

# Big Data Analytics For Healthcare Decision Support

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# Introduction

## Michael McGinnis

- Senior Sales Engineer
  - State, Local, K12, Healthcare
  - Security SME
- 15+ years in IT
- Security Architect 5 years at one of the largest hospital networks in the country



## Shirley Golen

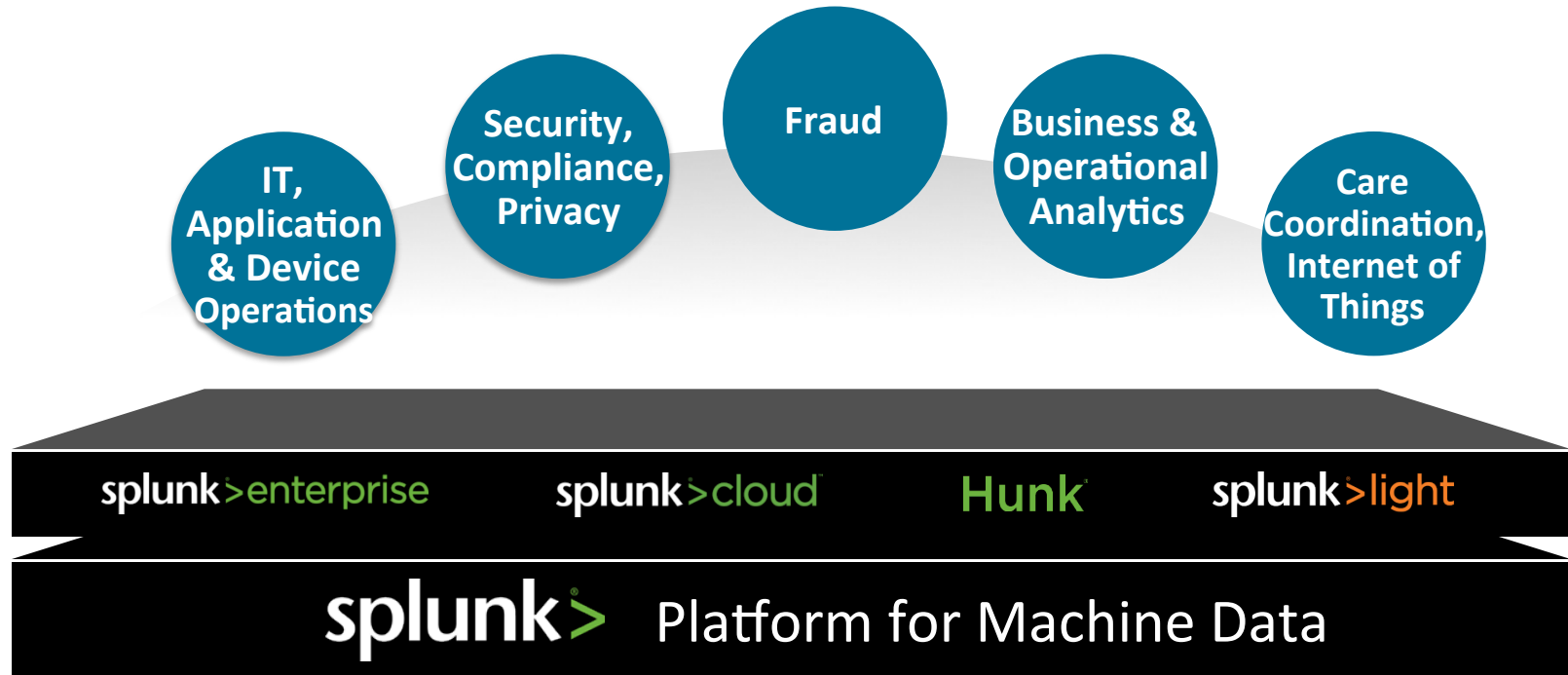
- Healthcare Industry Solutions Marketing Expert
- 16+ years in healthcare
- Background includes: Oracle, CareFusion/BD, The Advisory Board Company



# Established Vs. New Approach for Fraud, Waste, and Abuse Prevention and Detection

Established Approach	New Approach
Pay and Chase	Prevention and Detection
Platforms are not scalable with large scale data processing. Data is exported from database for analytics.	Near Real Time Analytics Distributed Processing.
One Size Fits All	Risk Based
Known Fraud Schemes	Discover new/unknown schemes
Inward focus communication	Transparent and Accountable
Standalone Fraud Prevention Programs	Coordinated and Integrated

