Should Health Care Come With A Warranty?

Many goods and services come with warranties; should health care? Analysis of one payment model shows promise and challenges.

by Francois de Brantes, Guy D’Andrea, and Meredith B. Rosenthal

ABSTRACT: How health care providers get paid has implications for the delivery of care and cost control; the topic is especially important during an economic downturn with persistent growth in health spending. Adding “warranties” to care is an innovation that transfers risk to providers, because payment includes allowances for defects. How do such warranties affect patient care and bottom lines? We examine a proposed payment model to illustrate the role of warranties in health care and their potential impact on providers’ behavior and profitability. We conclude that warranties could motivate providers to improve quality and could increase their profit margins. [Health Affairs 28, no. 4 (2009): w678–w687 (published online 16 June 2009; 10.1377/hlthaff.28.4.w678)]

In many industries, warranties are a common feature of economic exchange. A buyer purchases a product. A seller promises to cover repairs or otherwise compensate the buyer, under certain conditions, if the product proves faulty. It’s a simple idea that has been replicated in numerous markets. For example, Toyota’s introduction of stronger vehicle warranties in the 1980s helped change consumers’ perceptions of quality and kick-start an industry transformation that continues to this day.1–3 Can it happen in health care?

Beyond the product guarantee, as noted in the economic literature, two important characteristics of warranties are as follows: (1) they provide less than full insurance against unsatisfactory performance, and (2) they are supplied by the seller of the product rather than by a third-party insurer.4

Of course, the health care industry is not like any other. With the current fee-for-service (FFS) system, which rewards the production of services, irrespective of their quality, a textbook warranty between a buyer (patient) and seller (care provider) might not be meaningful. It is improbable that an insurer would want to...
purchase a warranty on an individual physician office visit, and equally unlikely that the physician would want to offer one. After all, what would the warranty cover?

Recent advances in health data analysis and quality improvement, however, have brought us to a point where warranties could become part of the negotiation process between insurers and providers. The particulars of a warranty in health care may differ from those in other industries. But the basic concept is the same: a supplier making good on a promise to indemnify a buyer in case of product failure—even if the “buyer” in this case is a third-party insurer.

In this paper we provide examples of how warranties have been used previously in health care settings. We discuss the conceptual framework of a new payment model that incorporates warranties. Finally, we analyze health insurance claims data to illustrate the value to both sides of the transaction.

**An Imperfect Market**

There is a rich economic literature on the performance of markets in which there is imperfect information about product quality. When information gathering is costly and consumers cannot fully observe product quality until after a purchase, the usual notions about competition and market outcomes fail. Many goods and services, including automobiles, consumer electronics, and legal counsel, fall into this category of so-called experience goods. Warranties (and secondary warranties that are available in some cases) can signal the manufacturer’s (and market’s) valuation of product quality and the risk of product failure.

Health care markets offer perhaps the most extreme example of costly search and imperfect product information. Imagine, for example, trying to identify systematically the best-value primary care physician in a major metropolitan area. In this light one can easily see, on a conceptual level, how warranties might increase the efficiency of market outcomes.

The key to making warranties viable is defining which failures are the supplier’s fault and which are not. After all, suppliers offer warranties only if they think they can anticipate or control the associated risk, and they prefer to cover failures they know are largely preventable. In health care, the primary sources of uncontrollable “product failure” are patient factors, including clinical risks, comorbidities, and behavioral risks (such as failure to adhere to discharge instructions). Other sources of failure are controllable by the service providers. These might result from poorly coordinated care, errors of omission and commission, and other actions that harm patients or fail to optimize outcomes.

Some experimentation with warranties in health care has occurred where providers were confident that they had developed reliable systems and processes. More than a decade ago Lanny Johnson, a surgeon, approached one of his largest payers to conduct a two-year pilot. His idea was to create a medical episode-of-care payment for knee and shoulder arthroscopic surgery, to prove their relative
effectiveness over more prevalent surgical methods. Johnson posted a $20,000 bond to release patients, payer, and hospital from liability for any unexpected charges above the negotiated case rate, thus effectively creating a warranty.

