Identifying Key Indicators for Facility Compliance

A Supplementary Analysis of the 2018/19 Fiene Coefficients for Childcare and Residential Care.
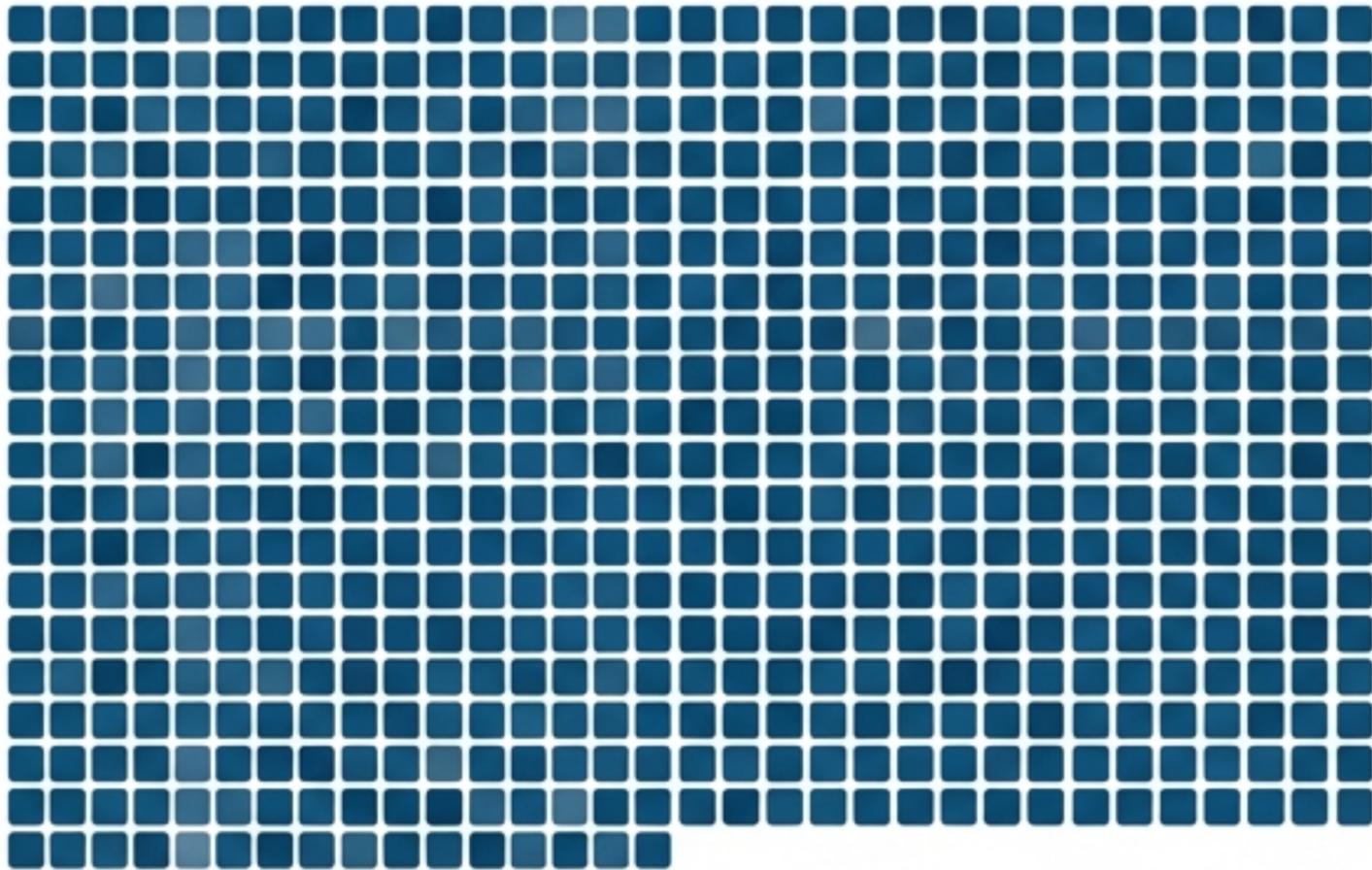
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The Monitoring Challenge: Signal vs. Noise

