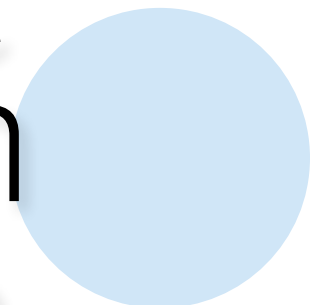
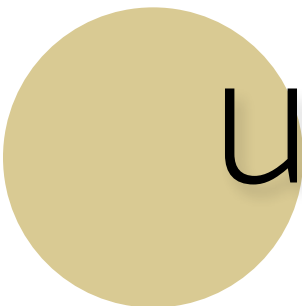


a holistic  
approach  
to health  
underwriting



**For health underwriters seeking to evaluate risk,  
medical diagnoses are the gold standard.  
But there's a wealth of potentially helpful information lurking  
in the questions that aren't being asked.**

BY TIA GOSS SAWHNEY

**T**HE FORMAL PROCESS OF UNDERWRITING IN THIS COUNTRY HAS REMAINED UNCHANGED for decades. The questions that are posed on individual health insurance applications are designed primarily to elicit a diagnostic history of the applicant. Information concerning each past diagnosis is combined with only a limited amount of non-diagnostic-related information to assess the health risk of the applicant and make an underwriting decision.

Tele-underwriting, online applications, and profiling through electronic prescription drug history are recent innovations in individual health underwriting. Although online applications replace paper applications, and tele-underwriting supplements and sometimes replaces applications, neither fundamentally changes the diagnosis-based underwriting evaluation framework nor the nature of the information being collected.

Electronic prescription drug histories do, in fact, provide a previously unavailable source of health information. The histories, however, are evaluated via the same diagnostic-based framework as traditional information—each drug gets mapped back to a diagnosis or probable diagnosis with the risk evaluation following from the diagnosis.

### Meet the Applicants

This current underwriting fixation on diagnosis can lead to some odd results.

Let's start by considering two applicants who appeared in "A Shock to the System," Howard Bolnick's 2005 *Contingencies* article that first identified the problem:



**JOHN** is an active, healthy 45-year-old who vigorously exercises four to five times per week. He began exercising three years ago when he was diagnosed with high blood pressure. John's exercise regime, his loss of 10 pounds (although he could probably lose a few more), and his adoption of a heart-healthy diet have brought down his blood-pressure readings at his last annual physical exam from 170/100 to 135/85 and also reduced his total cholesterol level from 235 to 190. John



**MATT**, who is the same age (45), is a bit overweight (not too much), doesn't exercise, and loves junk food. He hasn't been to a physician in 10 years. Consequently, he has no idea that he has high blood pressure (170/100) and a total cholesterol level of 235.

Even though Matt has the higher risk of cardiovascular problems and diabetes, the typical underwriting response would be to offer coverage to John with a premium surcharge because of his diagnostic history and to offer standard-premium coverage for Matt by virtue of his diagnosis-free history.

These examples demonstrate how diagnostic-based systems can fail to identify and find relevant risks and attribute more risk to certain diagnostic histories than is probably merited. Believing there's a better way, I've developed a framework that identifies several discrete risk factors relevant to health insurance risk assessment. I've also identified diagnostic and non-diagnostic elements that could do a better job of evaluating these risks than the current approach.

Before I do this, however, I need to add to my cast of underwriting applicants:



**MARK** has the same profile and health history as John, except that in addition to the lifestyle changes that John made, he takes moderate, stable dosages of cholesterol and blood pressure drugs.



**KIM** is also 45. She has been self-employed for years. She has a totally clean health history that includes annual exams. She's reasonably fit and trim. But starting shortly after her sister died of cancer two months ago, Kim hasn't felt well. She's sad and tired most of the time, and several of her joints hurt. Getting out of bed is a daily struggle, and several days she hasn't managed to do so and hasn't worked. At first, she thought it was probably the flu. Now she's not so sure. But she hasn't been to a doctor or other medical professional yet. First she needs to get some health insurance. She will answer application questions truthfully, but she will not volunteer information.