The published results of the pilot were encouraging. Price per case was in fact lower than in the comparable FFS environment. Profit margins for the surgeon and the hospital increased, while potentially avoidable complications and the number of reoperations decreased. (Johnson had to absorb the cost of four “redos,” but his overall margin rose anyway.) And the patients were generally satisfied with their treatment. To balance the provider’s incentive to increase the volume of knee surgeries, the payer instituted a prior authorization process but did not observe any measurable increase of unnecessary procedures.

Since then, the warranty concept has filtered into the self-pay portion of health care, such as corrective eye surgery, general cosmetic surgery, and dental care, which are often based on a global fee that includes any necessary rework by the provider. But it has taken much longer for warranties to appear in the third-party payer system. In mid-2007 the Geisinger Health System in Pennsylvania introduced a global episode price for elective cardiac bypass surgery that included a ninety-day warranty, although Geisinger did not use that term. Under its ProvenCare model, Geisinger charges a global episode price for bypass surgery, covering any preoperative, operative, and postoperative expenses up to ninety days after the surgery. Geisinger took this step after a major effort to improve its care processes based on a forty-item best-practice checklist. Geisinger has since expanded its fixed-price model to include a number of other types of episodes.

Johnson and Geisinger were driven mainly by the conviction that better surgical and patient management techniques could reduce potentially avoidable complications. They believed that delivering more reliable care would yield lower and less-variable total costs. And they believed that fixing a price at or slightly below the current average cost (which was inflated by potentially avoidable complications) could generate sufficient margins to cover the financial risk inherent in offering a warranty and reward them for high-quality care.

Such examples are intriguing, but their widespread applicability remains in question. Could warranties be used in arm’s-length provider payment arrangements generally? What—exactly—would these warranties cover? How would such a payment model affect providers’ profitability and behavior? What would providers need to consider before accepting a warranty approach? And what must payers consider before deciding what they are willing to pay?

To answer these questions and provide a path forward, a group of health care services experts in law, performance measurement, economics, and data analytics formed a nonprofit corporation and developed a new payment model, both called PROMETHEUS Payment, based on global episodes of care with warranties.
Two Key Forms Of Risk—One For Payers, One For Providers

Throughout 2007 and early 2008, supported by grants from the Commonwealth Fund and the Robert Wood Johnson Foundation, PROMETHEUS Payment worked with two conditions (one acute and one chronic) to develop a new method of pricing episodes of care (referred to as the new payment model). This method distinguishes two key sources of variation in the total cost of health care: “probability risk” and “technical risk.”

**Probability risk.** Probability risk is the classic form of insurance risk. It is caused by the likelihood of an event occurring to a patient as a result of genetic factors, health status, and any external event not controllable by the provider, such as contracting a virus or breaking a leg. In the new payment model, insurers take financial responsibility for probability risk.

**Technical risk.** Technical risk, on the other hand, is related to “care production.” It is at least partially controllable by providers, a result of their clinical skills and systems of care. In the new payment model, providers bear financial responsibility for technical risk.

**Separating them in practice.** Although probability and technical risk can be distinguished conceptually, in practice the two kinds of risk are difficult to separate, so the payment model must specify a decision rule to approximate the proper allocation. In the new payment model, the negative consequences of technical risk are defined as potentially avoidable complications (PACs). Examples of PACs in patients admitted to a hospital for an acute myocardial infarction (AMI) might include medication error and phlebitis as well as readmissions within thirty days of discharge. For patients with chronic conditions, PACs might include hospitalizations related to the condition.

According to the new payment model’s definitions, PACs include the Centers for Medicare and Medicaid Services (CMS)–defined Hospital Acquired Conditions. They also include so-called never events (preventable events that never should have happened), which the CMS, WellPoint, and other commercial insurers have announced they will no longer pay for.13–14

A summary of the work to distinguish these two kinds of risk was published in a Commonwealth Fund Issue Brief.15 This effort was central to creating the building blocks of the new payment model: evidence-informed case rates (ECRs).

