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Provider Risk Sharing and Random Noise

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Spurred by Medicare, state actions and the zeitgeist of the moment, provider groups are assuming financial risk for medical costs. These groups range from long-standing provider groups with substantial infrastructure to newly formed provider entities armed with the buzzwords “value-based contracting.”

The less-sophisticated providers will have a rocky time. Insurance companies understand pricing is sometimes too high and sometimes too low. There are techniques (pricing margin, statutory reserve) to address this risk. For hospitals or physicians, there is nothing comparable. Prior enthusiasm for provider risk sharing in the 1990s was curbed by financial difficulties.¹ The explosive demise of FPA Medical Management, a national physician management company, is a case in point.² Actuaries need to forewarn insurers and providers of the risks for these contracts to be sustained.

A risk-sharing contract requires the provider entity to control costs below a set target for a one-year period. Any difference between actual costs and the target are shared between insurer and provider.

The difference can have a number of causes. The provider entity may provide strong medical management.³ A target may be unfairly set to one party’s advantage. No doubt there are many other causes. The interest of this article is how random fluctuations affect financial savings.

A provider contracting entity is the corporate entity that reaches agreement with the insurer. The provider contracting entity may have separate agreements with physician groups or hospitals to negotiate a risk-sharing contract on their behalf. This extra distance may be required by state regulation and limits the risk of the underlying medical providers.

Assume the corporate entity is an independent practitioner association (IPA) for specificity and to avoid the clumsiness of “provider contracting entity.” The same threats loom over other provider entities.

As a straw man, consider the situation where an insurer enters into a risk-sharing agreement with an IPA. Assume that the IPA has a certain base year experience. Assume all parties genuinely expect and agree on a fairly set target for measurement year experience.

For this straw man, the provider will receive 50 percent of the savings if the actual experience is lower than the target. If actual experience is above the target, the IPA does not have to pay anything back to the insurer. This is a “one-sided” or “upside-only” contract.

ONE-SIDED RISK-SHARING AGREEMENTS

Many IPAs are only capable of agreeing to an upside-only contract. They may not have the reserves to meet statutory or insurer requirements, or they may not have the inclination to take downside risk.

A digression: An investment adviser starts eight investment newsletters. The adviser predicts yearly market gains in four newsletters and losses in four. After the first year, the adviser quits publishing the four that are wrong. The adviser repeats this process with the four remaining newsletters for two more years. Finally, there is one newsletter that predicted the market for three years running. The adviser now advertises this success.

My suspicion is that IPAs are less cynical than the investment adviser. Nonetheless, a good place to start is to assume that the IPAs have no capability to influence costs. This is reasonable in many situations. An IPA that is just starting may not have the infrastructure prepared for the necessary medical management, may not have the data to evaluate its level of medical management, or may not even have well-established goals.



In this case, like the newsletter, outcomes are random. Roughly half the time costs will be below the target and half the time above the target. Since there is no penalty to the IPA for costs above the target, the IPA will have an average gain over a period of years.

Let's assume the measurement year costs for a single individual sampled from the population follow a distribution around the target with a standard deviation equal to four times the mean. Based on my experience, a ratio of 4 is within the range of reasonableness for total costs of a commercial population with no stop-loss or other reinsurance. This ratio may not be appropriate for all commercial populations and is probably too high for Medicaid or Medicare populations. Other estimates on the level of fluctuation are available.⁴

While the distribution of costs for a single individual will be skewed, the costs over a provider panel should approximate a normal distribution. If a provider group has 10,000 members, the standard deviation for the average per member per month costs would be $4/\sqrt{10000} = .04$ or 4 percent of the average. A bit of calculus shows that there will be savings of 1.6 percent due solely to random fluctuations. The contract between the provider and the insurer would determine what portion of that savings is paid to the provider. Table 1 breaks this down for different size groups.

Table 1
Sample Random Variation and Savings in One-Sided Contracts

Panel Size	Standard Deviation as a Percentage of Total Costs	Expected Total Savings due to Randomness
2,500	8.0%	3.2%
5,000	5.7%	2.3%
10,000	4.0%	1.6%
20,000	2.8%	1.1%
40,000	2.0%	0.8%

Under our assumption of 50 percent risk sharing, the pricing actuary would have to add 0.8 percent to premium rates for the portion of business represented by this provider entity.

There will be occasions where there is a very large deviation simply because of chance. A provider with a panel size of 2,500 will show 4 percent or more savings roughly 30 percent of the time.

The assumption that provider performance has “no effect” is cynical and pessimistic. However, issues with random noise remain even if the provider performs successfully. For example,

if an IPA's actions lower experience by 4 percent but random noise adds 3 percent, there will be only 1 percent total savings.

TWO-SIDED RISK-SHARING AGREEMENTS

Over the long run, random fluctuation should even out in a two-sided agreement, with symmetric upside and downside risk. However, in the long run, some IPAs will be dead.

