Case study

reveleer

National health network pilot study: AI Decreases Labor Costs and Increases Efficiency in Value-based Analytics, Workflows, Documentation, and Coding

Shortage of coding and documentation integrity (CDI) professionals raises the urgency of identifying new ways to leverage AI

Nearly half of all health care reimbursement currently flows through shared savings, shared risk, bundled payment, population-based payments, or integrated finance and delivery system payments.[1] Government programs specifically use the hierarchical condition category (HCC) risk-adjustment (RAF) model to appropriately pay insurers and providers based on the illness burden of the population served.

To comply with the Center for Medicare and Medicaid Services (CMS), provider organizations continue to make major investments in systems and processes to ensure physicians are correct and thorough in their risk-based documentation, coding, and management of pertinent patient conditions. Many of these support systems entail a blend of information technology and dedicated human coding and documentation integrity professionals. Due to the national health care workforce shortage,[2] CDI professionals are increasingly difficult to find and resulting labor costs are escalating,[3] placing undo stress on provider budgets.[4] It is becoming urgent to identify new and better ways to leverage technology. The healthcare industry must find ways to ensure human professionals work efficiently and at the top of their license.

Key takeaways

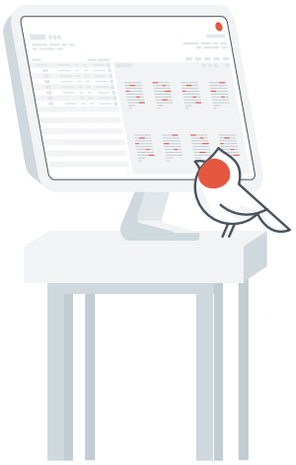
Reveleer's AI integrates directly into the networks EMR, in combination with human CDIs to surface suspect conditions for physician consideration

Reveleer partnered to co-design the study with the health system to test the optimal combination of AI and human involvement in documentation and coding

Results showed **a 50+% efficiency improvement** among the test's "CDI Select" cohort

Resource constraints **prompted a pilot program to expand the role of artificial intelligence (AI)** in supporting physicians with documentation and coding

Facing shortage and prohibitive cost of CDI professionals, national health network engages with Reveleer to test expanded use of AI in risk-based analytics and workflows



Headquartered in the southeast, the health network manages over 650,000 lives under risk contracts with 8,200 beds, 1,200 outpatient locations across 9 states. They partnered with service and technology provider, Reveleer, for value-based care analytics, documentation, coding, and care team information support.

In the spring of 2022, the non-profit health system experienced a major personnel shortfall and operational direct-cost overruns related to the scarcity of CDI professionals. Reveleer was in the process of redesigning its current platform to continue to provide highly accurate information with the use of fewer CDI professionals. Leaders worked with Reveleer to design a pilot that would test a new way of leveraging the artificial intelligence (AI) in the Reveleer Platform. The goal was to determine whether the AI could be used to greater effect–making more efficient use of scarce and costly CDI professionals' time–without compromising clinical quality, information accuracy, and physician experience with the overall information and workflow support that they receive.

Overview of the Reveleer Platform

As deployed, within the health network, the Reveleer solution consists of three components[5]: (1) A pre-visit analysis of each patient in which the Reveleer Platform sorts through broad sets of data to identify potential clinical conditions to be addressed. This output is then reviewed by CDI nurse professionals for appropriateness and completeness before presentation to the providers. (2) The resulting clinical insights are then available as a visit preview/opportunity summary, integrated into the EMR, at the point of care. In this visit preview step, the platform flags both existing and potentially new conditions for providers to consider addressing, (especially 'hierarchical category conditions' or HCCs that put patients at risk of further complications or avoidable admissions). (3) Post-visit services are then conducted to verify clinical documentation correctness and thoroughness. The health system provides a highly-trained team of professional coders on the back end to review the documentation provided in each case to ensure documentation and coding integrity prior to the bill being released to the payer.

