

# Machine Learning for Risk Prediction

## Model Results with Network Sensitivity Analysis

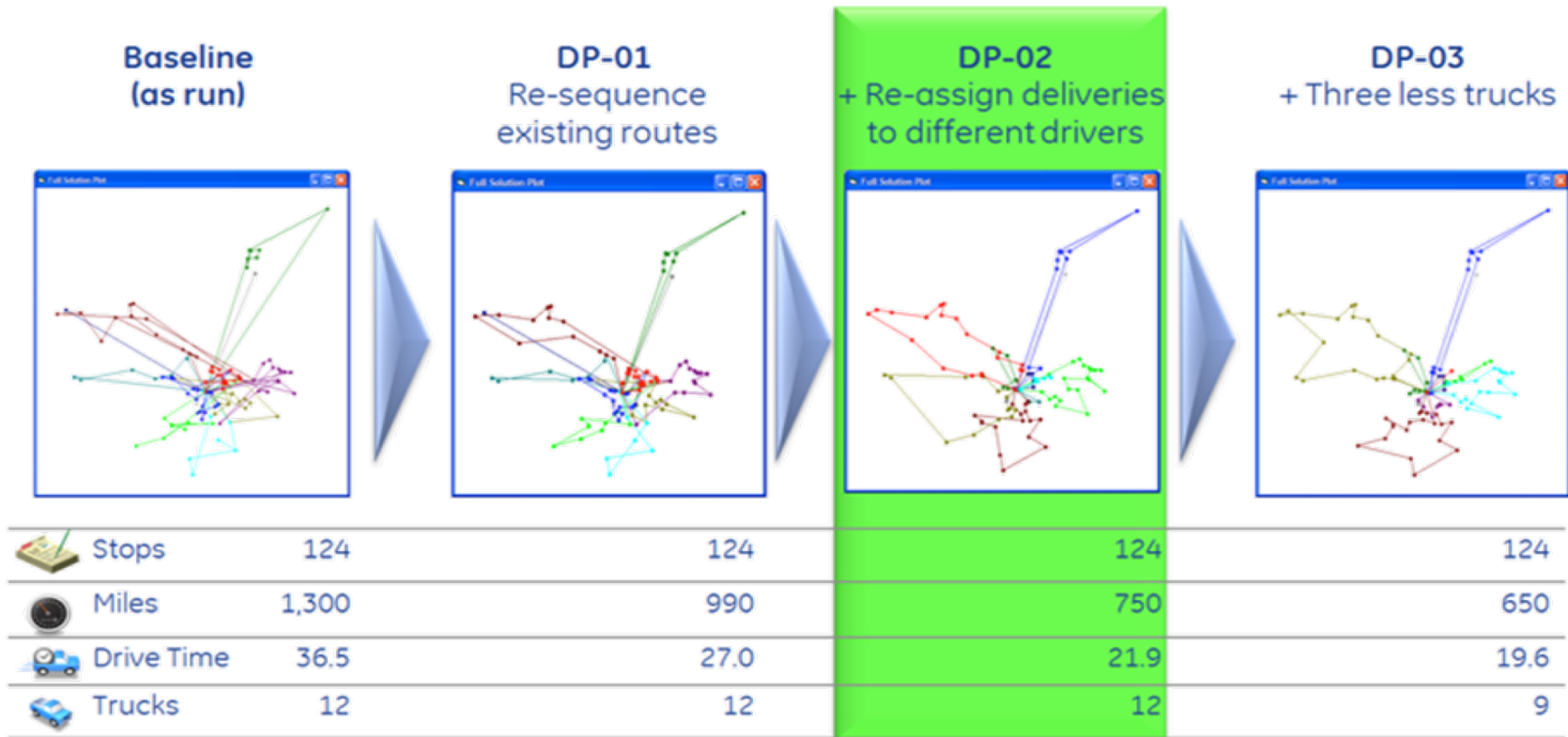
G. Edward Powell, PhD  
[epowell@snoptics.com](mailto:epowell@snoptics.com)

