



Case Study:

AI-Informed Early Warning for Healthcare Bill Non-Payment

How a healthcare provider used data technology to significantly reduce the non-payment of medical bills by their patients.



400% IMPROVEMENT IN
CORRECTLY IDENTIFYING
NON-PAYERS

25% REDUCTION IN
NON-PAYING
CLIENTS

^ SIGNIFICANT ENHANCEMENTS
TO THE DATA POOL &
ANALYTICAL PROCESS

In America's insurance-based healthcare system it can be difficult to accurately predict ongoing medical billing costs. Furthermore, patients' ability to pay is notoriously challenging to assess, as is their risk of eventual default on payments, since this depends upon many factors that lie beyond the purview of a healthcare provider.

From patients' perspectives, it's all too easy to fall into debt. A recent KFF poll found that **over half of respondents** had recently fallen into debt due to the cost of healthcare. In 2021, research by Stanford economist **Neale Mahoney estimated healthcare debt at over \$140 billion**. As Mahoney put it, "When you think about financial distress — debt collectors calling and knocking on doors of households — our research shows that more than half the time now, it is about medical debt."

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ABOUT THE CLIENT

Industry: Healthcare
Patients: 10,000+
Annual Revenue: \$2B+

CHALLENGES

- Low correlation between risk scoring and bill default rate of patients.
- Millions of data points across multiple variables still insufficient.
- Untenably high default rates putting pressure on an already challenged AR dept.

SOLUTION

- Proprietary Feature Factory AI applied to the data pool
- Increase in both size and depth of the data pool, including multifactorial data.
- Machine Learning and AI used to identify non-payment risk patterns.
- High speed data analysis allowed different risk cohorts to be identified.

The KFF's Survey of Income and Program Participation in 2022 indicated the problem could be even worse, suggesting that Americans owe over \$195 billion in medical debt and reporting that around 3 million people (around 1%) owe sums over \$1000.

From a healthcare provider's perspective, this scale of unmet financial commitments cannot be borne lightly. A 2018 study in Wisconsin found that **lawsuits by healthcare providers over unpaid debts had increased by 37% since 2001**. Many of the delays are understandable since there's often a complex process of negotiation between insurers and patients regarding what's covered by each policy.

However, it's untenable for a provider to shoulder the burden of a mountain of unpaid debt on an ongoing basis. The COVID-19 pandemic exacerbated the existing problem, putting further pressure on hospitals' Accounts Receivable departments. **One survey revealed that around 48% of hospitals were dealing with a significant increase in patient debt**. Additional changes to health insurance administration and an ongoing financial downturn further deepened this crisis. It became vital to become better at financial risk management in patient bill payments.

CLIENT CHALLENGES

An Impoverished data set

The client, a major healthcare provider, already had predictive systems in place to assess which patients were likely to default on their bill payments. However, these methods did not perform particularly well, in part due to the conservative data pool and lack of depth within existing data.

However, expanding the data pool significantly might create untenably lengthy analysis processes, rendering the exercise impossible to integrate into existing administrative procedures.

Extent of the Debt Burden

Within a few months of patients receiving their first bill, the client discovered that 20% had already fallen into arrears. Although there were delays in processing bills due to medical coding complexity or error, the client wasn't seeing a correlation between this and patient non-payment. The truth was evidently much more complex.

The client was also having trouble identifying which patients had a high risk of defaulting on their bill payments. The healthcare provider had a target in mind, however: to reduce late payments by 25%. This would bring their debt burden back within manageable parameters.

Public Relations Challenges with Debt Recovery

When patients fall into default during an economic downturn following a global pandemic, the “optics” on aggressive debt recovery tactics aren’t on a healthcare provider’s side. Consider one article in Propublica, which notes that “the poor or uninsured often bear the brunt of such actions, said Christi Walsh, clinical director of health care and research policy at Johns Hopkins University.”

Given the potential bad press and moral complexity of pursuing bad debt, it was therefore imperative for the client to find a solution which allowed them to adopt subtler, more empathic outreach tactics.

If the client could identify high-risk patients prior to them defaulting on payments, they could apply reimbursement plans which were far more manageable, protecting both revenue and their corporate reputation, whilst being kinder to patients in challenging circumstances.