Childcare Facilities

Residential Facilities

271 Applicable Regulations
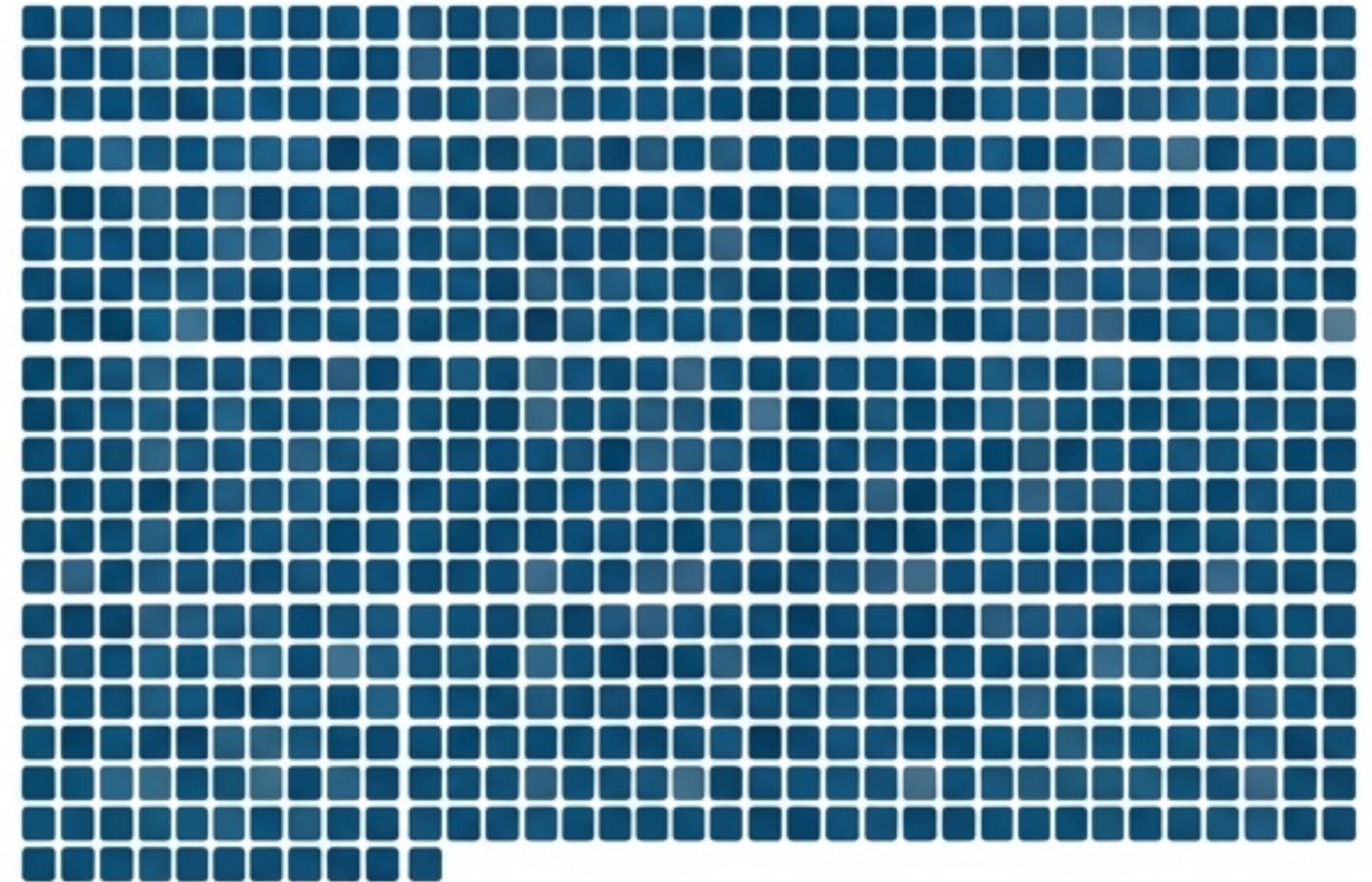
473 Applicable Regulations

How does the Health Protection department efficiently track overall safety and compliance across hundreds of disparate rules?

