Machine learning and advanced technology

Machine learning and advanced technology boosts payment integrity efforts, but requires the right data and expertise.

Machine learning and other advanced analytics can help health plans find significant savings opportunities that they might miss using traditional rules-based systems. However, health care coding and reimbursement is complex. To realize the greatest payment integrity savings potential, health plans need the right technology partner. That partner should have access to deep health care expertise with dedicated health care resources, and analytics built on extensive repositories of health care data.

Medical claims are at the center of the health care ecosystem. Health plans that want to maximize savings, lower administrative costs and improve relationships with health care providers must have effective payment integrity efforts that are consistently evolving and innovating. The stakes for getting payment integrity right are high. In 2016, the cost of waste was $389 billion in the Medicare and Medicaid programs and $1,145 billion among private payers and other entities. These dollar figures represent 31% and 41%, respectively, of all health care expenditures in the United States.*

Medical claims have many intricacies dictating how to pay providers. You can't apply technology alone. This is despite assertions by generic technology partners that cutting-edge technology alone can fix the health care system. These generic partners lack rich health care data assets and health care expertise and cannot move the needle on payment integrity program outcomes. Accordingly, health plans need a health care technology partner that has the ability to grasp both cutting-edge technology, such as machine learning and advanced analytics, and the complexities of the health care system.

*O'Neill DP, Scheinker D. Wasted health spending: Who's picking up the tab? Health Affairs Blog. May 31, 2018.

Getting payment integrity right

The stakes are high for getting payment integrity right. In 2016, the cost of waste represented an estimated 31–41% of all health care expenditures in the U.S.

Health care data complexities include:

- The correlations among the tens of thousands of clinical codes that represent the health condition of the patient

- Medical guidelines regarding the appropriateness of care

- Best practices for paying providers for their services.

The health care payment system is unique and varies greatly from the financial services or retail industries. Identifying improper or fraudulent billing activities in health care is not easy to identify nor validate. As a result, it requires a highly specialized and often customized technology approach.

Pairing the advanced capabilities of machine learning with in-depth health care knowledge will yield meaningful payment integrity results. Together, these capabilities gather insight from the complex data and myriad variables that exist in the health care payment process. This approach is necessary because of all the factors involved in evaluating the likelihood of inaccurate or inappropriate payments:

- How a patient is treated

- Which medical decisions are made

- Whether these decisions are in line with other claims made in similar situations and in comparable settings

Health plans that effectively leverage machine learning technology and extensive data assets can lower claims risk, reduce provider abrasion, and realize much higher savings.

How is detecting improper billing, suspicious behavior and fraud different in health care versus other industries?

In the last ten years, technology companies have repeatedly tried to replicate practices that were successful in identifying fraud in other markets such as financial services or telecommunications. But these practices have not worked in health care. For example, a credit card company uses customer information and spending habits to determine questionable or fraudulent activity. Are charges excessive for the cardholder's income? Do charges appear uncommon for the person's age range or gender? Are charges made in locations that the person often visits? Health care is much more complicated. There are multiple variables to consider when deciding whether a medical claim is accurate and if the claim should be further investigated.

These factors include:

Member information

Is the member eligible to receive services?

Provider information

Provider location to member
- How many miles away is the provider from the member?
- Are there many other similar providers much closer to the member?

Provider group information
- Who does the member work with in this group?

Provider specialty information
- Does the service provided make sense for the provider's specialty?

The complexities of health care

Detecting fraud in health care is much more complicated than detecting credit card fraud. There are many variables to consider when deciding whether a medical claim is accurate and if the claim should be further investigated.

Procedure/service information

There are more than 300 health care service codes (e.g., CPT codes) that define the actual service provided by the provider. These CPT codes help drive how much the provider can charge for their service.

- Does the health care service submitted on the claim make sense for the member's age and gender?

- Is the service a covered service under the member's plan?

Diagnosis information

There are more than 85,000 diagnosis codes. Each code signifies a health condition, which describes how sick a member is and how much a provider should charge for their services.

- Does the diagnosis on the claim match the service that was submitted on the claim?

Claim matching/trending

- Are there historical claims for this same member, provider or service that make this claim questionable?
- Are there similar claims that indicate this claim may be part of a trend of abusive or wasteful utilization or billing behavior?

Modifier usage

Are there modifiers that are appended to the claims that could make the claim inaccurate or pay differently?
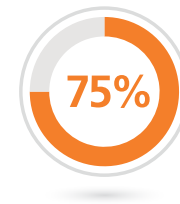
There are many data points that must be considered. To improve payment integrity, plans must use technology solutions with extensive health care claims data assets and a deep understanding of the health care system. Optum health care data assets span more than 20 years and cover roughly 240 million de-identified lives. This constitutes approximately 75% of the U.S. population. Our information spans provider data, member data, clinical data, claims data and employer benefits data. It's used to foster innovation and research across the health care system.

75%

Optum health care data assets span approximately

75% of the U.S. population.

What is machine learning and how can it help?