The general measure of the Reveleer solution's success is its effectiveness at processing large amounts of data in the electronic medical record, surfacing the most salient information, and then filtering and prioritizing that information to highlight the highest-merit information items for physicians, following the principles of data minimalism.[6]

The Reveleer solution combines technological and human elements in the following way:

The technology solution behind Reveleer uses artificial intelligence (AI) to process massive amounts of data about the patient and pull forward potentially relevant opportunities.

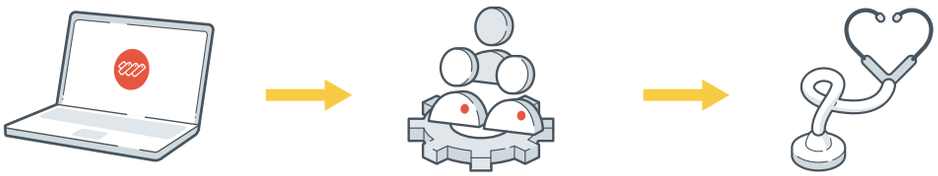
Clinical documentation integrity (CDI) professionals clean and organize the opportunity list prior to sending to physicians to prepare for the patient visit. Reveleer also supports additional documentation and compliant queries.

The test:

Three cohorts to calibrate the right mix of technology and CDI time

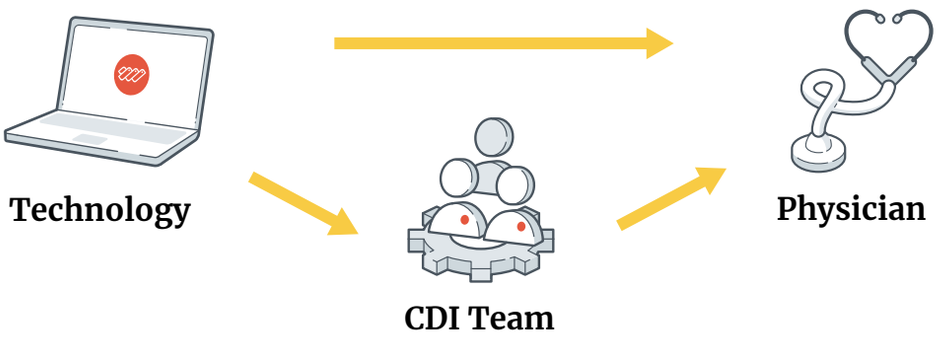
To test the efficacy of tightening the evidence threshold in the rules built into the Reveleer platform, together with maximizing the use of human CDIs, the health network and Reveleer designed a four- month experiment. Three workflow cohorts were created.

Cohort 1 'Control Group' (CDIs review all/existing legacy system)



Cohort 2 'Tech only'

Cohort 3 'CDI Select'