The Solution: Differential Monitoring via Fiene Indicators

Inter
All Regulations

Inter
Fiene Methodology Filter

Inter
Predictor Rules
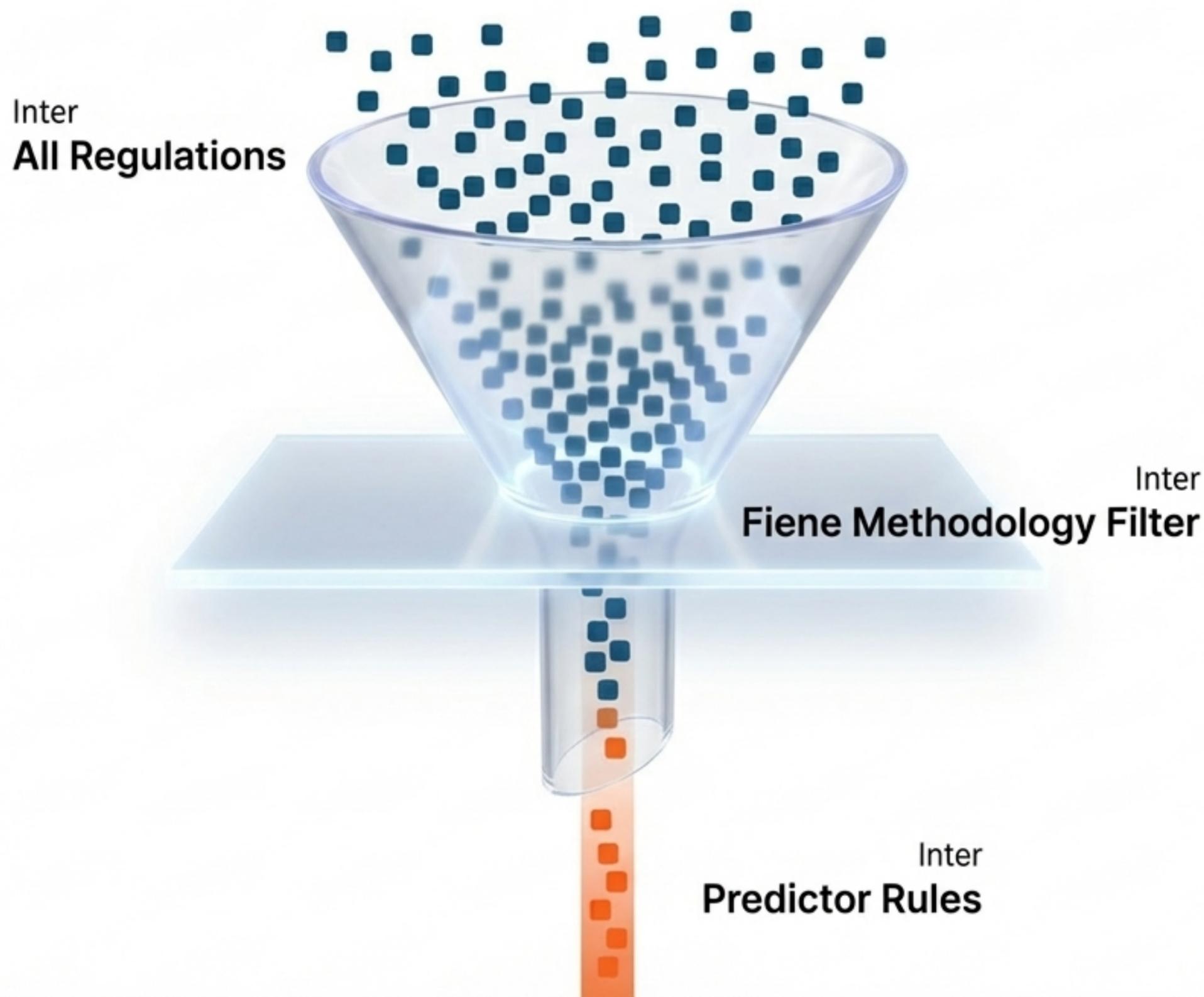
Inter
What is a Key Indicator?
Source Sans Pro
Statistically, they are predictor rules of overall compliance with all rules for a particular service type.