**JAN** is 45 and very fit and trim. There's nothing wrong with her, never has been. That's because she takes very good care of herself. Jan has never missed a recommended physical or diagnostic test and has never failed to fill a prescription. She goes to a doctor at the first sign of anything abnormal, including cold and flu symptoms. The visits always result in multiple brand-name prescriptions. She reads a lot of health articles and often tells her doctor what tests she should have in order to be assured that she's not seriously ill. For example, last year's sinus infection led to allergy testing and the headache the year before led to a CT scan. All tests were negative. Although her insurance did not cover these procedures, in the past two years she has had LASIK, a breast lift, a tummy tuck, and new dental crowns. Jan wouldn't think of going without insurance.



**PATTY** is 45 and fit and trim. She has no chronic conditions. She uses minimal health care: an annual exam and one or two other visits per year for minor issues—visits that seldom result in any follow-up care. Patty is also honest. Therefore, when presented with a questionnaire that asks if she has had any disorder of the skin in the past 10 years, she lists a plantar wart, a boil, and dandruff. When asked for details of every physician visit in the past five years, she lists all 12 visits. When asked if she has ever been hospitalized, been treated in the emergency room, or had any sickness, operation, or injury not already mentioned on her application, she details nearly every health event since childhood. She answers all questions with this integrity. The application requires several supplemental pages.

### A New Health Risk Evaluation Framework

My framework for evaluating health insurance risk has two variables: size of future claim and predictability of claim occurrence. The quadrants of the resulting framework can be described as follows:

**1) RANDOM NOISE:** *Small claims that just happen.* These claims, representing the bumps, bruises, and minor ailments of an otherwise healthy life, aren't related to a particular chronic condition or health consumption pattern. Unlike the other three quadrants, random noise shouldn't cause concern to underwriters.

**2) ANNUITY COSTS:** *A predictable stream of low-level claims, with costs that can reasonably be estimated at the time of underwriting.* These claims are the result of treating existing chronic conditions, the cost of routine physicals, and/or the applicant's general health-care-utilization patterns.

**3) IMPENDING COSTS:** *Future medium to large health claims that are reasonably predictable.* These claims can be the result of uncontrolled or expensive chronic conditions, recent or ongoing care, or unresolved symptoms. It's worth noting that a highly predictable event may have a highly unpredictable cost. The likely cost only needs to be somewhere between medium and very large.

**4) TRUE RISK:** *The risk of medium to large claims that can't be reasonably predicted.* These claims may be the result of out-of-the-blue events, or they may be from an acute event arising out of a known chronic condition, assuming that the predictability of such a specific event is nonetheless low. The present value of claims associated with a new (post-underwriting) chronic condition is also a true risk.

With this framework in mind, let's return to each of our applicants. I'll evaluate them with respect to both the new framework and current industry underwriting practices. (For ease of reference, I'll consider them in reverse order of their introduction above.)

**PATTY** *New framework*—Using the new framework, Patty is a good risk. With the exception of the annual exam, her prior claims are all random noise. She has no indications of elevated true risk or impending claims. She has a modest annuity claim because of to her history of annual exams, but this history also allows us to be reasonably certain that there are no undiagnosed conditions that drive excess true risk. She should be approved standard.

*Current industry practices*—Because she listed so many health care providers, events, and diagnoses, Patty's application in a best-case underwriting evaluation will be delayed, resulting eventually in a standard quote. In a worst-case evaluation, Patty (after waiting an extended period) will be rated and/or offered a policy with an exclusion rider because of a minor prior issue that most other applicants would have neglected to mention. For example, an underwriter may take action because plantar warts have a high likelihood of returning.

