

Using Option-Based Contracts To Improve Health Outcomes

A system in which individual insurance policies may be purchased for separate medical products and services is based on a medical options market and takes its cue from the financial sector

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Imagine that the insurance world did not revolve around the aggregation of medical products or services but rather involved the use of options, which allow for individual and separate transactions between payers, providers, and members.

In this new world, the medical options market would be the dominant scheme of implementation. *Options* are financial instruments that convey the right, but not the obligation, to engage in a future transaction involving some commodity or futures contract. There are a number of different types of options, but the main ones are the *call option* and the *put option*. Buying a *call option* provides the right to buy a specified quantity of a security or commodity at a set price at some time on or before expiration of the option. This contract hedges the buyer against fluctuations in the asset's price. Buying a *put option* provides the right to sell. When the option holder chooses to exercise the option, the party who sold, or wrote, the option must fulfill the terms of the contract.

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In this new scheme, entities may purchase individual insurance policies on separate medical products and services. We will explore how this may be implemented in clinical scenarios. Also, we will explore how this scheme may promote favorable clinical and economic outcomes.

With this proposed scheme, instead of one insurance policy, an individual could select single policies on only those products and services needed for a particular patient. This individual, who could be a physician, employer, legal guardian, parent, spouse, or the member himself, would bear the financial risk for the patient's health. As with existing insurance models, these individual policies would each have a premium and a future guaranteed price on the underlying product or service. Also, like current insurance models, these individual policies would have an expiration date.

The separate medical product and service insurance policies would be sold directly by physician offices, diagnostic laboratories, and pharmacies. Each policy would oblige the entity to provide the underlying product or service to the policy buyer. Patients would purchase these policies in collaboration with a professional who was certified to assess their risk, ideally their primary care provider.

Option contracts provide a flexible means of breaking health insurance into tradable components that can

be sold directly through health practice entities. In this proposed medical options scheme, the asset may be a medication, a diagnostic procedure, a period of hospitalization, or a physician practice service.

SELF-OWNERSHIP

Ownership of the individual option contract by the person who will use the service fosters the ability of this scheme to promote favorable health and economic outcomes. As a buyer's private property, an option may be tradable on an open market. Therefore, the bearer of the contract has a vested interest in reducing inherent risk before the contract's expiration. Lowering risk decreases the intrinsic value of the option to the owner; this allows the owner to sell the option and achieve a source of cash flow. In the medical options world, if everyone else's health behavior is riskier, then the owner of the option would gain because everyone else would push the price of the option higher. The other extreme is that everyone else is health conscious, and seeks to lower risk, and finally reduces the price of the option for everyone. Thus, everyone loses the amount of the contract premium and no one wins. The reality exists between these two extremes, however, and serves as the midpoint or equilibrium in this game theory model. My hypothesis is that the cash received from selling hospitalization options or intensive care options, for

example, would help the purchase of future maintenance or preventive care options.

Here is how this would be implemented in practice. First, I discuss the mechanics of an individual option sold by a single organization. Second, I discuss how multiple options within a single organization could be bundled for simplicity at the point of sale. Third, I discuss how different bundles would form networks between different health organizations. Finally, I discuss how this scheme addresses current problems in the U.S. health care system.

SINGLE MEDICAL OPTION

A health organization may write a contract that guarantees the buyer a price on a medical product or service for a period of time. The premium price of the contract reflects the organization's desired return on the sale and the underlying cost of providing the service. As with other option contracts, the price of the option is determined by the guaranteed price of the service, the length of time until expiration, the current underlying asset's price, and the risk-free interest rate.

Therefore, the organization could set the option price at a present value anticipating the material, facility, and labor costs over the life of the option contract. An increase in the utilization of a product or service would increase the value of the contract to its owner. The owner will want to sell the option if he no longer needs the underlying medical product or service. Likewise, less need or demand for a given product or service would reduce the intrinsic value of the option.

For example, before developing an acute illness, patients could purchase an option contract on an antibiotic to guarantee a future price on the medication. Suppose that during flu season, the price of filling the medication increases because of increased demand at the pharmacy. A patient

filling the prescription would exercise the contract at the pharmacy, paying the guaranteed price, ideally lower than the current price.

BUNDLES OF MEDICAL OPTIONS

An organization might bundle a set of options to provide to its members as a package. It might be clinically relevant to provide more than one product or service to a patient, given the nature of needed care. Therefore, the price of this package would reflect the prices of the component options and their underlying products and services.