How can we address the questions above to make palpable progress against the tremendous amount of waste and improper billing occurring in the health care industry? It requires a method of data analysis that automates detection of new analytical insights — machine learning. Machine learning uses algorithms to systematically examine millions or billions of lines of data on a daily basis while iteratively "learning" from previous actions/ results. This allows computers to find hidden analytical signals without being explicitly programmed where to look. When applied to the health care system, machine learning is an invaluable tool. It can be used to exponentially widen the net of what is being examined within health care claims, accelerate the process and improve predictive scoring models.

In the past, health plans have addressed payment integrity problems with traditional rules-based systems. These systems are myopic. They only look for known patterns and often just at the specific provider data on a claim for the date on which the service is provided. To more accurately assess the risk of the claim being incorrect, machine learning exponentially expands the criteria under consideration to include:

- Provider's billing history
- Provider's relationship to the plan member
- Member's clinical history
- Provider comparison to peers

What is OptumIQ?

OptumIQ™ is an integrated, modern data and analytics architecture that takes a holistic approach to analytics. It's built on unmatched data, powerful technology and the health care expertise that comes from being one of the world's largest employers of health data scientists. In other words, it helps Optum amplify the intelligence of its solutions and convert data into insights.

OptumIQ is guided by data, analytics and expertise assets in the following ways.

Curated data

OptumIQ data resources are vast:

- 240 million lives
- 11 billion lab results
- 5 billion procedures
- 4 billion diagnoses
- 20 years of claims payment history

And data are continually enriched, validated and refined to create a circle of insights that build over time.

Powerful analytics

Provider, payer and employer analytics allow for advanced predictive models that detect fraudulent claims and reduce false positive rates. Optum is the first in the market to use machine learning, and employs variation, outlier and activity monitoring capabilities.

Health care expertise

More than 25,000 technologists, data scientists, actuaries and clinicians — including 5,000 payment integrity experts — are reviewing and evaluating data in the health care context. Our unique data assets offer health plans the ability to look beyond their own four walls and leverage insights into questionable billing activities for their own benefit: maximizing savings while minimizing provider abrasion.
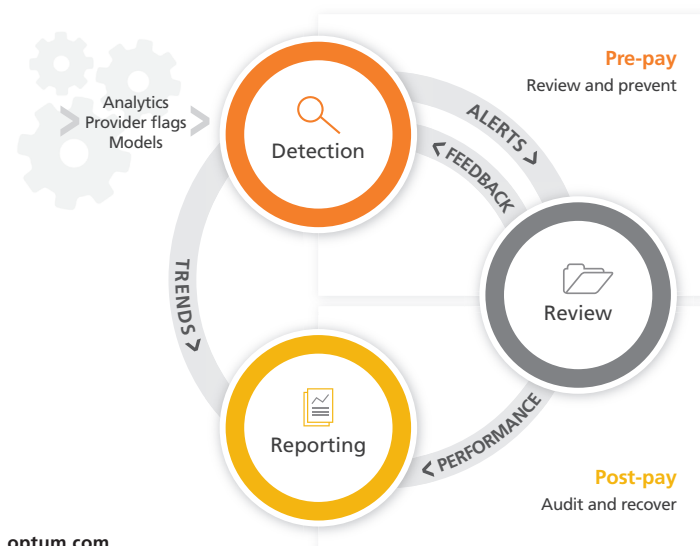
The OptumIQ machine learning approach to resolving plans' payment integrity concerns includes analytics, provider flags and predictive models. This approach detects, reviews and reports opportunities for pre-payment prevention and for facilitating post-payment audit and recovery efforts. Plans start with unsupervised models, which generate value until they have built up historical data. They then move rapidly into supervised models via an ongoing feedback loop of review results.

OptumIQ™ puts AI to work in health care.

This unique combination of data, analytics and expertise goes into every Optum solution.

Learn more at **optum.com/iq**

Pre-pay
Review and prevent

ALERTS

FEEDBACK

Analytics
Provider flags
Models

Detection

Review

TRENDS

Reporting

PERFORMANCE

Post-pay
Audit and recover

Optum can start with unsupervised models when the information needed to train a supervised model is neither classified nor labeled. Unsupervised models use sophisticated anomaly detectors to study patterns that can indicate a hidden structure in unlabeled data.

When a claim is flagged for further investigation, it receives a label, which contributes to the training data set for a supervised model. Under supervised machine learning, algorithms apply what has been learned in the past to new data using labeled examples to predict future events. Starting from the analysis of a known training dataset, the learning algorithm produces an inferred function to make predictions about the output values. Claims and medical record review operations uncover new payment issues beyond those targeted by unsupervised models and add those to the feedback loop. So the supervised models can detect a broader range of improper payments in addition to being more accurate.

At Optum, there are two levels of supervised models:

1. A semi-supervised, line-level model that builds upon unsupervised models and flags claims likely to be denied with higher savings

2. A claim-level comprehensive supervised model aimed at waste, abuse and error claims that may or may not be detected by another model

OptumIQ models get "smarter" as they process more claims data, quantified by improved "true positive" rates and higher savings per claim. A machine learning model evolves and matures as it gains more claims data experience with each particular customer.