**JAN** *New framework*—Jan isn't a desirable risk. She almost certainly will continue to use extensive, regular medical services. While she may not have a serious diagnosis (although it's not hard to acquire a serious diagnosis when you are regularly consulting doctors), and the individual services may not be costly, the costs over the years will add up. At a minimum, accepting Jan means accepting a stream of annuity costs that will most likely equal or exceed her net premiums in perpetuity. Furthermore, given her propensity to undergo both testing and surgery, there is every chance that some future test will lead to a surgery recommendation that she will accept at significant expense to her insurer. For

## Health Risk Evaluation Framework

PREDICTABILITY*		
SIZE OF CLAIM	LOW	HIGH
Small	Random Noise	Annuity Costs
Medium to Large	True Risk	Impending Costs

\* Predictability can be described as relative probability for that claim size. Small claims occur much more often than medium to large claims. Therefore, low predictability for a small claim is a much higher probability in absolute terms than low predictability for a medium or large claim. A healthy insured person is much more likely to get the flu than to have a serious heart attack, yet both are low-predictability events.

example, back surgeries are often performed, even though there is no evidence that they are effective. If Jan sprains her back any time in the future, there's a good chance she will end up on the table and under the knife. Jan has an unacceptable annuity risk and an elevated true risk.

*Current industry practices*—Jan will very likely sail through traditional underwriting, as there is “nothing” wrong with her.

**KIM** *New framework*—Kim clearly isn't a desirable risk because of her impending claim costs. She's going to go to the doctor soon after she buys insurance. At a minimum, that doctor visit is going to lead to extensive testing. The best-case scenario is that her physical health will turn out to be fine, and some combination of antidepressants, counseling, and time will take care of her. In the interim, even if her policy doesn't cover mental health treatments, the insurer will still have to pay for thousands of dollars

as a standard risk (more on this in the next section).

**MARK** *New framework*—Mark is very desirable from the true risk perspective. He has demonstrated his ability and commitment to keeping his cardiovascular risk at healthy levels. And since he has had routine care, the insurer can be reasonably sure he doesn't have other undiagnosed conditions such as diabetes. The concern with underwriting Mark is annuity costs. His annuity costs are stable and not huge, but they aren't trivial and can consume a good amount of a standard net premium, leaving little net premium for random noise and true risk. We would need to take some underwriting action.

*Current industry practices*—Current industry practices would also include underwriting action. The only question is the nature of the action (more on this in the next section).

**MATT** *New framework*—Matt has no annuity or impending costs. And even though he has a higher-than-average cardiovascular-dia-

in diagnostic tests, consuming her net premium for one to several years. These symptoms, however, could also lead to a diagnosis (or misdiagnosis) of lupus, chronic fatigue syndrome, Lyme disease, leukemia, fibromyalgia, rheumatoid arthritis, or hormonal imbalances that could result in many years of expensive medical claims.

*Current industry practices*—Because Kim hasn't yet sought medical advice, she can answer the questions of most health insurance applications honestly and get approved for coverage



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Applicant Summary			Likely UW Decision	
APPLICANT	DIAGNOSTIC HISTORY	OTHER INFORMATION	CURRENT PRACTICES	NEW FRAMEWORK
John	HBP/Chol	Lifestyle change success story	Substandard rate	Standard
Matt	None	Poor lifestyle, oblivious to health	Standard	Substandard rate
Mark	HBP/Chol	Good lifestyle and medical management	Substandard rate or other underwriting action	Substandard rate or other underwriting action*
Kim	None	Not feeling well	Standard	Decline
Jan	None	Constantly seeks health care	Standard	Decline
Patty	Long list of minor ailments	Too honest	Best case: standard after an underwriting delay	Standard

\* Includes the possibility of underwriting actions that aren't common current practices. More on this in the next section.

betes risk, for his age, it's rateable (not so high that it constitutes an impending claim). The underwriter simply has to match the rate with the elevated risk. However, the underwriter doesn't have the necessary information to know that Matt has a higher-than-average cardiovascular-diabetes risk. The cardiovascular-diabetes risk includes not only the risk of a future large claim event (such as heart attack), particularly if his blood pressure and cholesterol problems go undiagnosed or untreated, but also the risk that the diagnosis of his elevated high blood pressure and cholesterol will result in a lifetime of annuity costs. Without additional information regarding either his medical profile or lifestyle, Matt may be rated incorrectly as standard (more on lifestyle considerations in the next section).

*Current industry practices*—Current industry practices would rate Matt as standard.

