Session PM-8: Predictive Modeling
What Can We Learn from Each Other

Health Insurance Perspective

Ratemaking and Product Management Seminar

March 22, 2011

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Predictive Modeling for Health

Background

Claims Management Applications

- Disease Management
- Provider Fraud Detection
- Return to Work
- Benchmarking

Data Sources

Background

Health Insurance Products

- Medical (the big one)
- Dental
- Disability
- Critical Illness
- Long-Term Care
- Workers Comp (unofficially)

Use of Predictive Models

- Primary focus of predictive modeling for health insurance has been claims management
- Early adopters began 15-20 years ago
- Traction within the past 5 years
- Actuarial applications are lagging

Claims Management Applications

Claims Management Considerations

- Predictive modeling is a decision support tool to optimize claims management resources
- Identify claims where intervention can have the greatest impact
- Building accurate models is not enough
- The key driver of success is implementation
- User buy-in is critical!

Claims Management Applications

1. Disease Management
2. Provider Fraud Detection
3. Return to Work
4. Benchmarking

1. Disease Management

- Objective is early identification of plan members where case management can have the greatest impact in:
  - Preserving health
  - Reducing medical expenses

Case Study: Pitney Bowes

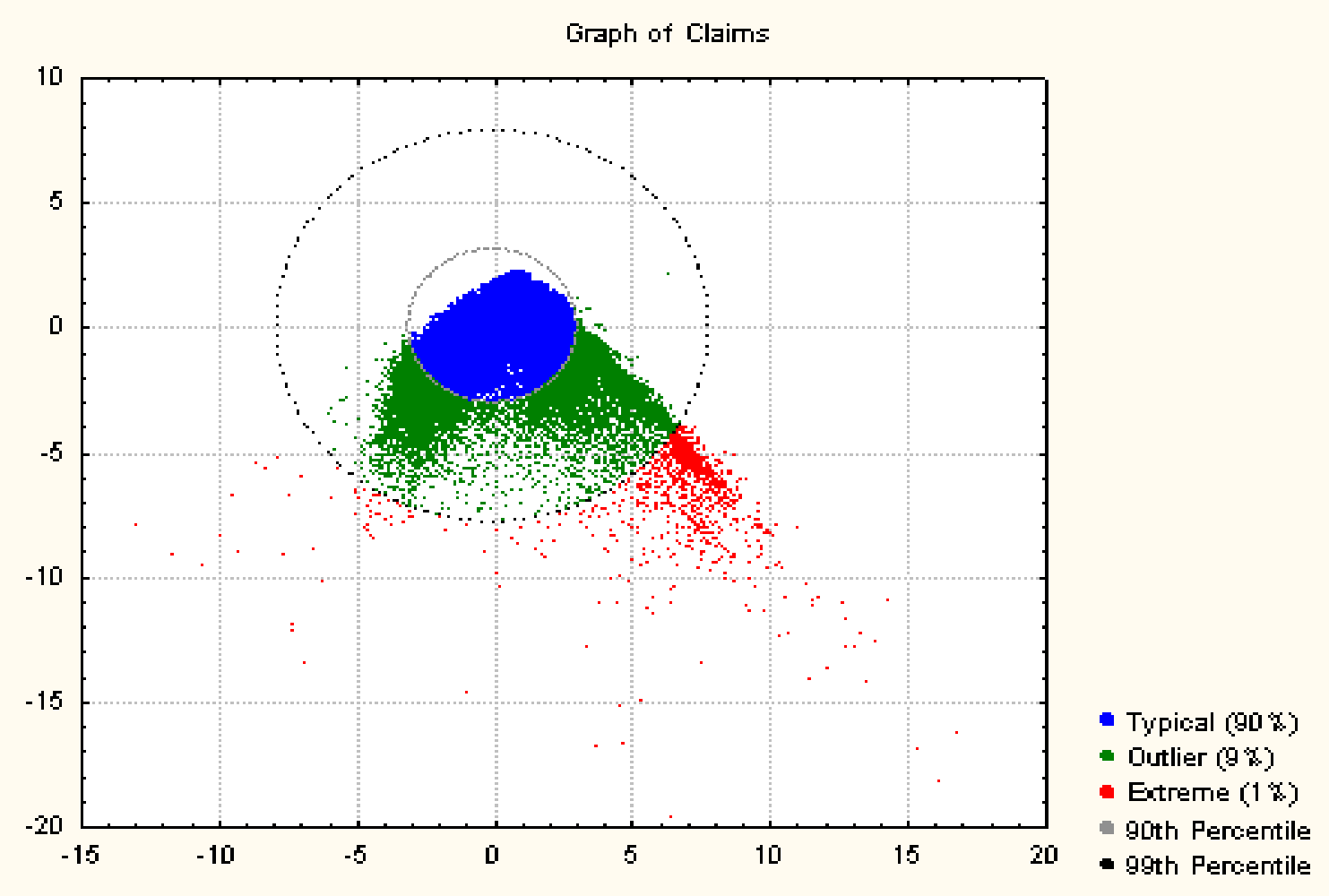
- Predictive model related low medication adherence to increases in expenses for patients with diabetes
- Changed pharmaceutical benefit design to reduce patient out-of-pocket costs
- Preliminary results after 2-3 years
  - Medication possession rates have increased significantly
  - Total pharmacy costs reduced 7%, emerg visits down 26%
  - Direct costs per plan participant with diabetes down 6%