For example, pharmacies that can legally provide influenza vaccines could write a single option contract on the influenza vaccine and another option contract on an antibiotic. They could then bundle and sell them as a package.

Another example would be to bundle a set of options on medications for metabolic syndrome. This bundle would be made up of an option on a lipid-lowering agent, a series of options on antihypertensive agents, and an option on a blood glucose lowering agent. This would be sold as a single package. For simplicity, the pharmacy might design the contract so that each agent or all agents would have a single exercise price.

CREATING A SUPPLY CHAIN NETWORK

The maximum benefit of the medical options scheme would occur if different organizations sold the option bundles to each other. This would create a supply chain network of option bundles for products and services that would ultimately reach a patient. As an example, consider a network of option bundles for hypertension management.

A hospital would sell a single care package for emergent stroke treatment. This would include a series of options guaranteeing the price on medications for acute stroke, any sup-

portive care products and services, and the cost of the hospital stay. The hospital would bundle a similar package for cardiovascular events. A pharmacy would bundle a series of options on a combination regimen for hypertension. Finally, a diagnostic laboratory would bundle a series of options on troponin and electrolyte blood tests.

A primary care physician could purchase these option bundles from the hospital, diagnostic lab, and pharmacy on behalf of his patients. The provider would then sell a single package to his hypertensive patient. The physician could resell all the options of the underlying bundles or sell a portion, keeping ownership of the hospital options, to resell later if the patient's risk of hospitalization is reduced.

IMPACT ON PATIENT OUTCOMES AND CASH FLOW

Considering the prior example, we can explore the potential impact on clinical outcomes and organizational cash flow. If the provider manages the patient well, the probability of exercising certain options is reduced. Therefore, the hospital profits by selling to providers who manage their patients well or who ensure better health outcomes. Lesser performing providers produce greater risk and therefore drive up the cost of the options. A hospital also profits if it performs with greater efficiency and lower cost. Hospitals could then compete based on ability to manage hospitalized patients with greater cost efficiency and better performance.

The benefit of this model is that it insures against internal risk, not just market risk. Financial options work better when their price reflects market risk. However, medical options involve an additional risk — internal risk, which involves underlying decisions or management practices that are difficult to place a price on. For example, one cannot assess *a priori* a patient's ability to be compliant with

a health regimen. This internal risk blind to the provider may increase the odds of exercising the option. Therein the system gains when provider and patient work together to reduce this internal risk.

Under this scheme, when patients are doing well, the physician may judge that the options for hospitalization may not be needed. The physician may sell these hospital options to generate positive cash flow. As the term of a contract nears its end, a physician may judge a given patient's performance and resell the option to another entity for an accrued cash flow. Physicians may compete against each other based on their ability to produce outcomes. The market would reward physicians who lowering the risk of hospitalization or other poor disease progression end-point measures. In this scheme, health outcomes and economic outcomes should converge positively—a focus on health outcomes delivers better economic outcomes.

Finally, there would be competition among patients. Given the na-

ture of the contract, physician and patient agree on the option contract's terms and price. A contract may have provision for premium increase on a given patient if the patient fails to comply with the regimen and experiences an exacerbation leading to hospitalization. Therefore, option prices may increase for riskier patients. Less risky patients may compete against the more risky by getting the same insurance at a lower price.

VALUE-BASED COMPETITION

Given the arrangement of tying option price to risk and its subsequent bundling price, this scheme offers an opportunity for the entire system to reward practices that decrease risk. The U.S. health care system currently demonstrates poor patient compliance, rising costs of care, and poor clinical outcomes. An individual's ability to resell options that are unneeded because of lowered risk presents an incentive to improve compliance with a medical and health regimen. The scheme also promotes value-based competition such that

entities that reduce risk and achieve outcomes at lower cost are rewarded.

The flexibility of organizations to write their own option contracts and to bundle them allows for simplicity at point of care.

Finally, the system capitalizes on local knowledge. Clinicians understand the outcomes of their own practice, given a patient's underlying disease risk, lifestyle, and profile. Decisions that providers make are rewarded and punished based on the short-term cash flow of the medical option economy.

The options scheme might require adopting efficient pricing models for practical implementation by health organizations. Existing pricing models for current financial options and derivatives are too complicated for the average clinician and patient to use. The legal implications of such a scheme must be developed to protect the private property inherent in the option ownership. Finally, empiric work must measure what in theory should result in improved clinical and economic outcomes.