**JOHN** *New framework*—Because John has lowered his cardiovascular-diabetes risk by lifestyle modification and proven his ability to maintain these changes, he has no annuity or impending costs and an acceptable true risk. John should have a standard rate.

*Current industry practices*—John is likely to receive a substandard rate because of his previous diagnosis of hypertension and high cholesterol.

Above is a summary of our applicants.

### Differentiating and Evaluating the Quadrants

Why make this four-quadrant differentiation? We need to distinguish among the quadrants because each requires a different perspective with respect to application questions and subsequent underwriting evaluation. This isn't being accomplished by today's applications and underwriting processes.

**1) RANDOM NOISE:** Random noise simply doesn't matter. To be alive means at least occasional encounters with the health system. Past encounters matter only to the extent that they predict future need for care. But if most applicants answer application questions literally, the result will be a lot of random noise for the underwriter to sort through in the pursuit of an impending claim, an annuity cost, or excess true risk.

Fortunately (and unlike Patty), most applicants save us underwriting time by not providing all the information that we request. Totally untrained in underwriting, applicants decide what should and shouldn't be relevant for our risk evaluation and write down only what they think is relevant.

Although it's easier to propose than implement, it would be better if we asked applicants only questions likely to be relevant to potential impending claim, annuity cost, or excess true risk and not go through the pretense of soliciting the details of a lifetime of random noise.

**2) ANNUITY COSTS:** The original purpose of major medical health insurance was to protect insureds from the cost of unexpected catastrophic events—true risk. However, with the advent of first-dollar coverage (introduced by managed-care plans) and state mandates, individual health insurance now has a significant annuity component. Annuity costs are not unexpected; they are fully expected. A dollar of premium that is spent on an annuity cost is one less dollar that is available for unexpected events (random noise and true risk).

The costs associated with many chronic conditions, patterns of overuse of the health system and possibly even conscientiously obtained preventive care (the array of preventive care and testing recommended by various credible and noncredible medical advisers is overwhelming), annuity costs can consume nearly every dollar of the standard net premium with near certainty year after year, leaving virtually no premium for unexpected events.

Health insurance companies have long made underwriting decisions based on the treatment costs of chronic conditions, but they haven't made similar decisions based on the consumption of routine care and/or potential overuse of the health care system. The argument that treating chronic conditions and routine care pay for themselves often isn't applicable to individual health underwriting as the bulk of the economic payback is in years after the expected life of the health insurance contract. We need underwriting mechanisms to assess the cost impact of health care use in excess of what is justified for the management of near-term good health.

With respect to the treatment of chronic conditions, insurers traditionally rated up these applicants substantially, wrote broad exclusion riders, or denied coverage. I propose that there may be two other reasonable underwriting actions: use of a narrow exclusion rider and shifting the deductible.

Traditionally, insurers have used exclusion riders to bar both current treatment and potential future events associated with a disease. Exclusion riders therefore have been used only with conditions that feature a limited number of well-defined potential future health events that could be attributed unambiguously to the root condition. The exclusion rider then has been applied to both the condition and to potential related health events.

But if we think of current treatment as an annuity cost and of future potential events as true risk, it theoretically isn't necessary to exclude both. In fact, the treatment of several chronic conditions, notably hypertension and high cholesterol, mitigates current true risk and makes the applicant more, not less, suitable from a true risk perspective. Particularly with respect to hypertension and high cholesterol, it may be sufficient to merely exclude the treatments (annuity costs), while still covering circulatory and cardiovascular events (true risk). This approach would be particularly powerful if combined with a policy provision that says circulatory and cardiovascular events will be covered only if the claimant can demonstrate that he or she complied with a physician's hypertension and high-cholesterol control plan. The regulators, of course, may or may not appreciate this approach.

Because they share the same impending claim (none), random noise, and true risk profiles, John and Mark have identical

claim probability distributions. The only difference is that Mark's distribution is shifted to the right by the amount equal to the cost of his annual drugs and testing. Let's assume that this is a \$1,000 annual cost. If the requested plan has drugs under the deductible, a fully equitable and actuarially correct underwriting solution is to offer John and Mark identical rates but with Mark's deductible \$1,000 higher than John's.