Source: *Reducing Patient Drug Acquisition Costs Can Lower Diabetes Health Claims*, John J. Mahoney. MD, The American Journal of Managed Care, August 2005

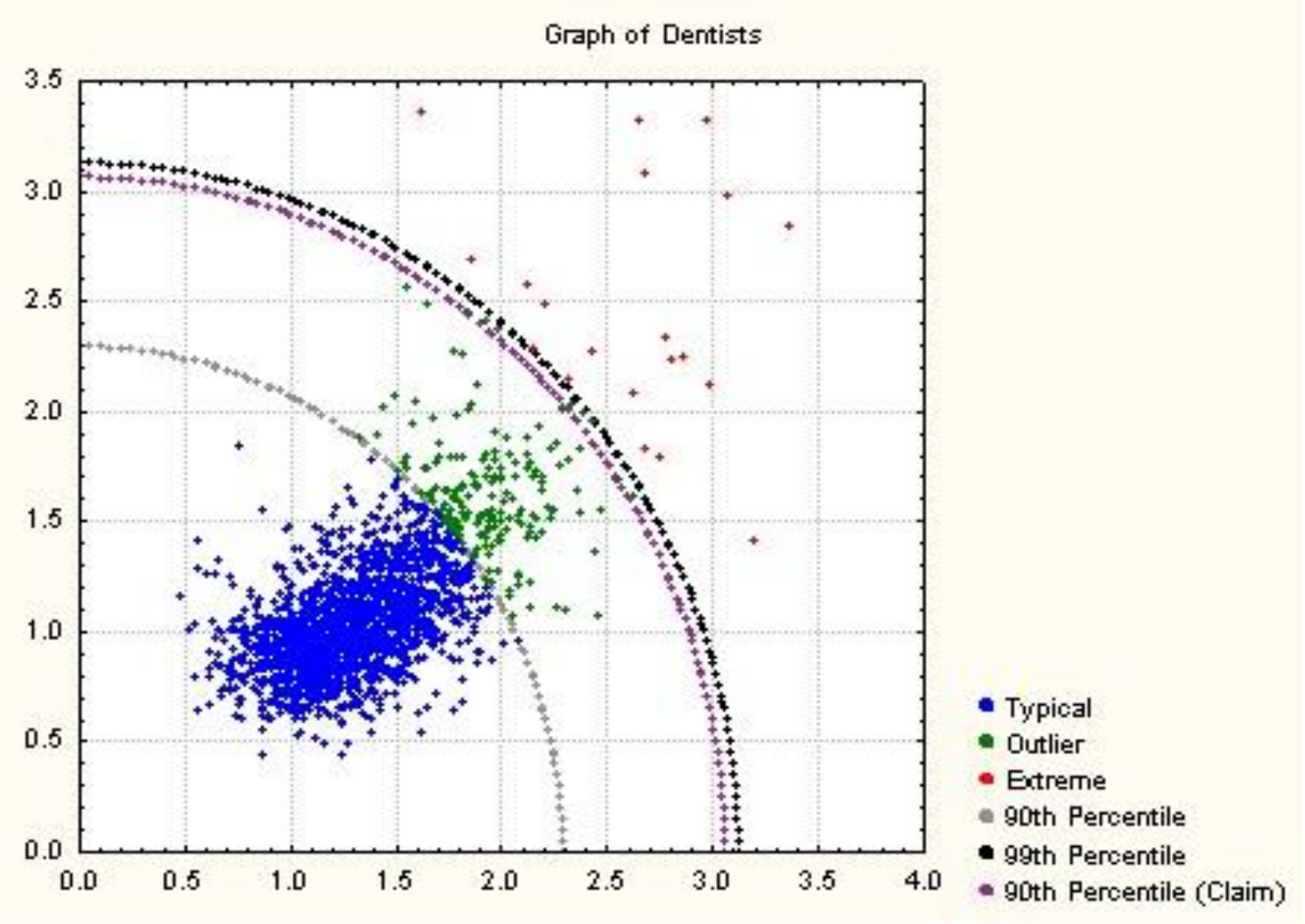
2. Provider Fraud Detection

- *Supervised* approach will identify providers with profiles similar to known fraudsters
- *Unsupervised* approach will isolate providers with atypical practice profiles
- Allow SIU to focus on investigating suspicious providers rather than manually searching for suspicious providers