WHY DOTDATA: AN AI-POWERED SOLUTION

dotData was able to propose an effective data analytic approach. By applying predictive analytics and machine learning to a multifactorial and vast data pool, correlations would be found. dotData’s proposal was both to increase the absolute size of the client’s data pool and also the number of data sources drawn upon.

These new data sources included patient demographics, physician information, insurance details and medical specialities. By adding these additional data points, dotData significantly increased the total count of data sources and individual data points, which now numbered into the millions. However, the volume of data remained within the capabilities of dotData’s AI systems.

The intention was to derive clear signals within the data so that accurate propensity-to-pay models could be created, broken down by patient cohort. By doing so, approaches to debt recovery could be tailored more effectively to each patient group.

Whereas previously such an approach would have been prohibitively slow and complex, dotData were confident that their methods would provide the best opportunity to achieve the client’s ambition of a 25% reduction in overdue payments.

How dotData used Analytics and Machine Learning for Pattern Identification

dotData’s Feature Factory was their chosen tool for data analytics, due to its ability to run

RESULTS

- Patterns identified which were high indicators of default likelihood.
- 400% increase in accuracy of bill payment default.
- Stratification of risk profiles made possible, allowing targeted outreach.
- 25% reduction in debt non-payment achieved.
- Data analytic process established which could readily be repeated.

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multifactorial pattern recognition on very large data pools. The Feature Factory AI studied these higher dimensional datasets and quickly discerned new patterns of data which correlated with overdue payments.

While previous systems might have taken weeks to thoroughly comb through the required millions of data points, Feature Factory was able to manage it within a matter of days. This gave dotData's AI a significant advantage over legacy analytics – it could be repeated on an ongoing basis, rather than applied as a “once and done” solution.

Patterns in the Data Emerged with Clarity

Among the important signals in the data were the following patterns:

- Some patients displayed repeated non-payment behavior.
- There was an obvious correlation between the size of the total payment owed and delayed payments.

These two insights, among others, made it easier for the client to derive bespoke advance strategies to contact patients at high risk of late - or non-payment to offer new payment plans or strategies. The revenue protection outcomes were significant, and the client achieved its stated aim of a 25% reduction in defaults.

SIGNIFICANT IMPROVEMENTS IN THE DEBT RECOVERY PROCESS

dotData's models achieved a 400% increase in the accurate identification of patients who required follow-up to avoid falling behind in their payments. High risk patients could be scored much more accurately in terms of default probability.

The client's business team was able to integrate dotData's results into their patient outreach tools and systems. The healthcare organization began to proactively call high risk patients to discuss their bill repayments before any default occurred. In so doing, they would offer various repayment plans which made it easier for these struggling patients to afford their scheduled payments.

Other patients were identified early enough in their treatment that they could be persuaded to pay in situ during their visits, rather than later following invoicing. dotData's models accurately identified 50% of patients who would not pay in full prior to the due date of their debt. From those patients so identified, the client selected the most high-risk 10% for proactive follow-up.

The final effect of these procedural changes was a 25% reduction in overdue payments, constituting a considerable administrative saving. Furthermore, the process could be integrated permanently into the healthcare providers billing procedures.

RESULTS

- 400% improvement in the correct identification of non-paying patients.
- 25% reduction in non-payments.
- Significant enhancements to the data pool and analytic processes.

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About dotData

dotData solves the biggest challenge of organizations of any size: Turning raw business data into valuable and meaningful data marts ready for Machine Learning (ML), Artificial Intelligence (AI), and traditional data analytics deployments and applications. dotData provides solutions tailored to the needs of companies that are just getting started with predictive analytics and companies with more mature data engineering processes. Our core technology allows companies to automatically convert data from data warehouses and data lakes into data marts and feature tables by exploring the relationships between varied data tables with hundreds of columns and millions of rows. Our global customers have used our platforms to accelerate their ML, AI, and Advanced Analytics adoption, achieving rapid ROI by lowering their dependence on scarce, costly expert resources.

Forrester recognized dotData as a leader in ML and AI in 2019, and CRN named dotData to its emerging vendors' list in for four years running and was named a CB Insights Top 100 AI Startups for 2020. The AI breakthrough awards recognized dotData as the "best machine learning platform" for 2019, and Fortune 50 clients around the Globe rely on dotData to help them accelerate their ML, AI, and Advanced Analytics projects. For more information, visit www.dotdata.com, and join the conversation on Twitter and LinkedIn.