# One Platform, Multiple Use Cases in Healthcare



# Healthcare Facts

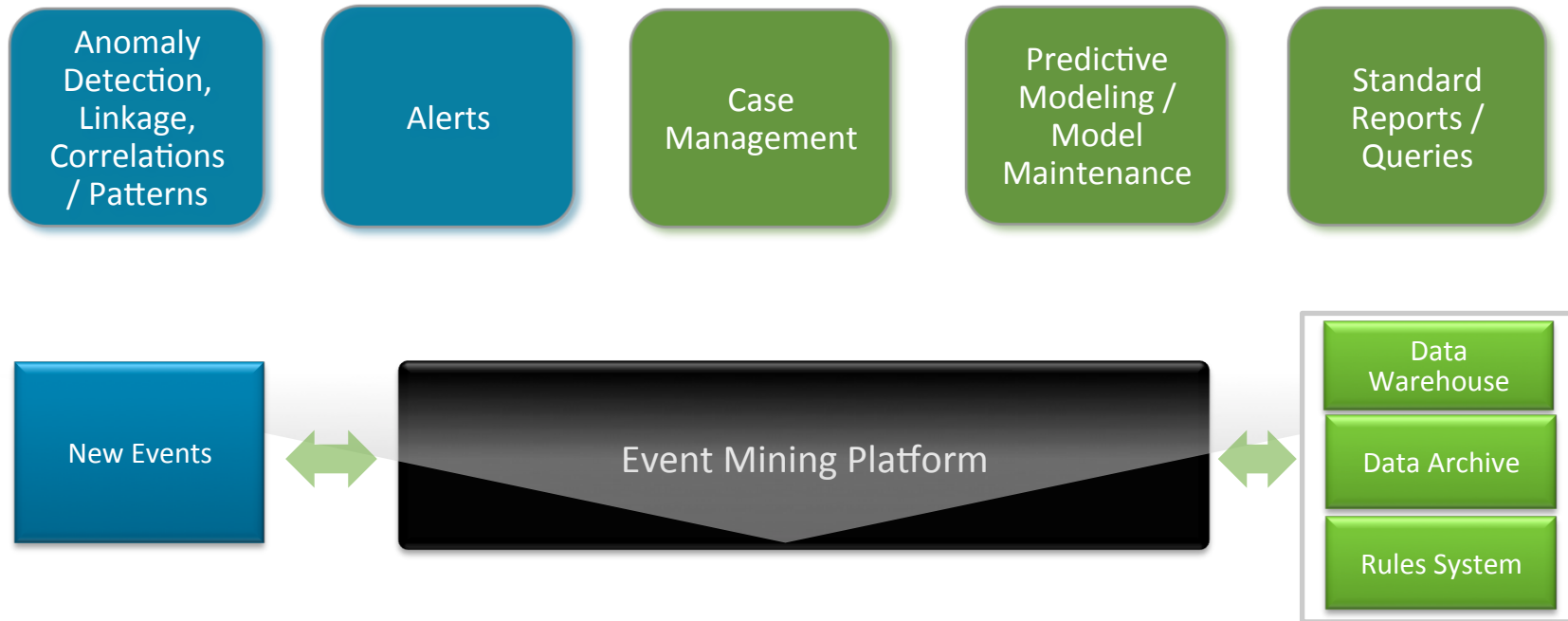
## Medicaid Program Overview:

- Beneficiaries Enrolled: 57 million
- Total Costs: \$427 billion in 2011
- Medicaid Payments: \$21.9 billion in 2011
- Medicaid is designated as **high risk** for improper payments

