CI	P*
Open Case Load		1.10	(1.01-1.19)	.03
Active Investigators		1.02	(0.99-1.04)	.17
Case/Investigator Ratio		1.08	(1.01-1.14)	.02
Case Steps		1.09	(1.03-1.16)	.01

<--------Lower Odds-------- -------Higher Odds------>

*Significance determined using univariable generalized estimating equation logistic regression models.

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Univariable Inefficient Case Resolution

Case Characteristics	Inefficient Case Resolution	
	OR (95 CI)	*p*
Case Type Frequency		.71
Most Common	1.58 (0.46 – 5.41)	.47
Second Most Common	1.35 (0.27 – 6.66)	.71
Third Most Common	2.52 (0.58 – 10.96)	.22
Fourth Most Common (*Ref*)	-	
Case Category		.56
Professional Conduct	0.54 (0.15 – 1.99)	.35
Impairment/Diversion	1.17 (0.24 – 5.57)	.85
Practice Error (*Ref*)	-	
Criminal	1.00 (0.23 – 4.35)	.99
Open Case Load (*Unit = 100*)	1.10 (1.01 – 1.19)	.03
Active Investigators	1.02 (0.99 – 1.04)	.17
Case/Investigator Ratio (*Unit = 10*)	1.08 (1.01 – 1.14)	.02
Case Steps	1.09 (1.03 – 1.16)	.01
Nurse Age	1.01 (0.98 – 1.05)	.35
Nurse Sex		
Female	0.93 (0.19 – 4.54)	.93
Male (*Ref*)	-	
Data Notes: The unit of increase for all continuous predictors was defaulted to 1 unless otherwise noted.		
Abbreviations: OR = odds ratio; CI = confidence interval; Ref = referent		

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Multivariable Inefficient Case Resolution

| Case Characteristics	Inefficient Case Resolution	
	AOR (95 CI)	p
Case/Investigator Ratio (*Unit = 10*)	1.08 (1.02 – 1.13)	.01
Case Steps (*Unit = 1*)	1.09 (1.02 – 1.17)	.01
Data Notes: Both multivariable models adjusted for case category.		
Abbreviations: AOR = adjusted odds ratio; CI = confidence interval		

Case Characteristics	Inefficient Case Resolution	
	AOR (95 CI)	p
Case/Investigator Ratio (*Unit = 10*)	1.06 (0.98 – 1.15)	.13
Case Steps (*Unit = 1*)	1.09 (1.00 – 1.18)	.05
Abbreviations: AOR = adjusted odds ratio; CI = confidence interval		