# Background

## Demonstrating the Value | Building Confidence

| Transforming Data Into Actionable Intelligence |

# Operational Optimization Delivery Company



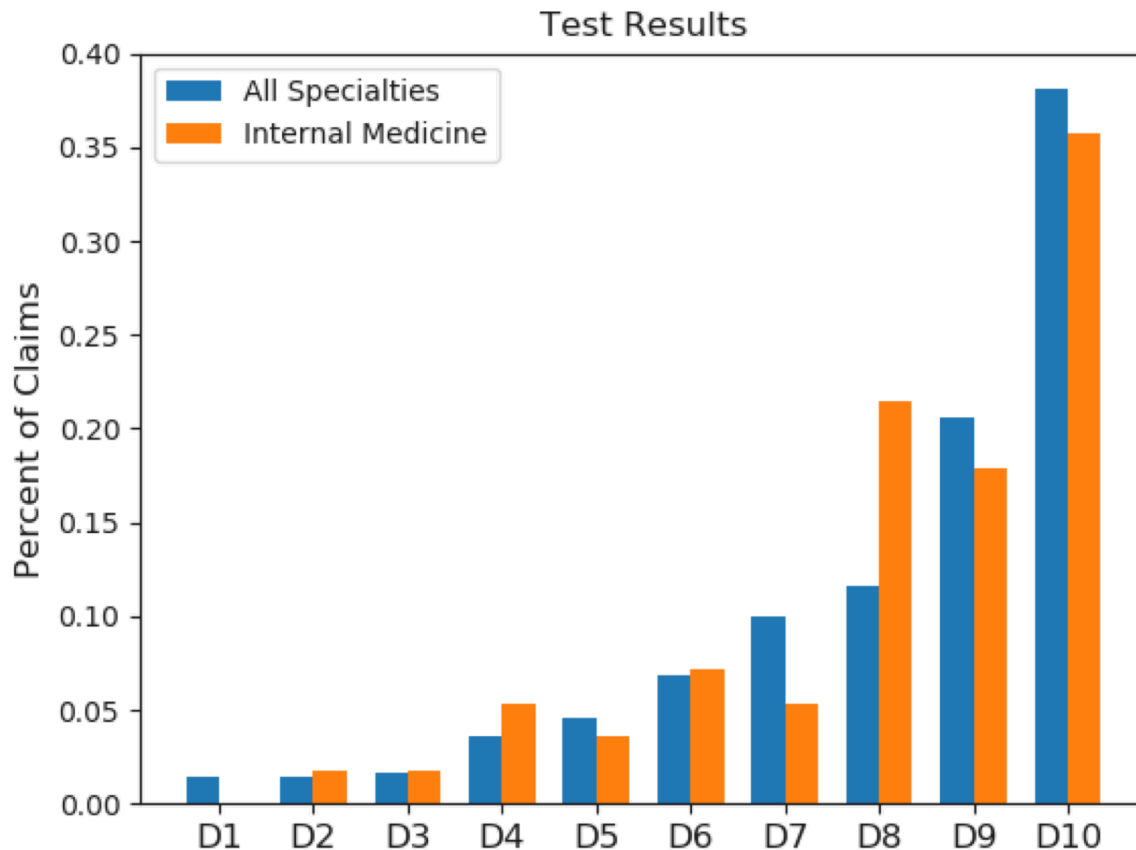
Proprietary and Confidential



# Predicting Malpractice

Florida Providers (Train 2013-2015, Test 2016)

| Transforming Data Into Actionable Intelligence |



- Neural Network with Unsupervised Learning
  - Completely Automated
  - Using Medicare claims
  - Using Florida malpractice claims