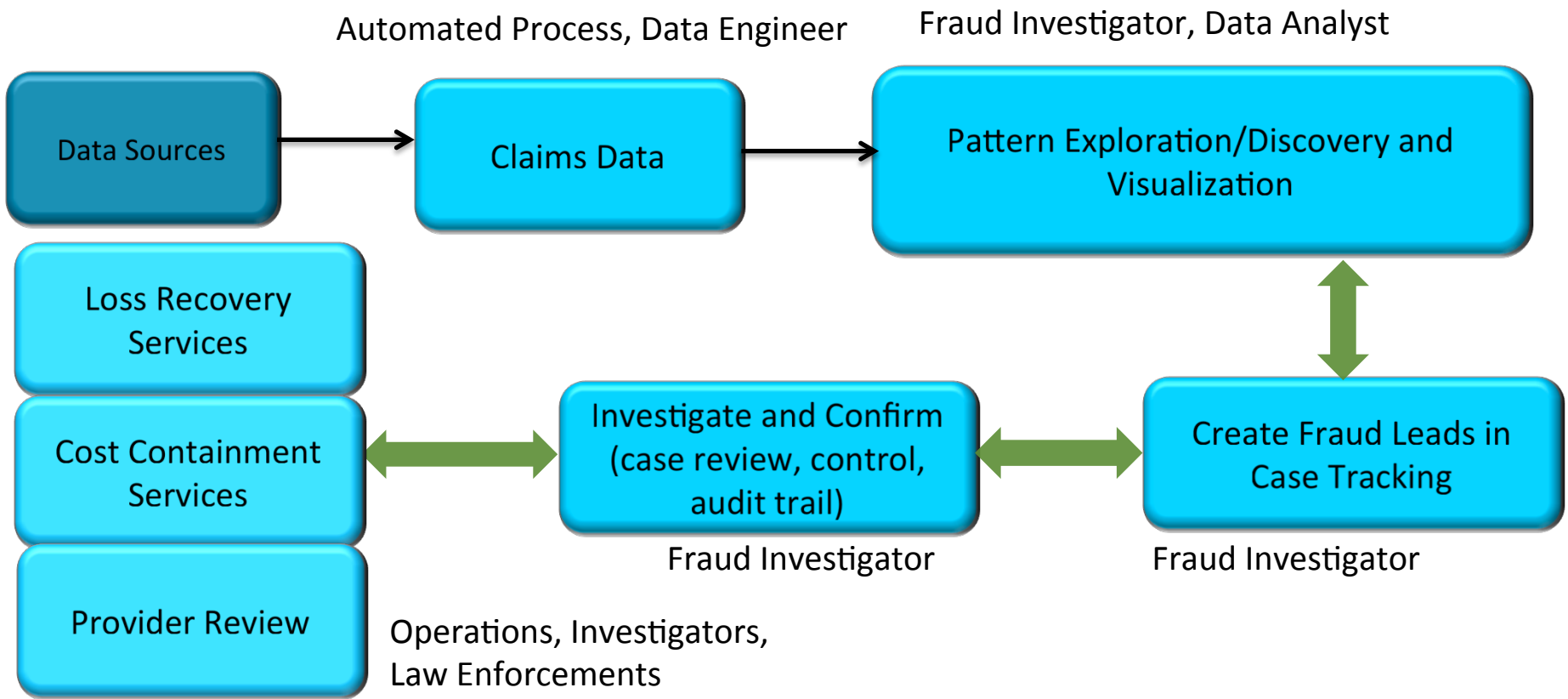
## Medicaid Waste, Fraud, & Abuse Facts:

- Improper Payments: \$21.9 billion in 2011
- Federal Government: \$4 billion recovered in 2012
- State Government: \$2.9 billion recovered in 2012