Inter
The Operational Value
Source Sans Pro
This differential monitoring approach predicts overall facility safety by tracking only the most statistically significant indicators, drastically optimizing inspection efficiency.

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Project Scope and Data Extraction Parameters

2017/18 Fiscal

2018/19 Fiscal

2019/20 Fiscal

Historical
comparison data.

Primary Focus:
Most recent fiscal period
with complete inspection data.

Excluded:
Data incomplete.
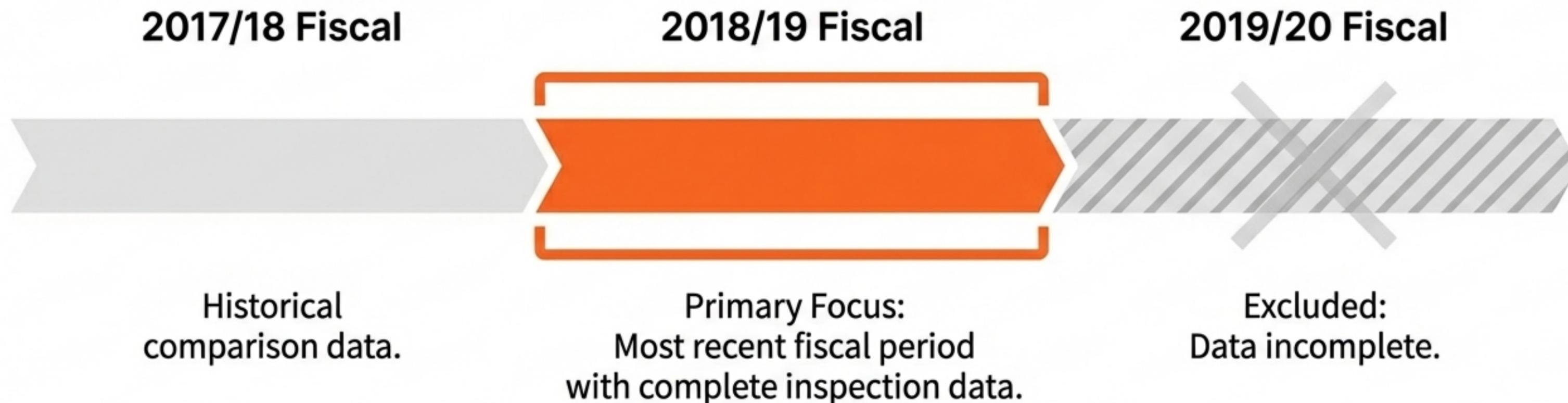
Extraction Details

- Source: Healthspace Extract
- Date Range: April 1, 2018 – January 13, 2020

Diagnostic Matrix: Selecting the Inspection Variable

First Inspection	Most Violations	Inspections Combined
Definition: Source Sans Pro Select only the first inspection in the study period.	**Definition:** Source Sans Pro Select only the inspection with the most violations.	**Definition:** Source Sans Pro Combine all violations across all inspections.
Rationale: Source Sans Pro Replicates the 2017 methodology; provides a pure, cross-sectional picture of compliance at the inspection level.	**Rationale:** Source Sans Pro Mitigates bias and maintains independent observations, but focuses only on worst-case instances.	**Risk:** Source Sans Pro Introduces heavy selection bias. Facilities with more frequent inspections naturally accrue more violations, artificially lowering their compliance ranking.

Selected Approach

To ensure cross-sectional accuracy and consistency with 2017 data, the First Inspection methodology was strictly applied.

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Visualizing the First Inspection Rule in Practice

Sample Facility A

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5
Facility A	(Blank)	(X)	(Blank)	(X)	(Blank)

Edge Case Application:
If a facility had zero inspections in 2018/19, the very first inspection occurring in the subsequent fiscal period was utilized to prevent data gaps.