**Evidence-Informed Case Rates: A Warranty In Effect, If Not In Name**

To create a conceptual framework for warranties in health care, clinical working groups developed criteria for building ECRs in several areas, including cancer care, chronic care, interventional cardiology, and orthopedic care.11–12 These groups modeled ECRs for episodes of care that include both inpatient and outpatient services.
Here’s how ECRs work. To care for a patient diagnosed with a specific condition, providers are paid a risk-adjusted global fee (that is, a fee that is adjusted for each patient based on a variety of risk factors, such as age, sex, presence of chronic illness, and prior acute events). This fee covers all services recommended by well-accepted clinical guidelines or expert opinions. It includes treatment delivered by physicians, hospitals, laboratories, imaging centers, pharmacies, rehabilitation centers, and other providers.

These global fees are combined with a robust set of performance incentives to promote cost control and quality improvement. Specifically, a portion of payment is withheld and redistributed based on providers’ performance on measures of clinical processes, care outcomes, and patient experiences.

This model includes an explicit effort to separate the quantity and types of services that are routine or typical from the quantity and types of available services caused by PACs. To compensate providers for the potential occurrence of avoidable complications and to create an incentive to reduce them further, half of the total predicted PAC costs are added to the severity-adjusted base global fee. This mechanism creates a de facto warranty in much the same way that Johnson posted a bond or that any manufacturer allows in its total product price an anticipated cost of fixing defects. Because the ECR always includes this PAC allowance, providers win or lose financially based on their actual performance in reducing the incidence of avoidable complications.

Even with robust risk adjustment, patterns of care for any single condition vary greatly. And although research on topics such as preventable admissions has begun to clarify the issue, the difference between “unavoidable” and “potentially avoidable” complications can be hard to determine. Over time, however, this can change. Perhaps we can again look back to the auto industry as an example. If American automakers were asked in 1975 how many defects could be driven out of production lines, they might have answered, “some, but not many.” Japanese companies such as Toyota thought differently, and a quality revolution ensued. In health care, the pilot implementations of the new payment model can perhaps be seen in a similar light, at the vanguard of a larger “defect reduction” movement that will ultimately determine which PACs are truly unavoidable and which are not.

Still, in today’s industry, it is fair to assume that most physicians, hospitals, and other care providers would have difficulty estimating the cost of a warranty for their services. However, a payer or third party using billing data, possibly in combination with clinical data, could estimate warranties.

Next we examine how the new payment model does this. Although some specific assumptions (such as the exact ECR price) can certainly be debated, that is not our purpose here. Rather, our goal is to review the analytical model as currently constructed and use it to illustrate a general approach to payment that incorporates a warranty.
How The Base ECR Was Calculated

The team working on the new payment model used a large commercial insurance claims database to model an ECR for AMI and determine both the total cost of PACs and the allowance that would be assigned to any ECR for AMI. Analysts identified many different types of PACs for AMIs and different costs for each PAC.

Exhibit 1 presents the summary data on AMI and the results of constructing a severity-adjusted case rate for patients with different risk factors. The base price is set to cover the costs of typical cases in a manner consistent with the best available evidence and expert consensus. Both the base ECR and the PAC allowance vary by patient severity. The specific formula for determining the PAC allowance is designed to balance two needs: the need to maintain incentives for providers to treat more severely ill patients, and the need to minimize incentives for artificially increasing the patient’s illness severity through the use of certain claims codes.