# Real Time Monitoring and Anomaly Detection



# Interactive Search and Visualization Workflow





# Demo Screens



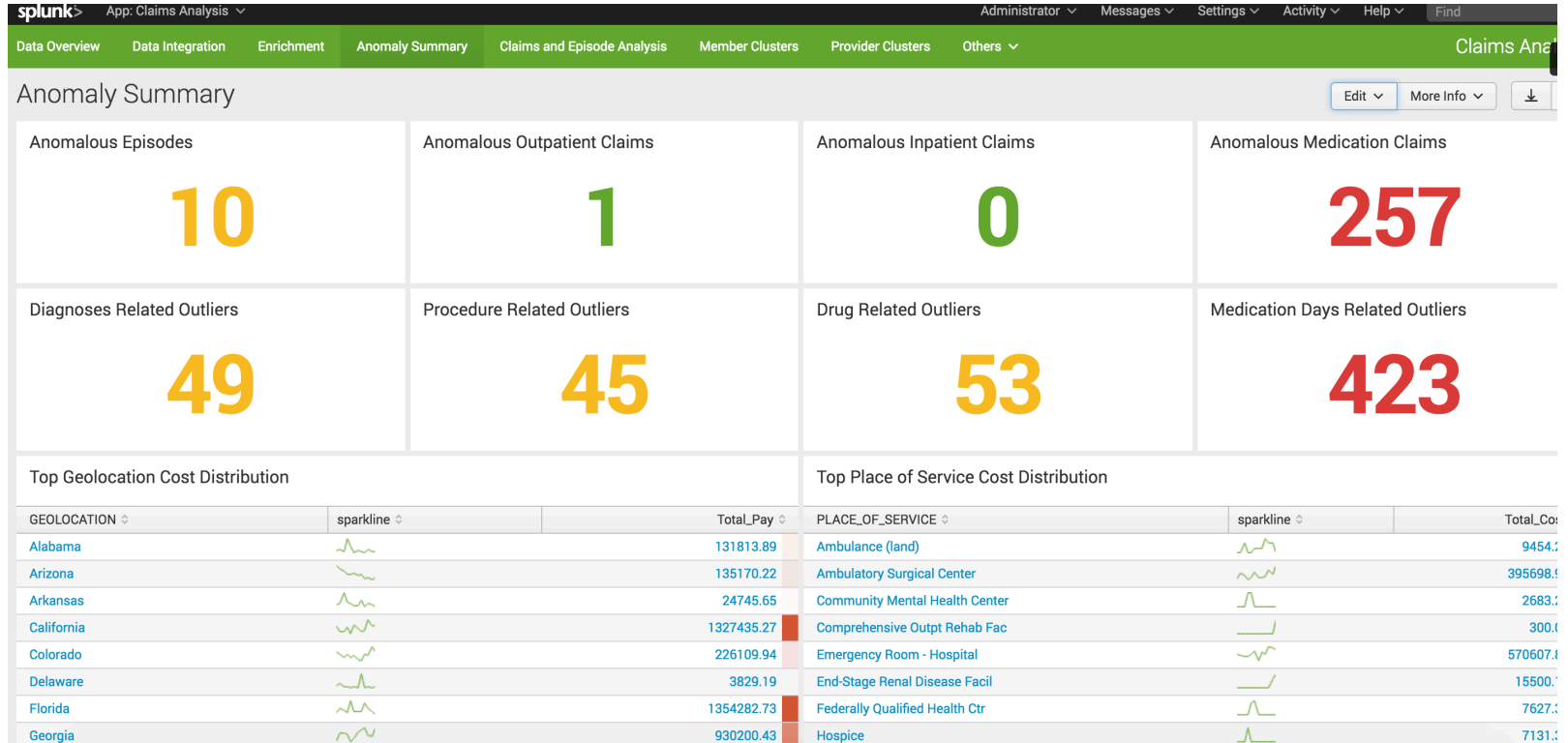
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