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Defining the Extremes: Quartile Isolation

Average Performance – Excluded from formula to isolate predictive extremes.

Highest Compliance Facilities (Top 25%)

Lowest Compliance Facilities (Bottom 25%)

Only data from these two extreme quartiles are fed into the Predictor Matrix to calculate the final coefficient.
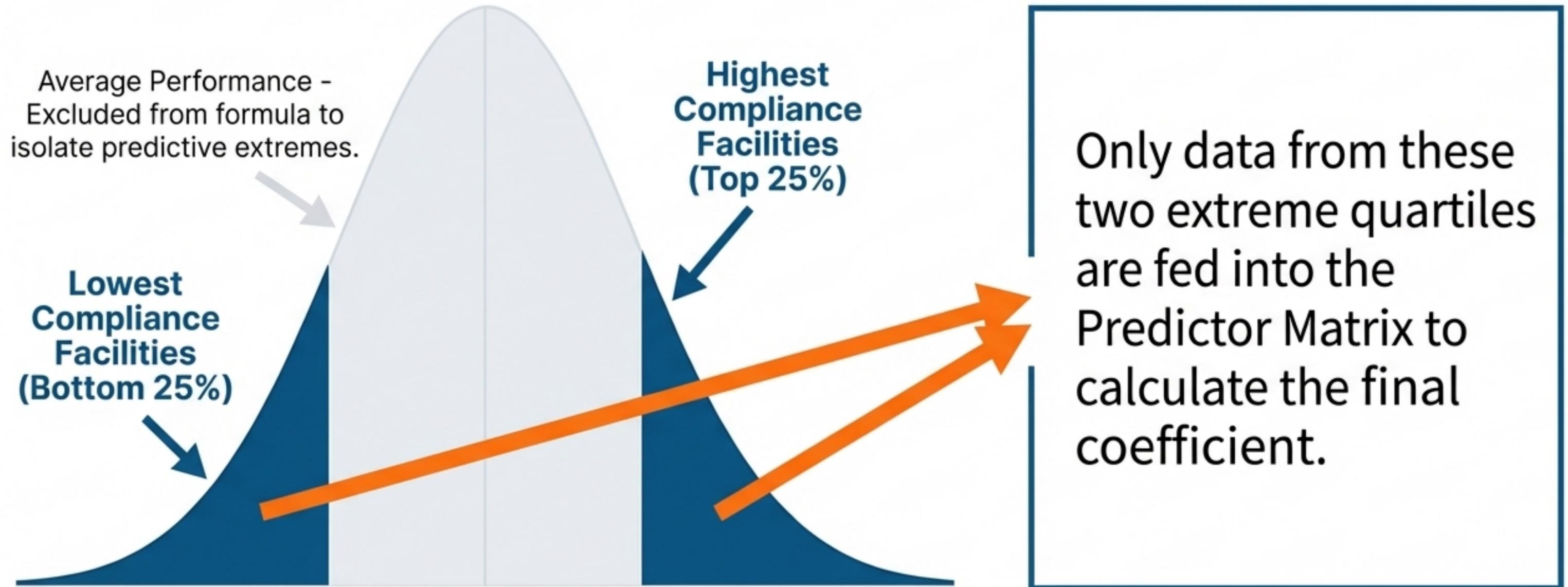
Step 1: The Predictor Matrix

	Providers In Compliance on Rule	Programs Out Of Compliance on Rule	Row Total
Highest level (top 20-25%)	A	B	Y
Lowest level (bottom 20-25%)	C	D	Z
Column Total	W	X	Grand Total

For every single regulation (all 249 tested), facilities are plotted into this matrix to determine if passing this specific rule correlates with being a high-performing facility overall.