Analysis And Results

■ The drivers of margin in the ECR PAC allowance. To test the effect of ECRs on provider financial incentives, we constructed an analysis that includes the variables that influence a provider’s profits in the new payment model. In this analysis

EXHIBIT 1
Evidence-Informed Case Rate (ECR) Pricing For Acute Myocardial Infarction (AMI) In The PROMETHEUS Model

<table>
<thead>
<tr>
<th>Model assumption</th>
<th>Average cost</th>
<th>Number</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total AMI cases (facility plus professional)</td>
<td>$53,206</td>
<td>13,977</td>
<td>$743,657,708</td>
</tr>
<tr>
<td>Claims for typical patients</td>
<td>$40,712</td>
<td>7,246</td>
<td>295,001,860</td>
</tr>
<tr>
<td>Claims for patients with PACs (including readmissions)</td>
<td>$66,655</td>
<td>6,731</td>
<td>448,655,848</td>
</tr>
<tr>
<td>Added burden for PACs (including readmissions)</td>
<td></td>
<td></td>
<td>224,419,314</td>
</tr>
<tr>
<td>Allowable cost of PACs</td>
<td>50%</td>
<td>$8,028</td>
<td>112,209,657</td>
</tr>
<tr>
<td>Flat fee portion (spread 25% of allowable PACs over all cases)</td>
<td></td>
<td>$2,007</td>
<td>28,052,414</td>
</tr>
<tr>
<td>Proportional rate (75% of allowable PACs as a rate typical costs)</td>
<td></td>
<td>$6,021</td>
<td>156</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient 1</th>
<th>Patient 2</th>
<th>Patient 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of care of typical AMI case (facility plus professional)</td>
<td>$10,957</td>
<td>$43,915</td>
</tr>
<tr>
<td>Allowance for PACs</td>
<td>3,628</td>
<td>8,502</td>
</tr>
<tr>
<td>Flat fee allowance (25% of complete costs spread over all)</td>
<td>2,007</td>
<td>2,007</td>
</tr>
<tr>
<td>Proportional allowance</td>
<td>15%</td>
<td>6.495</td>
</tr>
<tr>
<td>Margin</td>
<td>10%</td>
<td>4,392</td>
</tr>
<tr>
<td>Total ECR per patient (severity + PAC allowance + margin)</td>
<td>15,680</td>
<td>56,809</td>
</tr>
</tbody>
</table>


NOTE: PAC is potentially avoidable complication.
there are three factors that vary randomly and contribute to the results: (1) patients’ illness severity; (2) number of complications; and (3) average cost per complication. After running 500 iterations of the model, we analyzed each of these factors to estimate their impact on the provider’s profits in the new payment model.

Our results reveal only a very weak correlation between the severity index of a provider’s patients (a measure of how costly and prone to complications that provider’s population is) and that provider’s profit margins (Exhibit 2). Overall, profit margin increases slightly with severity of illness, but the correlation is weak. This is consistent with the principles of the new payment model, which is designed to insulate providers from probability risk. Providers have little control over their patients’ risk factors and therefore should not bear the financial risk associated with underlying patient risk. Moreover, the new payment model is designed to avoid incentives for providers to “cherry-pick” less risky patients. If anything, the model shows that there is a small incentive to treat riskier patients.

Next, consider the effect that the number of complications has on profit margin. There is a fairly strong negative correlation between the number of complications and profit (Exhibit 3). This is consistent with a key objective of the new payment model, which is designed to actively engage providers in reducing complications.

The final variable, average cost per complication, has an even stronger negative correlation than the number of complications. This is also consistent with the new payment model’s design, since the total cost of complications is an important element of technical risk—the greater the “defect,” the greater the cost of that defect and the providers’ financial risk. Under this model, providers would have a strong incentive to focus on preventing expensive complications.