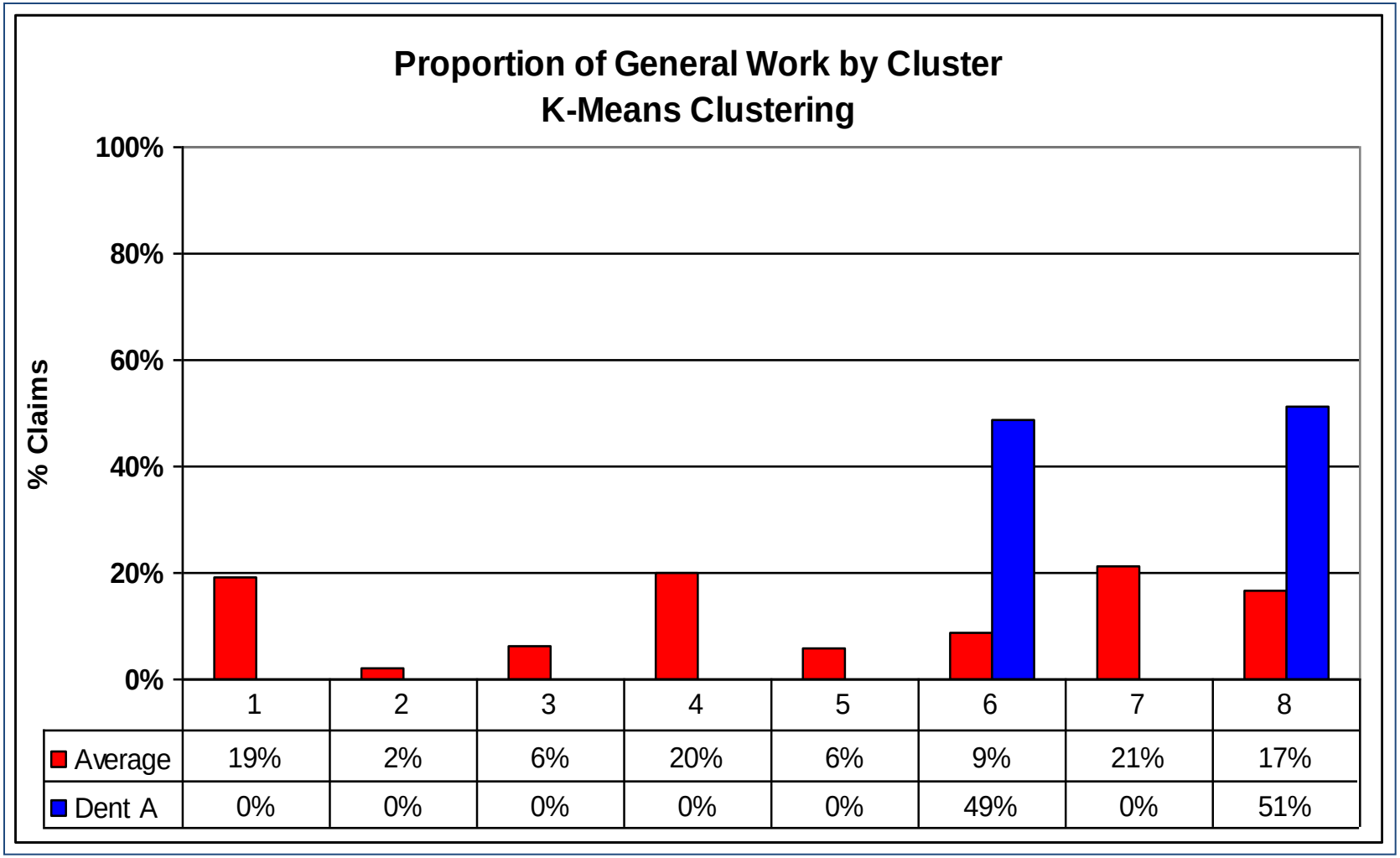
PCA - Identifying Atypical Claims



PCA - Identifying Atypical Dentists



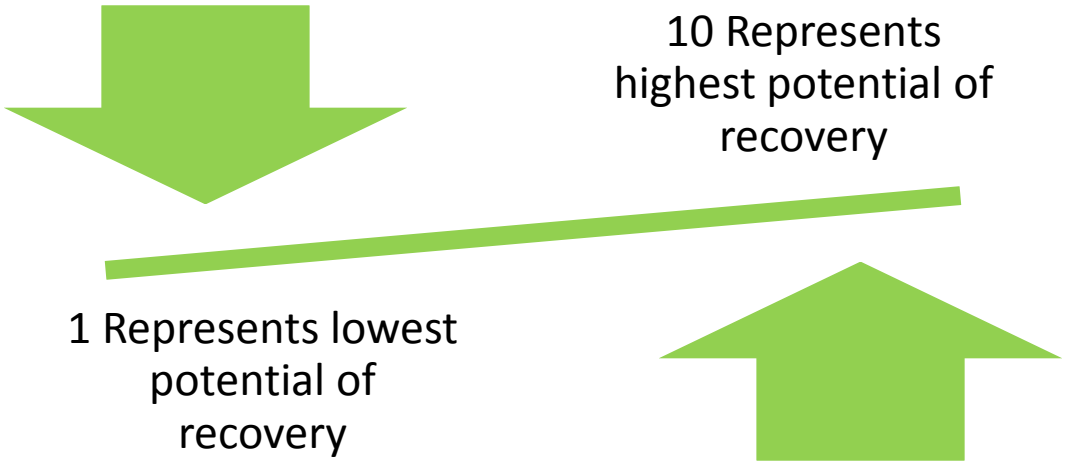
Clusters – Identifying Atypical Dentists



	1	2	3	4	5	6	7	8
Average	19%	2%	6%	20%	6%	9%	21%	17%
Dent A	0%	0%	0%	0%	0%	49%	0%	51%

3. Return to Work Claims Scoring

- Based on its specific attributes, a claim will be scored between 1 and 10



1	2	3	4	5	6	7	8	9	10
5%	15%	25%	35%	45%	55%	65%	75%	85%	95%

Claims Near Predicted Duration

- Identify claims nearing predicted duration
- EG: current duration 3-6m, 6M score = 7-10

Claim #	Analyst	Duration	Age	Gender	Score6M
001234	Susan	3 months	55	M	7
003462	Ted	3 months	47	M	9
009541	Jackie	4 months	23	F	8
015844	Robert	4 months	60	F	7
024689	Lisa	5 months	32	M	10

- Similar report for claims beyond predicted duration

Workload Allocation

- Claims can be allocated by degree of challenge
  - Claims scored 4-7 more difficult and time-intensive – allocate to more experienced and expert claim analysts
  - Claims scored 1-3 and 8-10 simpler – allocate to less experienced claim analysts
- Measure relative workload of claims personnel
  - Use claim scores as an indicator of complexity
  - Determine caseload on a complexity-weighted basis

Workload Allocation

- Measure workload on a weighted basis:

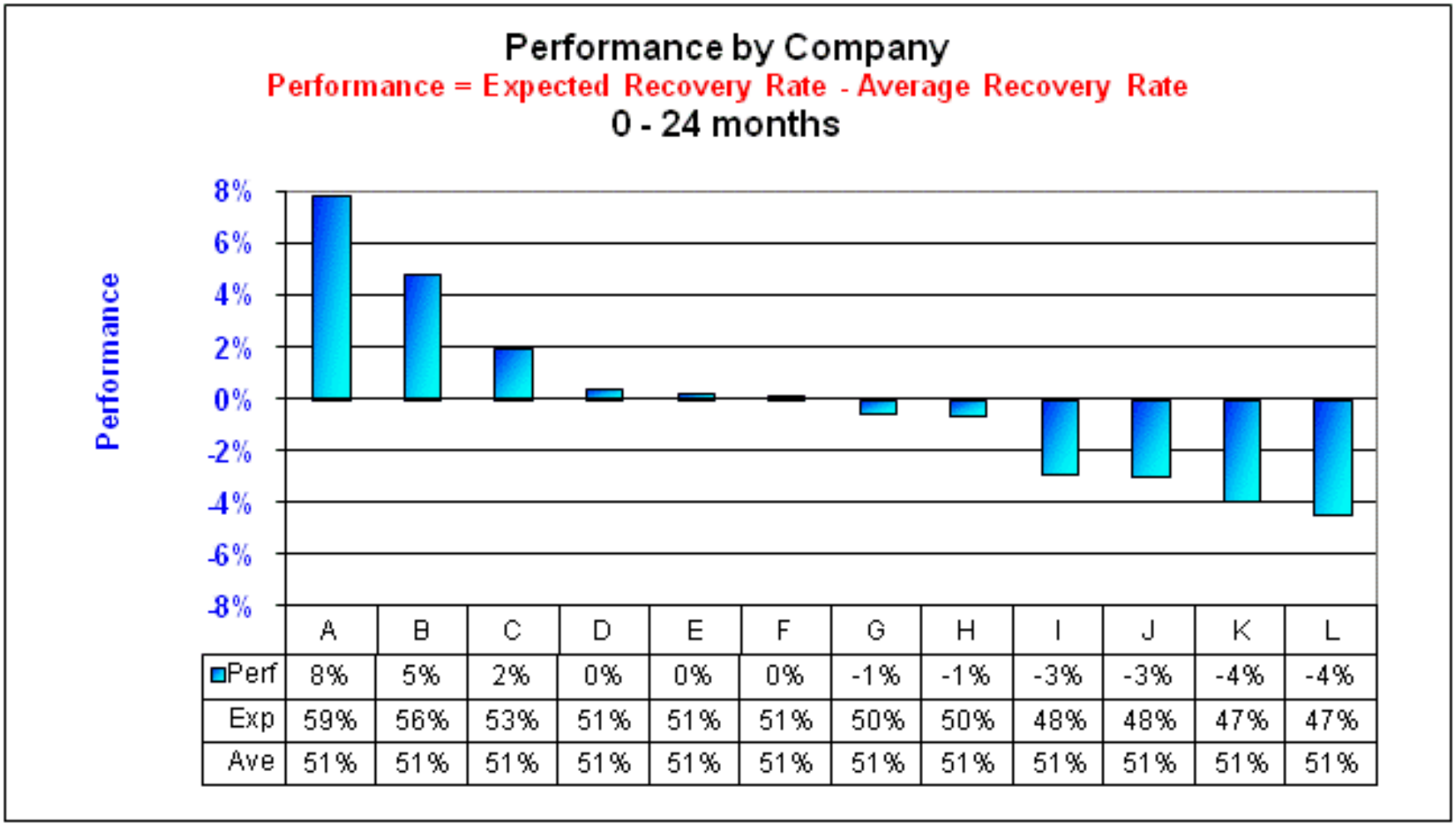
Score	1	2	3	4	5	6	7	8	9	10
Weight	0.5	0.5	1.0	1.5	2.0	2.0	2.0	1.5	1.0	0.5

Analyst	# Claims	Weighted Claims
Susan	100	134
Robert	100	126
Ted	100	111
Jackie	100	87
Lisa	100	73
Morris	100	59

4. Benchmarking

- Predictive modeling can be used to normalize for differences in business mix to allow for more meaningful comparisons
  - Multi-company benchmarking of Group LTD claimant recovery experience
  - Benchmark physicians on total cost of treatment for various ailments