**3) IMPENDING CLAIMS:** Impending claims are the ultimate anti-selection—the result of people buying insurance precisely because they know they're going to need it in the near future. People enter the health care system when they don't feel well. The health care system then spends as much money as required to diagnose what's wrong and make them feel better again.

Not feeling well is an excellent predictor of forthcoming, potentially significant, health claims. Yet few applications ask applicants how they are feeling. I have in front of me an actual application for an individual Blue Cross Blue Shield policy, and there are no questions that would elicit a positive response from Kim regarding her current health problem. Given that she has not yet sought medical advice, the only defense most insurers would have against Kim's claims would be the "prudent person" or similar language in the policy's pre-existing condition clause. The insurer would need to investigate at the time of the claim, deny the claim, and then be



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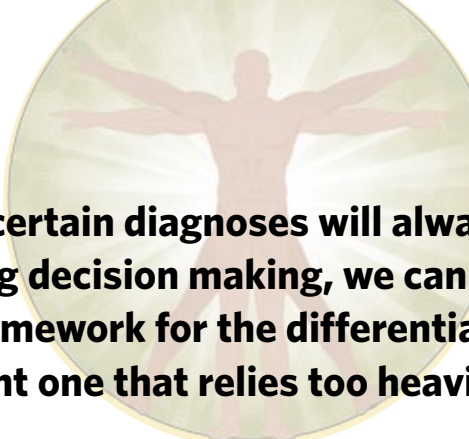
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**While certain diagnoses will always affect underwriting decision making, we can build a better underwriting framework for the differentiation of health risk than the current one that relies too heavily on diagnoses.**

willing to defend the prudent-person denial against a legal challenge. And in some states, excluding for a pre-existing condition wouldn't apply if Kim had sufficient creditable coverage.

Pain, fatigue and lassitude, changes in mood, and an inability to perform normal activities are what normally drive people into the health system for new potentially significant conditions. Positive responses to questions based on these four indicators could alert underwriters to the possibility of impending claims. If asked these questions, Kim would no longer be rated standard.

Applicants may, of course, say that they feel fine when they don't. But with respect to the applicant who tells the truth, the insurer gains valuable underwriting information. With respect to the applicant who doesn't tell the truth, the insurer has a possible misrepresentation defense at claim time and doesn't need to rely exclusively upon the prudent-person clause of a pre-existing-condition exclusion.

**4) TRUE RISK:** According to insurance theory, true risk is what insurance is all about—protecting people from unexpected events that they couldn't otherwise afford. True risk accounts for the majority of the claim costs paid by individual health insurance companies. Yet the current system doesn't incorporate many of the variables that have a documented impact on true health risk.

› *Lifestyle* There's overwhelming medical evidence that lifestyle plays a significant role in future health true risk. (In this context, lifestyle doesn't refer to sexual orientation or domestic arrangements.) Yet lifestyle has a modest role in our current underwriting system. The most common non-diagnostic underwriting considerations are age, gender, ZIP code, tobacco use, illegal drug use, implants, hazardous activities/occupation, and sometimes heavy alcohol use (alcohol use independent of a diagnosis of alcohol abuse). Of those, only tobacco use, illegal drug use, hazardous activities/occupation, and heavy alcohol use are lifestyle related. Exercise, diet, medical compliance, and driving and work habits aren't commonly considered, yet the medical literature is rich with evidence that they affect true risk. Based on medical evidence, for instance, the World Health Organization is considering naming overnight shift work as a known carcinogen. Similarly, numerous other studies have linked overnight work to cardiovascular disease, diabetes, and metabolic syndrome.

› *Socioeconomic Considerations* Decades of studies have demonstrated the significant impact of education and income on health—both at the individual and at the family level. Education in particular is an easily documented objective variable that is perfect for underwriting use. Income is both a correlated and inde-

pendent variable with respect to education. Education and income may not be socially acceptable in the context of individual health insurance underwriting, but it doesn't appear that the industry has asked. There is precedent for using these factors. Education and income are already embedded in disability and life underwriting guidelines. Smoking, drinking, obesity, and many of the diagnostic factors that we currently use for health insurance underwriting are statistically related to socioeconomic standing.