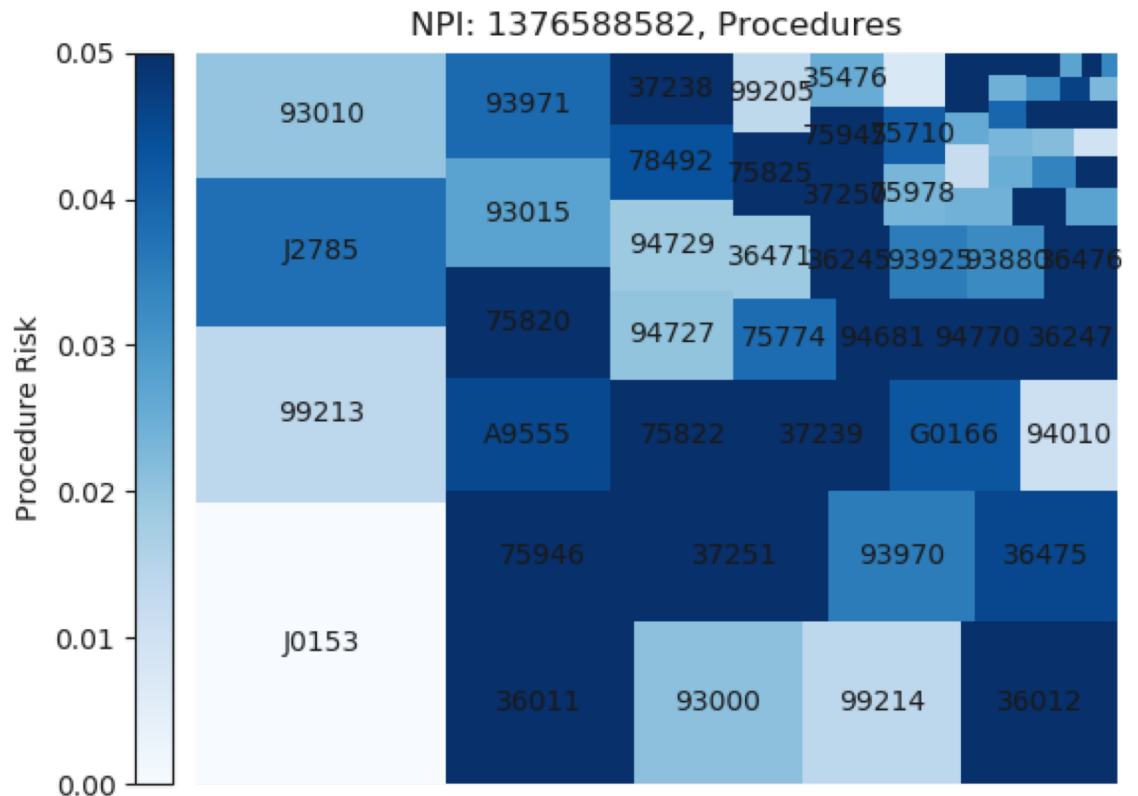
# Provider Specific Information

## Risk from Procedures Performed

| Transforming Data Into Actionable Intelligence |

- Automatically generated reports for each provider
- Heat maps show frequency (area) and risk (dark) for every procedure or drug done by provider
- NSA plots show where provider ranks on high impact parameters