LTD Claim Recovery Benchmarking

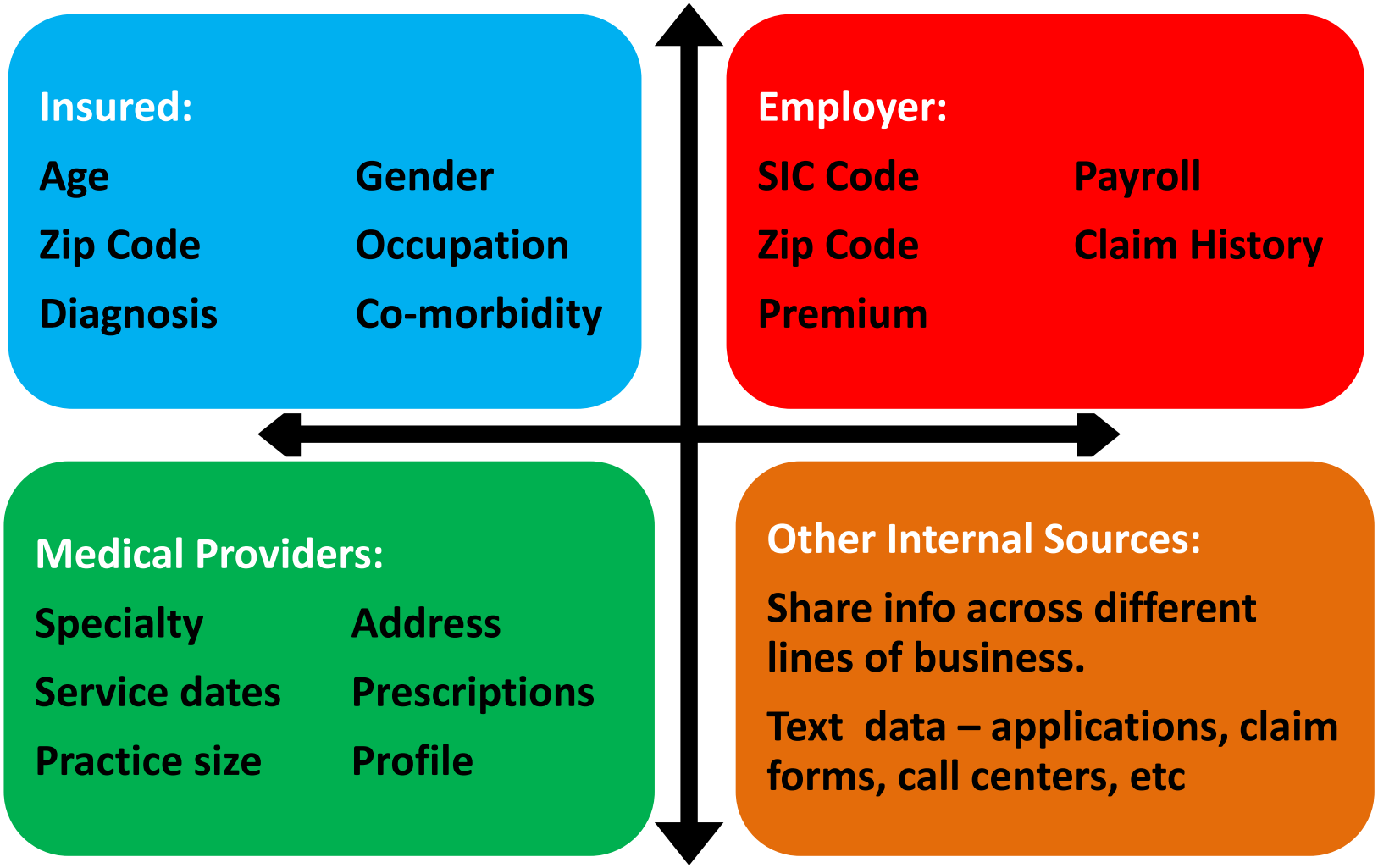


	A	B	C	D	E	F	G	H	I	J	K	L
Perf	8%	5%	2%	0%	0%	0%	-1%	-1%	-3%	-3%	-4%	-4%
Exp	59%	56%	53%	51%	51%	51%	50%	50%	48%	48%	47%	47%
Ave	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%

Difference of 12% between best and worst performers

Data Sources

Internal Data



External Data

- Industry data
- Credit score and other financial data
- MIB
- Prescription drug history
- Criminal records
- Census and other geospatial information

Questions