**Overall effect of PAC mix on provider margin.** For the initial analysis, we assumed that every provider has the same expected 50 percent rate of complication

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**EXHIBIT 2**

Provider Margin Relative To The Illness Severity Mix Of Patients

<table>
<thead>
<tr>
<th>Profit margin (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>-5</td>
</tr>
<tr>
<td>-10</td>
</tr>
<tr>
<td>-15</td>
</tr>
<tr>
<td>-20</td>
</tr>
<tr>
<td>-25</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Relative to expected risk (positive = riskier)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30</td>
</tr>
<tr>
<td>-20</td>
</tr>
<tr>
<td>-10</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

*Source:* Authors’ analysis of the data/simulation; see text for details.
occurrences. However, a major goal of the payment model is to encourage providers to take steps to reduce the underlying occurrence of complications. Exhibit 4 shows what happens to expected profit as providers decrease their expected rates of PACs. As complication rates fall below 40 percent, providers can generally expect to break even or show a profit. Based on the simulation assumptions, providers must, to guarantee profitability, drive their underlying complication rates to around 25 per-

EXHIBIT 3
Provider Margin Relative To Number Of Complications Among Patients

EXHIBIT 4
Impact Of Potentially Avoidable Complication (PAC) Rate On Hospital Profit Margin (Total Margin Relative To Rate Of Complications)

SOURCE: Authors’ analysis of the data/simulation; see text for details.

NOTE: Data were developed by running 500 iterations of the model at different complication rates.
cent. Conversely, providers with expected complication rates of 50 percent or more will usually lose money, because the PAC allowances they receive won’t cover the costs of treating their patients’ frequent complications.

**A Promising Direction—If Payers And Providers Can Depart From The Status Quo**

Because consumers and payers cannot easily observe quality of care when they contract with providers or seek treatment, warranties would serve as a proxy quality indicator. This concept fits broadly within the trend toward performance-based pay and the idea that health care providers should compete based on delivering good outcomes. Warranties are also natural extensions of episode-based payment models, including PROMETHEUS Payment’s ECRs and Geisinger’s ProvenCare, which seek to compensate providers for a set of clinically appropriate services for a given condition.

ECRs have a built-in allowance for PACs. This acts as a warranty. The allowance is based on 50 percent of the current rate of observable complications, recognizing the reality that some complication rate is unavoidable. Our analysis suggests that providers will be largely insulated from loss resulting from random chance—patient severity mix, PAC mix, complication cost mix—if their total rate of PACs is less than 40 percent, or roughly two-thirds the current complication rate. In other words, to be profitable under the new payment model, providers with average complication rates today would have to improve performance by one-third. Whether or not complications are truly avoidable will have profound implications on their ability to “win” in a new payment model.

This analysis suggests that the model would strongly benefit providers such as Geisinger that have already developed systems and processes to reduce avoidable complications. Further research is required to determine whether the warranties would motivate providers with average rates of complications to improve performance. It may be worth noting that if a payer were to calculate a single warranty it was willing to pay based on market average data and use it for payment on a voluntary basis, only the highest-quality providers might accept the terms (assume some insight about true complication rates). It is possible, then, that the payer would end up paying more to those high-quality providers even if no quality improvement occurred, while continuing to pay for complications directly for providers who would not enter into the warranty agreement.

The research to date suggests that it is feasible to construct a payment model that incorporates a meaningful and acceptable warranty against the consequences of technical risk, while protecting against inappropriate transfer of probability risk. However, generalizing this model across a large number of conditions will require a sizable ongoing investment in data analysis. Parallel work is needed to develop organizational frameworks and accountability models to support these more evolved methods of payment.
The authors thank the Commonwealth Fund and the Robert Wood Johnson Foundation for supporting the development of the Prometheus Payment model; and Bob Conte for his editorial supervision.

NOTES
7. The episode of care includes all services associated to the episode from all providers in one single global fee, as opposed to the prevalent fee-for-service payment where every single service is priced independently.
8. An example of a warranty from Mentor, a maker of “products for the aesthetics specialties fields,” is available online at http://www.mentorcorp.com/breastsurgery/augmentation/cs_ba_warranty.htm.
18. Additional information on our calculations and results is available in a technical appendix, online at http://content.healthaffairs.org/cgi/content/full/hlthaff.28.4.w678/DC2.
19. See Technical Appendix 2, online as in ibid.