› *Health Care Consumption Patterns* There is general consensus that a major portion of U.S. health care consumption is unnecessary and provides little or no value. What few experts publicly acknowledge is that unnecessary health care is more of an issue for some people than others and that health care consumption begets health care consumption, independent of medical need. Even though neither has a significant diagnostic history, the Jans of the world have a greater true risk than the Pattys. Underwriting studies should assess the predictive power of the volume of care the applicant has historically received, independent of diagnosis, and then embed volume-based parameters into underwriting.

› *Biomarkers* Although bio-testing can include genetic testing, let's limit this discussion to non-genetic testing. The health insurance industry typically only uses biomarkers for underwriting older adults and people who admit to a health condition. Given that health insurance costs more each year, while many tests, especially blood and other fluid tests, cost less each year, it may be time for health insurers to re-examine the economics of testing and require test results for a broader swath of applicants—similar to what life insurers require. Since a regular biomarker assessment is a valuable part of routine health care, independent of an application for individual health insurance, it's not clear that insurers should be required to pay for the testing. They could instead demand the results of recent tests. This would permit proper assessment of applicants such as Matt.

› *Mental Health and Social Integration* Numerous studies have shown that long-term mental health (factors such as impulse control, perception of autonomy, and optimistic attitude), and the extent of social integration affect future health risk. Because of the nebulous nature of the necessary measurements, evaluating these factors for use in health insurance underwriting will be both difficult and, if implemented, controversial. But at the least, our industry should be aware that we are leaving a valuable category of information unevaluated.

## Building Tomorrow's Underwriting Process

In an age where everyone wants everything in minutes, current health insurance applications are already too long (which is why applicants decide to provide only select information) and current underwriting evaluation takes too much time (days to weeks). Is it possible to incorporate variables that we aren't evaluating today into a new evaluation framework that uses a less time-consuming application and results in faster underwriting?

The answer is yes. But it can be done only by rethinking the underwriting process and concentrating on what's important and by using a dynamic application process whereby questions are asked only when they are likely to yield actionable information. Pre-printed applications, whether on paper or on a static Internet page, must be scrapped—they simply cannot support dynamic information requirements.

Dynamic applications can be, but aren't necessarily, those entered online by the applicant. An agent or call center employee could elicit information from the applicant while using an Internet- or Intranet-based application. If agents don't always have continuous Internet connectivity (for example, when visiting a client), it's possible for the dynamic application software to reside on a laptop that provides access to regularly scheduled application software updates and allows uploads of applicant response data.

Dynamic applications require structured response information in order to determine which questions should appear next. Structured response information has two other purposes beyond controlling question flow: supporting automated rules-based underwriting and running statistical analysis.

Automated rules-based underwriting is necessary if we are going to substantially shorten underwriting times. No other industry offering mass-marketed consumer products or services expects customers to wait several days and up to several weeks for a price. Although underwriters will still be required to manage the rules, to handle the ambiguous and unusual situations, and perhaps even to give final approval to the automated decision, much of the current underwriting tedium can be handled by the automated process.


Structured information will then also be used for subsequent statistical analysis. The historical lack of structured application information, stored in databases, has hindered the development of statistically sound underwriting. Proper statistical analysis will allow us to further refine our underwriting decisions and eliminate questions that don't have independent predictive value.

While certain diagnoses will always affect underwriting decision making, we can build a better underwriting framework

for the differentiation of health risk than the current one that relies too heavily on diagnoses. It's to the benefit of all of us to do so. Actuarial Standard of Practice No. 12, *Concerning Risk Classification*, encourages the development of risk classification systems that create classes of "sufficient homogeneity" so as to minimize adverse selection. Minimizing adverse selection is essential to providing economic incentives for insurers to operate, encouraging widespread availability of coverage, and protecting the soundness of the individual health insurance system. ●

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