NPI: 1376588582  
Specialty: Cardiology  
Percentile: 99  
Rank: 69281/69285

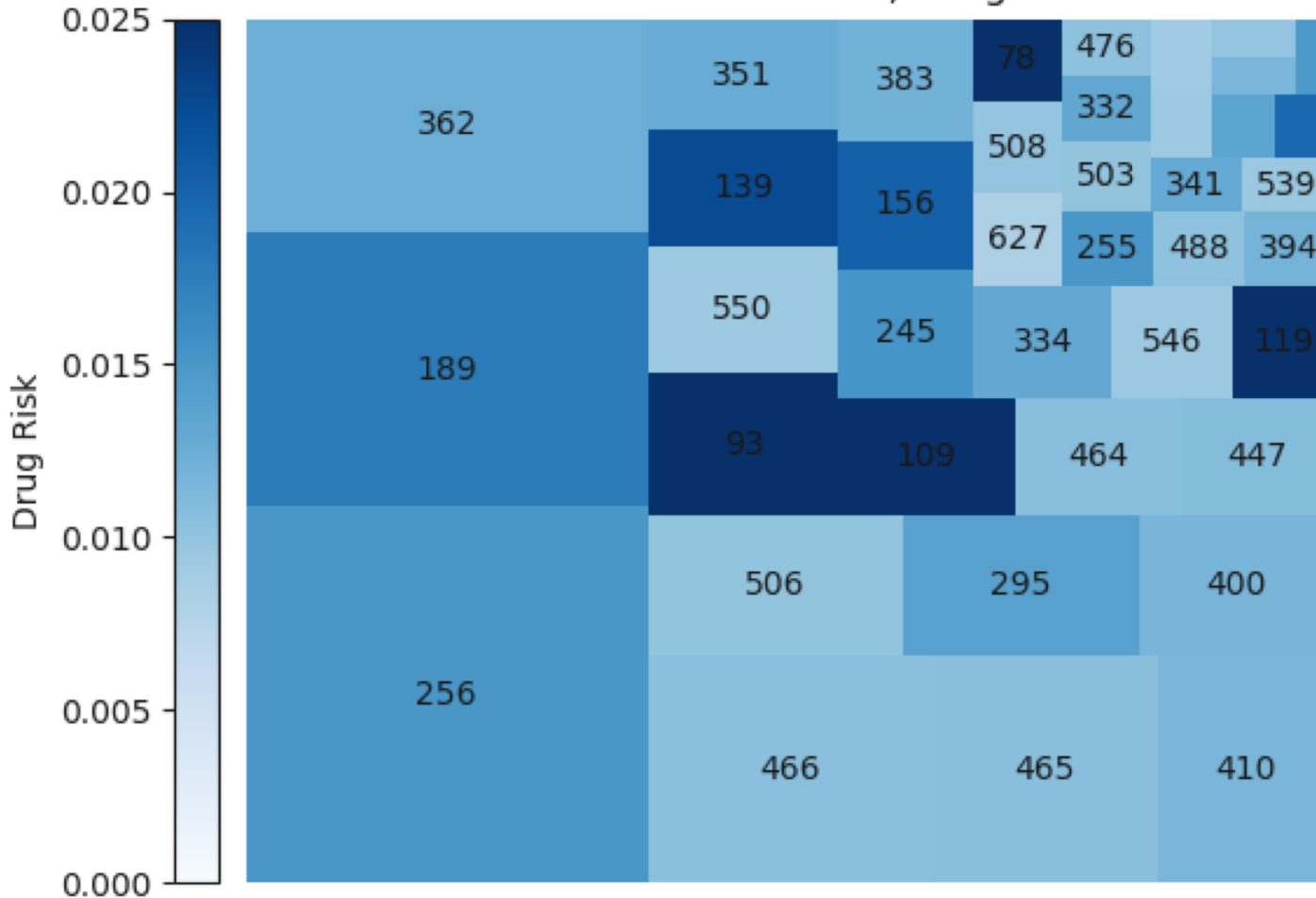


# Provider Specific Information

## Risk from Drugs Prescribed

| Transforming Data Into Actionable Intelligence |

NPI: 1376588582, Drugs



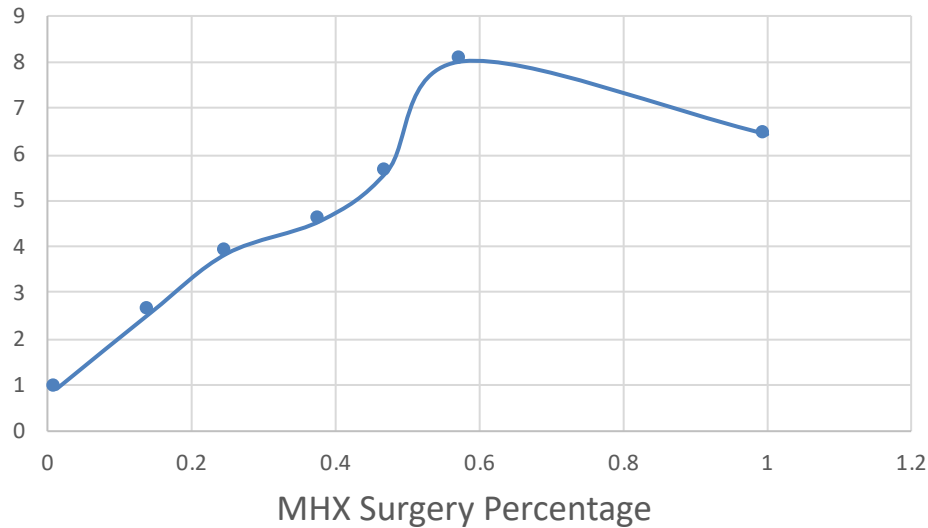
- 245: NITROGLYCERIN
- 156: RIVAROXABAN
- 383: PANTOPRAZOLE SODIUM
- 334: FUROSEMIDE
- 546: HYDROCHLOROTHIAZIDE
- 119: ENOXAPARIN SODIUM**
- 627: METFORMIN HCL
- 508: PRAVASTATIN SODIUM
- 78: PRASUGREL HCL**
- 255: CILOSTAZOL
- 488: TRIAMTERENE/  
HYDROCHLOROTHIAZID
- 394: WARFARIN SODIUM
- 503: ATENOLOL
- 332: SPIRONOLACTONE
- 476: POTASSIUM CHLORIDE
- 341: DILTIAZEM HCL
- 539: LOVASTATIN
- 256: CLOPIDOGREL  
BISULFATE
- 189: ISOSORBIDE MONONITRATE
- 362: METOPROLOL SUCCINATE
- 466: LISINOPRIL
- 465: AMLODIPINE BESYLATE
- 410: ATORVASTATIN CALCIUM
- 506: ALLOPURINOL
- 295: CARVEDILOL
- 400: ACETAMINOPHEN WITH  
CODEINE
- 93: RANOLAZINE**
- 550: SIMVASTATIN
- 139: OXYCODONE HCL/  
ACETAMINOPHEN
- 351: METOPROLOL TARTRATE
- 109: APIXABAN**
- 464: LOSARTAN POTASSIUM
- 447: GABAPENTIN