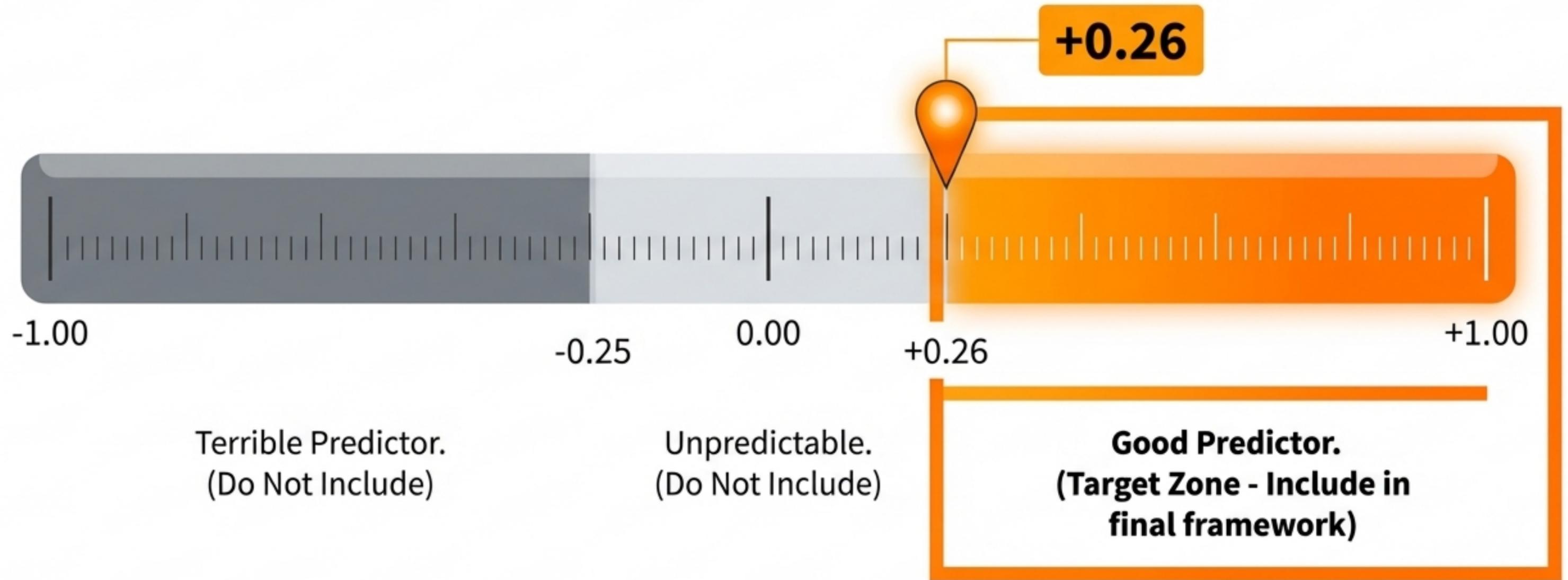# Step 2: The Fiene Coefficient Formula

$$\phi = ((A \times D) - (B \times C)) \div \sqrt{W \times X \times Y \times Z}$$

| A = Top 25% In Compliance | B = Top 25% Out of Compliance | C = Bottom 25% In Compliance | D = Bottom 25% Out of Compliance |
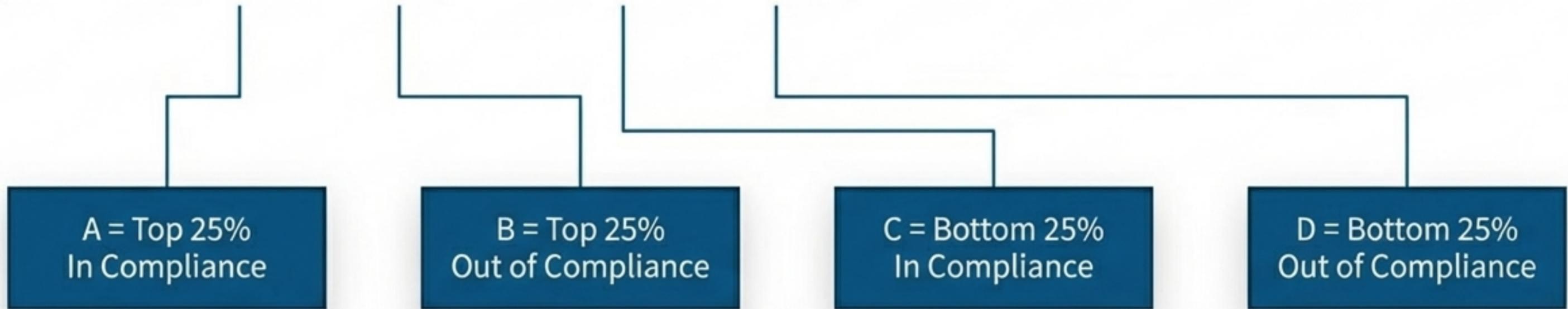
This calculation yields a single numerical coefficient (ϕ) for each regulation, representing its predictive strength.