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Points of Interest

ROC Curve for Case to Investigator Ratio
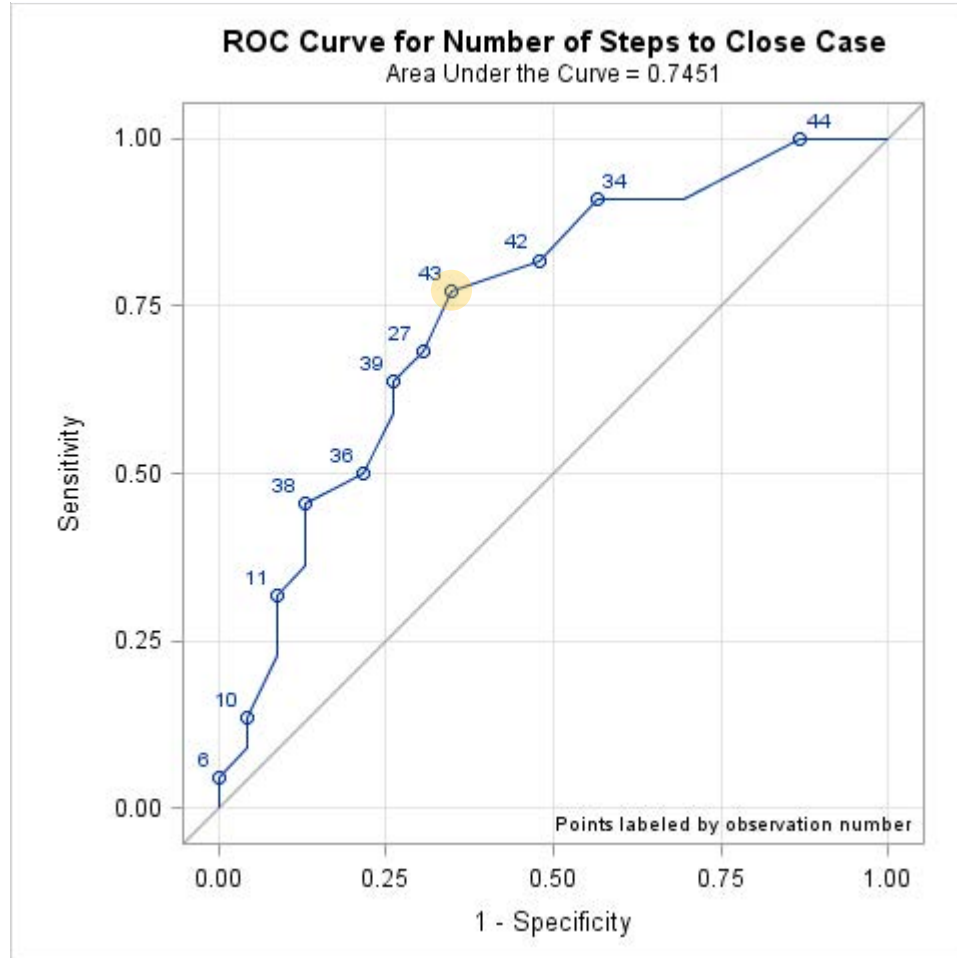Area Under the Curve = 0.7569
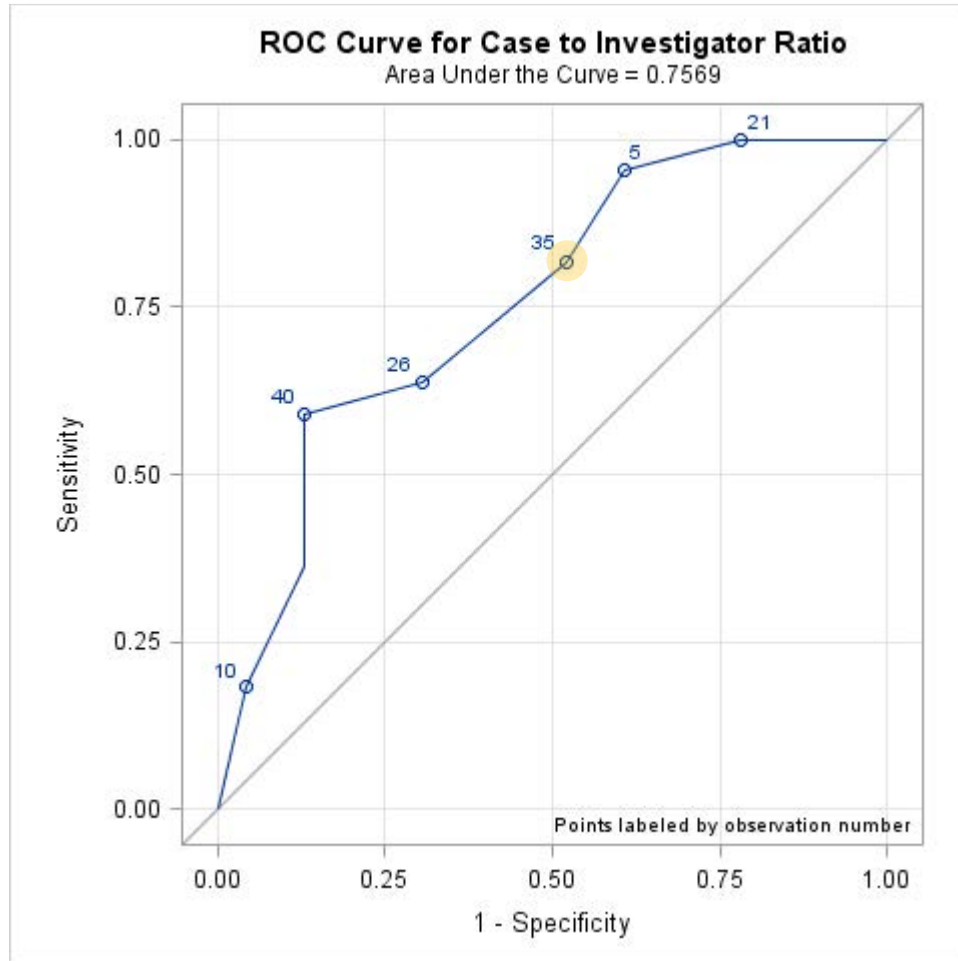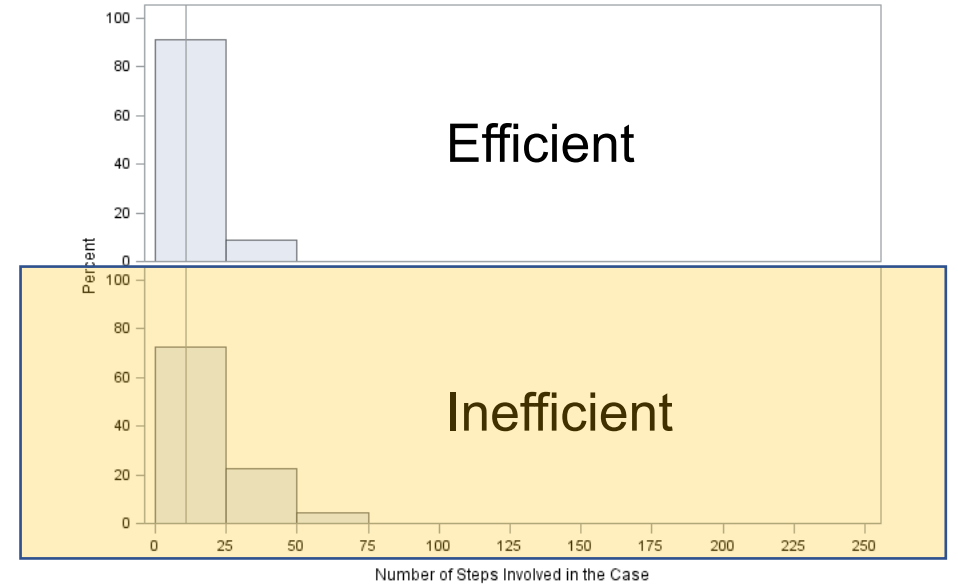
Cut Point = 38 cases/investigator
- *AUC:* 0.76 (95 CI: 0.62 – 0.90)
- *Sensitivity:* 0.59
- *Specificity:* 0.87
- *PPV:* 81%
- *NPV:* 69%
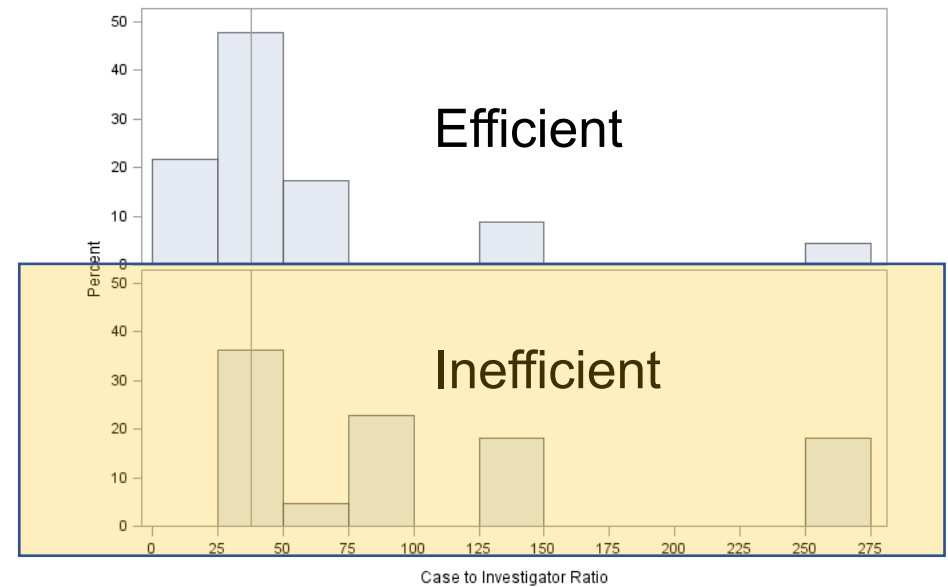
Points of Interest

Cut Point = 11 steps per case
- *AUC:* 0.75 (95 CI: 0.60 – 0.89)
- *Sensitivity:* 0.77
- *Specificity:* 0.65
- *PPV:* 68%
- *NPV:* 75%

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Natural Language Processing (NLP)

Efficient

Inefficient

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Key Takeaways

1) There are indicators of operational efficiency that transcend individual jurisdictions.

2) Monitoring investigator workload and case complexity is critical.

3) Agile regulatory systems are best supported by standardized and systematic data collection.

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Questions

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