Having responsibility for losses is a transfer of insurance risk. The IPA must provide evidence of solvency under adverse circumstances by either law or contract or both. This requires additional solvency guarantees (for example, a letter of credit) from an entity without deep resources for funding. A few consecutive bad years can sink the IPA.

CHANGES FROM YEAR TO YEAR

Year-to-year fluctuations are familiar to actuaries but will surprise provider groups.

Again, consider the agreement between an insurer and an IPA with 10,000 members. Again, there is no improvement in cost containment: The deviations from the measurement targets are solely due to randomness.

The standard deviation of experience is 4 percent, as above. This implies a 10 percent chance that the experience will be 2 percent or more below the target the first measurement year but 2 percent or more above the target the second measurement year. The IPA's experience worsened by 4 percent or more.

Unsophisticated provider groups' reactions may include denying the results, questioning the data or blaming “one-time” catastrophic events. In a one-sided agreement, the IPA may have been counting on the same risk-sharing amount as last year to fund operations. In a two-sided agreement, the provider group will have to reach into its own funds. Presumably, the IPA had a letter of credit or other guarantee mechanism that has to be replenished.

In my experience, insurers make concessions because the insurer “needs” the provider group. This could include writing off the amount owed, providing unearned cash to the provider entity or delaying collection. A judgment on the frequency and size of concessions must be included in pricing.

These swings worsen if the target changes from one year to the next. If a provider has a successful first year, the target may be lowered for the second measurement year to reflect this “success.” Any “regression to mean” the following year implies no gain for the IPA (in a one-sided arrangement) or even a large loss (in a two-sided arrangement).

A good place to start is to assume that the IPAs have no capability to influence costs.

SURVIVOR BIAS

Over time, some contracts between insurers and IPAs will fall by the wayside, undone by bad luck, bad performance or both. The remaining provider entities will have had better-than-average success.

One possibility is that the improvement is due to IPA performance. Both the insurer and the provider entity would gain.

A second possibility is that the targets were not set appropriately. For example, some provider entities will perform better or worse by the nature of the communities they serve. Class, race, sex and other variables affect relative expense.

Say a contract calls for a percentage of premium to be passed from the insurer to the IPA. IPAs composed of provider groups that have systematically favorable targets will persist. Other IPAs will gradually fail or withdraw from the contract. A survivor bias will raise costs for the insurer.

The situation worsens as IPAs become more sophisticated. IPAs will examine history and include only those provider panels that are profitable. The insurer's actuary must reflect the increased costs in premium pricing.

CONCLUSION

Risk sharing with provider entities without successful medical management can only raise premiums. This is particularly true for smaller providers with little infrastructure. Pricing actuaries will need to estimate the direct effect of random fluctuations, the indirect effect of concessions to providers and the savings from medical management. Hopefully, this article outlines some of the considerations.

Actuaries will be educating provider contracting departments for both health plan and provider entities on these considerations.

The sooner this starts, the more likely the transfer of risk can be accomplished in an equitable manner.

Actuaries should consider

1. Evaluating the sophistication, infrastructure and medical management capability of the provider group
2. Estimating the random variability for populations across years
3. Advising whether there is sufficient panel size to justify a risk-sharing contract
4. Advocating limits to upside or downside provider risk sharing
5. Modeling the likelihood of an IPA continuing (or going insolvent) under assumptions of bad luck
6. Including these effects in premium pricing

Sometimes these estimates will be crude or back-of-the-envelope. Still, our clients will be well served by being forewarned. ■

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ENDNOTES

- 1 Glabman, Maureen. Downstream Without a Paddle: State Legislatures That Tackle Medical Group Insolvencies Have Come up With Strategies That Sometimes Shift Accountability to HMOs. *Managed Care*, Dec. 1, 2000. <https://www.managedcaremag.com/archives/2000/12/downstream-without-paddle>.
- 2 Brewster, Linda R., Leslie A. Jackson and Cara S. Lesser. Insolvency and Challenges of Regulating Providers That Bear Risk. Center for Studying Health System Change, *Issue Brief* no. 26, February 2000. <http://www.hschange.org/CONTENT/56/index.html>.
- 3 By "medical management," I am including the full range of possible provider actions, including steering to efficient providers, disease or care management, utilization management, contract negotiations, bundled payments, etc.
- 4 Weissman, Joel S., Michael Bailit, Guy D'Andrea and Meredith B. Rosenthal. 2012. The Design and Application of Shared Savings Programs: Lessons From Early Adopters. *Health Affairs* 31, no. 9:1959-68. <https://doi.org/10.1377/hlthaff.2012.0383>; Dugan, Chris, Howard Kahn and Robert Parke. 2015. Payer and Provider "Checklist" for Alternative Payment Arrangements. Milliman Healthcare Reform Briefing Report. <http://us.milliman.com/insight/2015/Payer-and-provider-checklist-for-alternative-payment-arrangements/>.