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Step 3: The Threshold for Success

+0.26

-1.00   -0.25   0.00   +0.26   +1.00

Terrible Predictor.
(Do Not Include)

Unpredictable.
(Do Not Include)

Good Predictor.
(Target Zone - Include in
final framework)

The Final Yield: 2018/19 Target Indicators

Started with 271 Regulations

↓

19
Good Predictors Identified

Childcare Facilities

Started with 473 Regulations

↓

9
Good Predictors Identified

Residential Facilities

By applying the 0.26 Fiene threshold, we have distilled hundreds of regulations down to a highly targeted, statistically validated list of 28 total indicators for differential monitoring.

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Predictor Dashboard: Childcare Facilities

**The Stable Core** (Common across 2014, 2017, 2018)

| 11010 | Highest recent score: **0.51** | 19090 | 19070 | 12140 | 12040 |

| 11200 | 19100 | 12090 | 12050 | 11020 | 13050 |

| 13050 | 19080 | 10050 | 19160 | 15030 | 12060 |

Emerging Predictors (New to 2018/19)

| 12430 | 13060 | 13020 |

19 total indicators provide a robust, cross-validated monitoring framework for all childcare sites.

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Predictor Dashboard: Residential Care Facilities

The Stable Core (Common across 2014, 2017, 2018)

	0.48		0.45		
31300		**33280**		31290	31260
32320		32100		30240	32110

Emerging Predictors (New to 2018/19)

32010

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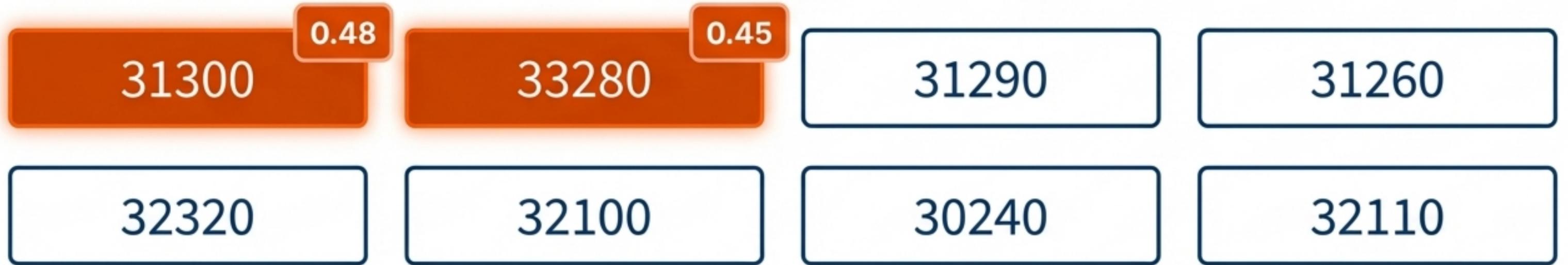
Strategic Synthesis & Operational Readiness

Step 1

Methodology Validated.

The First Inspection approach successfully maintained data independence and replicated the analytical rigor of the 2017 study.

Step 2

Predictors Distilled.

28 total Key Indicators (19 Childcare, 9 Residential) have successfully passed the rigorous +0.26 Fiene mathematical threshold.

Step 3

Ready for Implementation.

The Health Protection Directorate now has a statistically backed, highly efficient framework to conduct differential monitoring across all Fraser Health facilities.

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