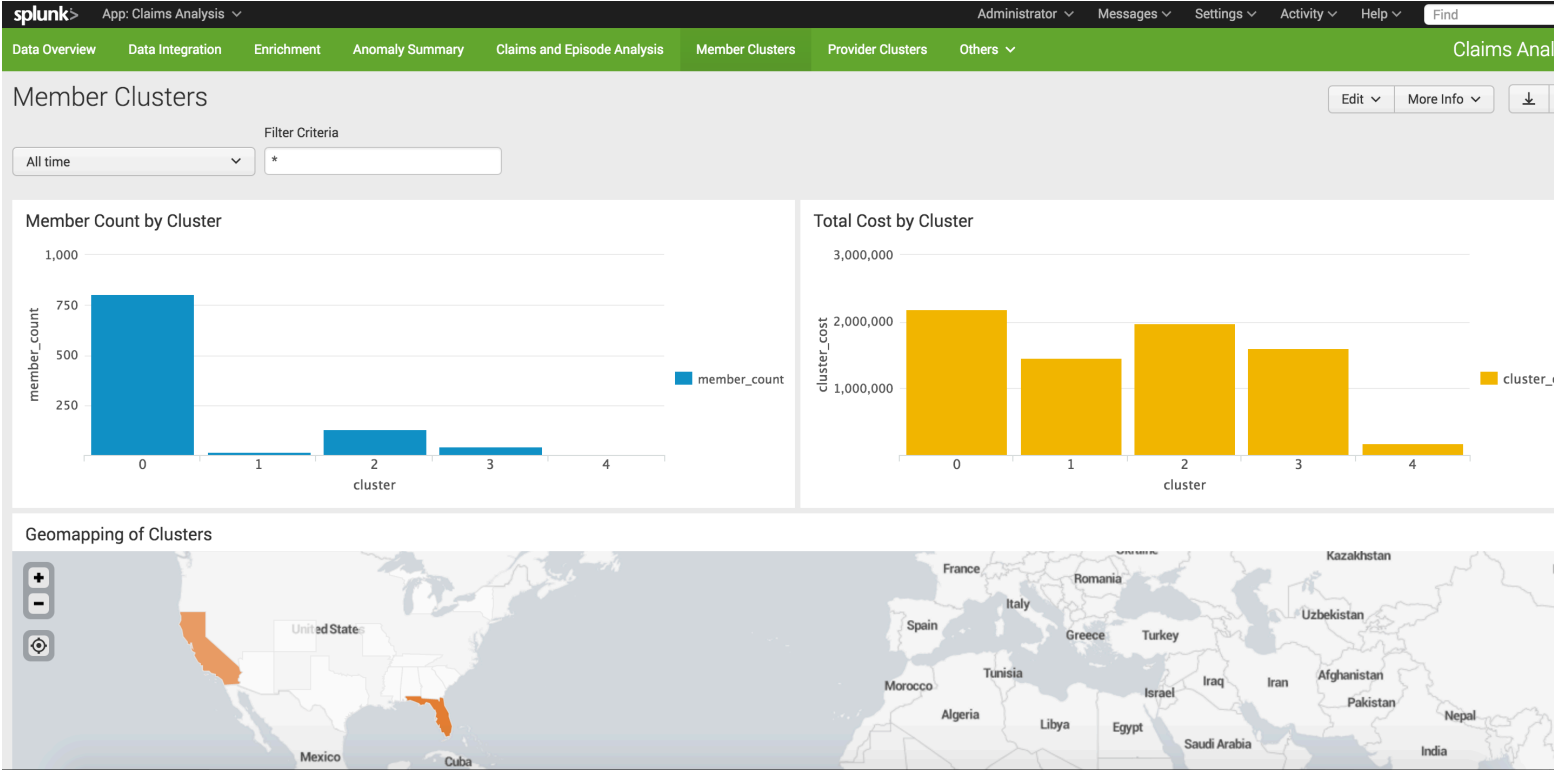
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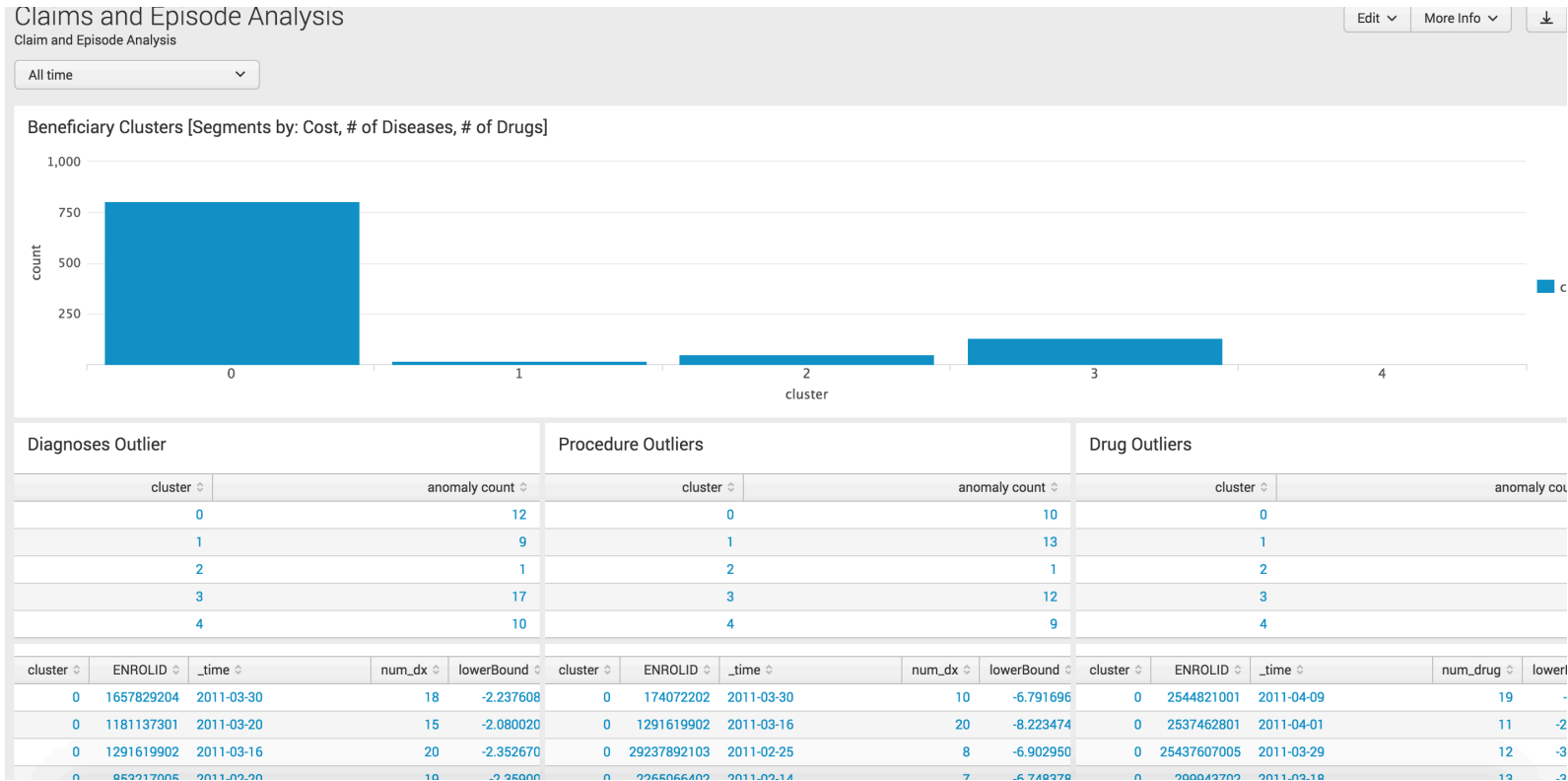
# Claims Anomaly Postures