# Internal Medicine

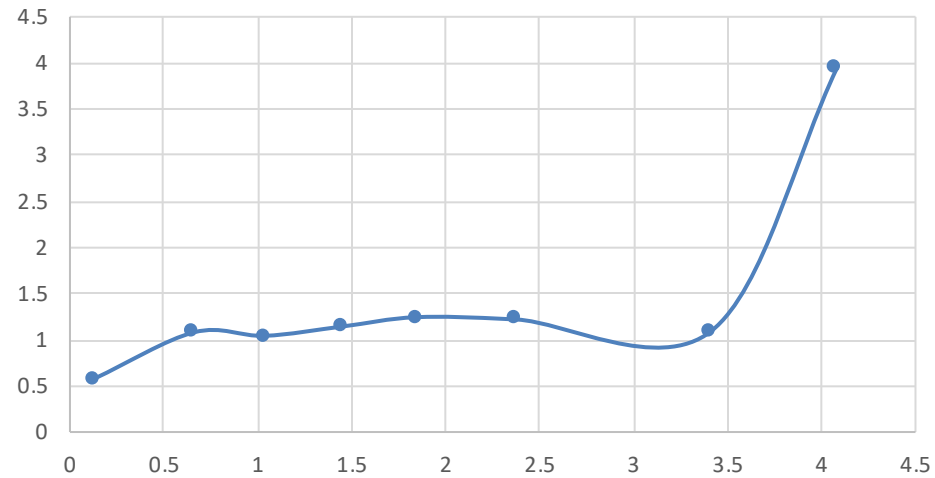
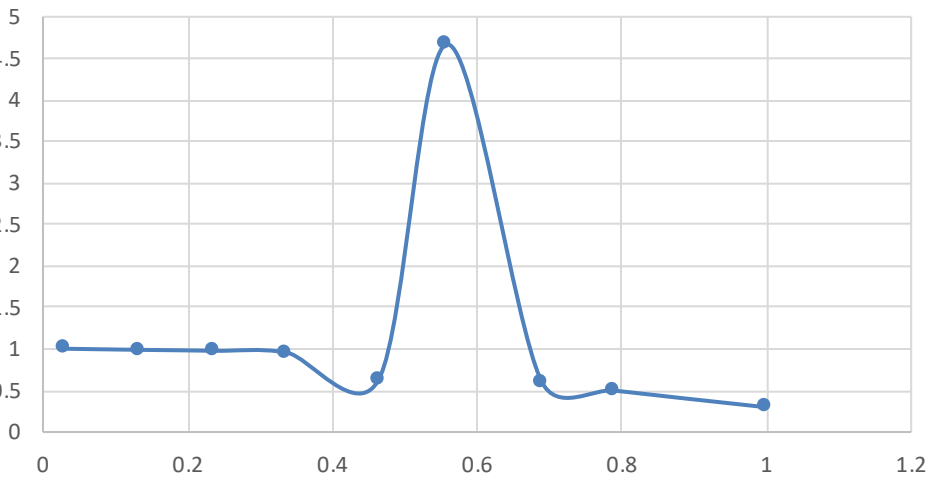
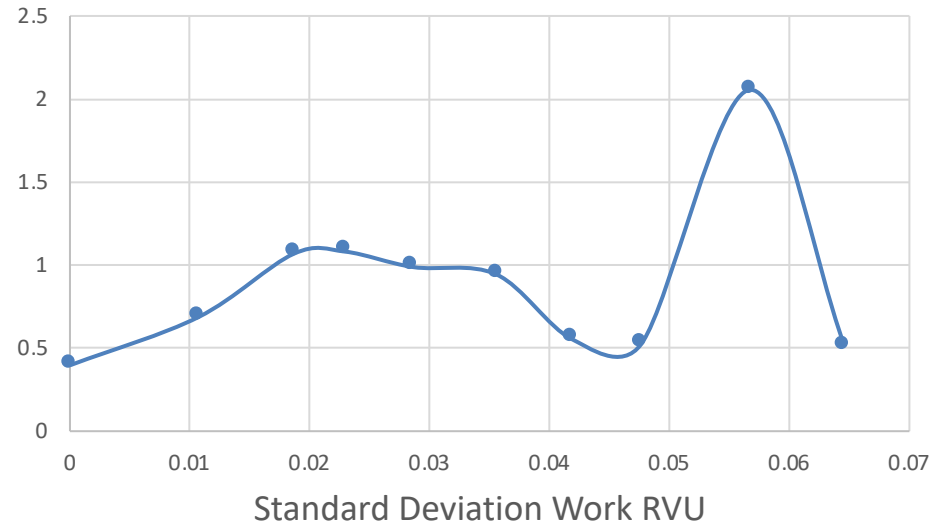
## Network Sensitivity Analysis – Example parameters with significant impact

| Transforming Data Into Actionable Intelligence |

Last Year County Bayesian by Specialty



Last Year Bayesians from NDC Code



# Summary

- **Robust Innovation Process**
  - Design Thinking meets Agile Development
    - Broad spectrum of analytical technologies
    - Deep learning platform
    - Network Sensitivity Analysis
- **Rapid Analysis Framework**
  - Aggregate data via robots
  - Analyze complex systems
  - Leverage models to generate insights
- **Financial Model Instantiation**
  - Platform to evaluate impact of insights on operational performance
- **Continuous Improvement Platform**
  - Refining operational model
  - Enhancing economic optimization

## **For More Information Contact:**

G. Edward Powell

[epowell@snoptics.com](mailto:epowell@snoptics.com)

615.838.7450