"Optum has the ability to understand and interpret the claims situation before the claim is paid and bring advanced analytic solutions to bear on any problems," says Pat Ross, vice president of payment integrity for Optum. Ross says Optum IQ "is really transforming the way we attack any type of payment integrity concern."

This evolution is the key to better outcomes. When an OptumIQ model progresses from unsupervised to supervised, the supervised model can yield:

- 50% improvements in the "true positive" rate
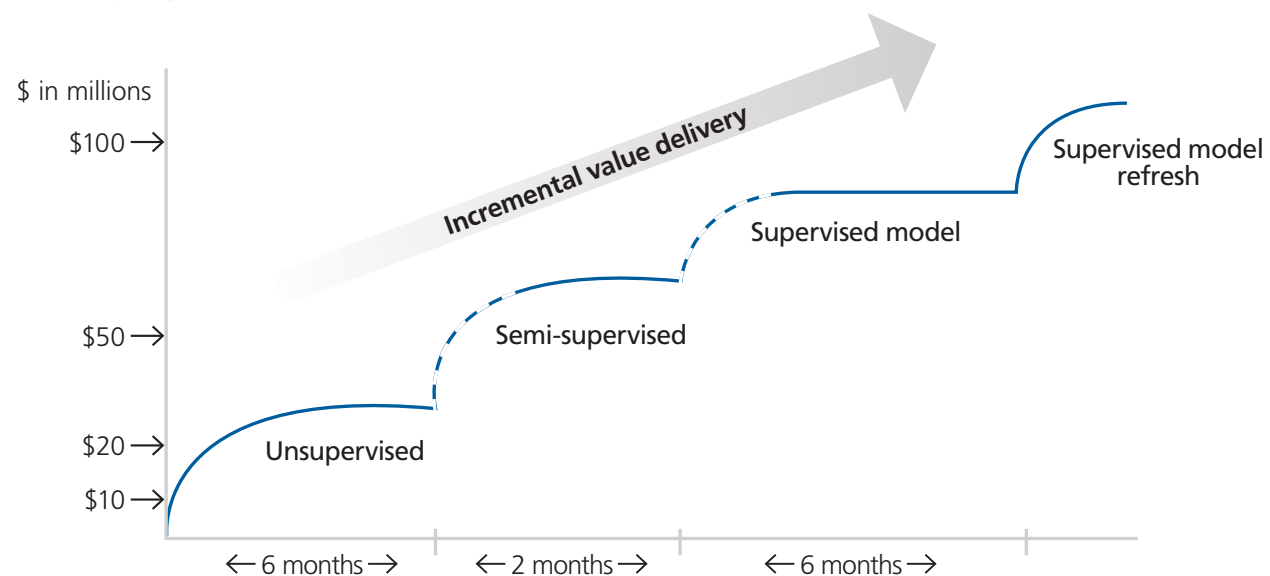- More than a 100% improvement in savings per claim

This drives much higher savings from even a mature claims review process. Consistent and continued improvement of true positive rates and savings per claim amounts are key performance indicators that all health plans should utilize when evaluating the value of their prepay program.

Maximize savings and efficiency

As our prepay customers mature, we collect more information on historical effectiveness of our analytics.

- We can use this information (called "labels" or "tags") to improve our models.

- Our initial model is unsupervised (that is, no labels/tags available).

- After we have accumulated enough historical labels data, we are able to add supervised models to our model portfolio.

Incremental value delivery

$ in millions

$100 →

$50 →

$20 →

$10 →

Unsupervised

Semi-supervised

Supervised model

Supervised model refresh

← 6 months → ← 2 months → ← 6 months →

OptumIQ marries innovative technology with actionable intelligence

The successful application of machine learning and predictive models will deliver significant savings for health plans. This goes above and beyond the savings that are being generated by typical payment integrity solutions such as claims editing, overpayment recoveries and other prepay offerings. Typical incremental savings ranges from $7 per member per year to $35 per member per year.

For example, in 2018 Optum supported a regional health plan customer with approximately 2 million members and an annual savings target of $29 million. The actual 2018 savings achieved were $42 million and the savings for 2019 are estimated to be $65 million. Also, the average savings per claim reviewed improved more than 200% as the predictive models evolved from unsupervised to supervised, getting "smarter" with more plan-specific experience. OptumIQ provides plans with increased payment integrity savings and improved systems that work smarter with fewer resources.

In summary, the effective application of machine learning can help health plans transform how they approach payment integrity. It is important to combine advanced technology techniques such as machine learning with deep knowledge of health care, both through the use of health care resources who understand the complexities of health care as well as access to extensive health care data assets. The value transcends across all stakeholders in health care, maximizing savings for health plans while also educating providers on appropriate billing methods.

Optum has been at the forefront of developing high-value machine learning technology for health plans, developing our first predictive models in 2009. We realized the value of developing a cost avoidance strategy and technology platform that assesses the risk of improperly billed claims before the claim is actually paid. As a result, Optum generates more than $14 billion in savings per year for our health plan customers and machine learning is an integral part of the value we provide to our customers.

Learn more about the innovations Optum is making in payment integrity.

Email: empower@optum.com
Visit: optum.com/paymentintegrity

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With **OPTUM IQ**™