# Find Peer Groups (Clustering) and Geo-location Visualization



# Finding Anomalies in Claims Episode and Individual Claims: Outliers by Population Segments



# Finding anomalies using unsupervised machine learning (anomaly detection algorithm)

## Anomaly Detection: Outpatient Claims

SEQNUM	AGEGRP	DX1	PROCGRP	PLACE_OF_SERVICE	PROVIDER_TYPE	totpay	isOutlier	probable_cause
202869227	2	9779	485	Ambulance (land)	Transportation	5233.12	1	PLACE_OF_SERVICE
23857690	4	7061	104	Office	Dermatology	94.00	0	
23857689	4	4659	104	Office	Family Practice	94.00	0	
23857688	4	V815	306	Office	Obstetrics & Gynecology	8856.08	0	
23857665	4	7921	120	Office	Gastroenterology	180.00	0	
23848227	4	4019	104	Office	Internal Medicine (NEC)	1058.72	0	
23792052	4	79389	223	Office	Radiology	1073.98	0	
23731986	2	7852	101	Office	Cardiovascular Dis/Cardiology	888.00	0	
23731983	2	4659	31	Office	Family Practice	636.52	0	
23731972	2	78607	104	Office	Allergy & Immunology	758.00	0	

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## Anomaly Detection: Medication Claims

SEQNUM	THERAPEUTIC_GROUP	date_month	num_drug	Days Supply	totpay	isOutlier	probable_cause
150429490	Oxytoxics (Class 183)	august	1	3	14.52	1	THERAPEUTIC_GROUP
9421829	Oxytoxics (Class 183)	june	1	2	9.57	1	THERAPEUTIC_GROUP
195375921	Antineoplastic Agents (Classes 21-22)	august	10	263	2562.78	0	
195375920	Hormones & Synthetic Substitutes (Classes 165-180)	august	274	10726	34864.10	0	
195375918	Central Nervous System (Classes 57-77)	july	343	10932	21934.68	0	
195375917	Hormones & Synthetic Substitutes (Classes 165-180)	july	249	9831	26651.14	0	
195375916	Antineoplastic Agents (Classes 21-22)	july	8	329	413.18	0	
195375915	Gastrointestinal Drugs (Classes 147-162)	june	81	2917	7898.35	0	
195375914	Hormones & Synthetic Substitutes (Classes 165-180)	june	259	10365	27646.43	0	
195375913	Central Nervous System (Classes 57-77)	june	347	9981	19111.80	0	

# THANK YOU

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