ACCOUNTABLE CARE ORGANIZATIONS MODEL RISK

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ABSTRACT

The Centers for Medicare & Medicaid Services(CMS) established the Medicare Shared Saving Program to reduce Medicare spending. Accountable Care Organizations (ACOs) are risk taking provider groups. We assessed the model error in the current CMS evaluation method. We compared baseline samples to condition samples comprised of specific diseases such as diabetes, cancer, chronic heart failure and overall cardiac problems. The relative risk factors for these condition samples over-compensate for the average disease cost, implying model risk. Smaller ACOs are likely to share in gains (False Positives). We found that inefficient ACOs with high prevalence of high cost conditions are also likely to share in gains.

ACO BACKGROUND

The **Accountable Care Organization (ACO)** is a network of doctors and hospitals that shares financial and medical responsibilities for patients.

- The **Medicare Shared Saving Program.**
  - Established by the Affordable Care Act.
  - Ensures quality care for Medicare Fee-For Service beneficiaries.
  - Reduces unnecessary costs.
- ACO's share 50% of saving with Medicare.
  - Projected cost minus actual cost.
  - Risk adjustment is applied to the population to ensure risk comparability with the sample.

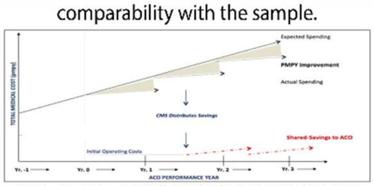

Figure 1 : Expected vs. Actual ACO Spending for the Shared Saving Programs

PROJECT OBJECTIVE

In the current CMS evaluation method, **Model Error** occurs when the ACO appears to show savings (losses) when there are none, because of the random nature of the outcomes.

- The frequency and magnitude of a **"False Positive".**
  - ACO Actual Spending < CMS Predicted
- The frequency and magnitude of a **"False Negative".**
  - ACO Actual Spending > CMS Predicted

DATA DESCRIPTION

- 2009 public use files from CMS.
- 65,000+ patient observations
- Each observation includes:
  - Member ID, Sex, Age, Cost, Risk Score, and HCC(Medical conditions based on diagnosis codes).
- **Population Overview by Age and Sex**

AGE	MALE	RISK SCORE	COST	FEMALE	RISK SCORE2	COST2
Under 45	1368	2.8	$6,231	1306	3.3	$7,013
45 - 65	5264	2.97	$5,937	5415	3.27	$6,317
65 - 75	11982	2.88	$5,667	14406	2.89	$5,755
Over 75	10061	3.81	$6,919	15889	3.77	$6,827
Average		3.26	$6,370		3.45	$6,609
Total	28657			37016		

METHODS

- Evaluating Gains and Losses

Gain/Loss = Population Mean * [Risk Adjustment Factor] - Sample Mean.

$$\text{Risk Adjustment Factor} = \frac{\text{Risk Score of Sample}}{\text{Risk Score of Population}}$$

Figure 2: Calculating Gains/Losses

- Risk Corridors

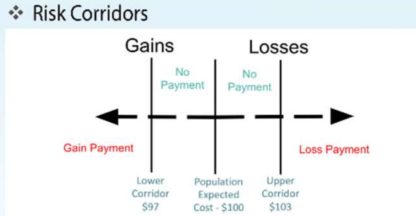

Figure 3: Risk Corridors

ACO RESULTS

- **Baseline Sample**
  - Population Mean Cost = $6,272
  - Population Risk Adjustment Factor = 3.287

Sample Size	Sample RAF	Sample Mean ($)	Risk Corridor	False Positive	False Negative	False Percent	Positive Average	Negative Average	Positive Percent	Negative Percent
10,000	3.2845	6264	188	16	20	3.60%	$215	$225	3.43%	-3.60%
5,000	3.3401	6276	244	23	29	5.20%	$289	$292	4.61%	-4.66%
3,000	3.27529	6203	313	35	42	7.70%	$373	$385	5.94%	-6.14%

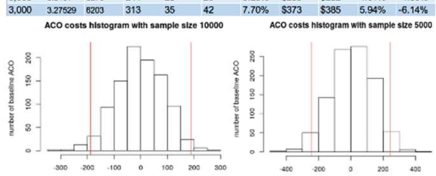

Figure 4: Baseline Sample Results and Histograms

- **Cancer Sample** - 39% of the population

Sample Size	Sample RAF	Sample Mean ($)	Risk Corridor	False Positive	False Negative	False Percent	Positive Average	Negative Average	Positive Percent	Negative Percent
10,000	5.46	9,864	188	1,000	0	100%	583	0	9.29%	0
5,000	5.5	9,977	244	968	0	96.80%	584	0	9.31%	0
3,000	5.51	9,807	313	899	0	98.90%	634	0	10.12%	0

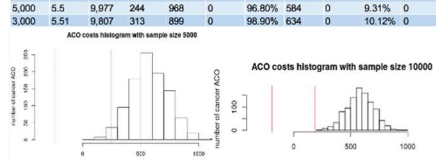

Figure 5: Cancer Sample Results and Histograms

- Cardiac Sample - 55% of the population
- Diabetes Sample - 61% of the population
- Congestive Heart Failure - 37% of the population

ACO IMPLICATION

Model error results in shared saving even when ACO does not reduce costs. This is due to risk score relativities. The scale of the error is greater for higher severity conditions. Model error can result in shared saving even for an inefficient ACO. Then we model the **degree of inefficiency** within the condition population permits.

- **Decreased Cancer Efficiency by 6%**

Sample Size	Sample RAF	Sample Mean ($)	Risk Corridor	False Positive	False Negative	False Percent	Positive Average	Negative Average	Positive Percent	Negative Percent
10,000	5.46	9,876	188	59	77	13.60%	239	-242	3.82%	-3.87%
5,000	5.543	9,826	244	81	92	17.30%	326	-328	5.20%	-5.24%
3,000	5.543	9,943	313	82	79	16.10%	404	-434	6.45%	-6.93%

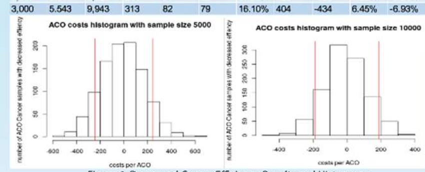

Figure 6: Decreased Cancer Efficiency Results and Histograms

- Decreased Cardiac Efficiency by 2.5%
- Decreased Diabetes Efficiency by 2%
- Decreased CHF Efficiency by 8%

CONCLUSION

Condition Category Results

- All condition categories produce gains for the ACO. This is because the relative risk factor for the condition categories over-compensates for the average cost of the condition category.
- **Risk Adjustment Factors:**
  - Cardiac: 4.897
  - Cancer: 5.504
  - Diabetes: 4.541
  - Chronic Heart Failure: 5.804
  - Population: 3.286

Adjusted Efficiency For Each Group

- The amount of inefficiency the model will allow and not penalize the ACO:
  - Cancer decrease by 6%
  - Cardiac decrease by 2.5%
  - CHF decrease by 8%
  - Diabetes decrease by 2%
- But they still have a significant percent of model errors. Variance are widespread and risk adjustment factor can not adjust for the variance.

FUTURE STUDY

This was a pilot study performed on the CMS public use files. The population risk adjustment factor is 3.287 but we expect this to be way closer to 1. Therefore, we recommend redoing the study using actual medicare datasets to double check that we got believable numbers and make sure our research is publishable and knowledgeable enough.