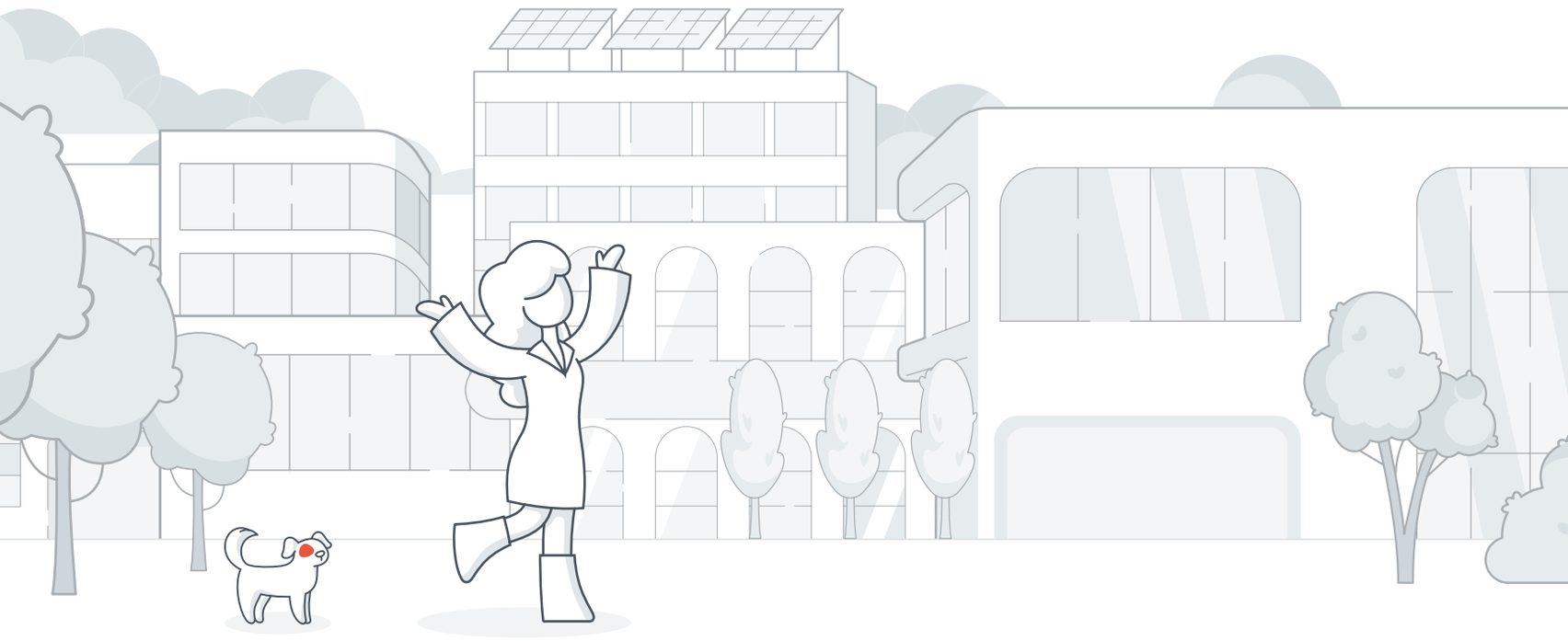
The platform used AI to surface and send evidence for high-confidence qualifying conditions only and then selectively sent them either to physicians directly or to CDIs for pre-visit review (putting 50% of visits in each category). The briefs on patient visits that the AI determined to be the most straightforward were sent to physicians directly. However, the briefs that the AI determined needed human pre-visit processing were sent for CDI review. In this cohort, CDIs saw fewer (better prioritized) total opportunities than they did in the control group. Thus, this cohort used the enhanced version of the Reveleer platform and an algorithm to route more difficult cases only for CDI Nurse Professional review on the front-end.

The Metrics of Success:

Information Quality, Not (Just) Quantity

In assessing the 'tech only' and the 'CDI select' cohorts' performance against the control group, system leaders and Reveleer looked primarily at HCC capture, or 'provider acceptance' rate. This metric indicates the cleanness and correctness of the information that reaches the physician prior to, or during the visit. The appropriateness of HCC capture was validated on the back-end through the 100% review by the health network's post-visit review coding team to ensure both under- and over-coding was prevented.

HCC capture rate (or 'provider acceptance' rate) tracks the clinical relevance of the opportunity lists sent to physicians–and also to the CDIs, if they are reviewing the record ahead of the visit. It essentially demonstrates how accurate the system is in identifying care gaps by noting the rate at which the potential conditions are confirmed by the physician during the visit and the post-visit review. Strong performance on HCC capture rate indicates that neither CDIs nor physicians are being overwhelmed with long lists of low-merit possibilities–and that care team attention is going to the clinical conditions that are most likely to need active management to support high quality patient outcomes.



The Results:

‘CDI Select’ Is the Winner

The percentage of HCCs captured per patient was significantly higher in the two cohorts that had tighter prioritization rules in place; and, the ‘CDI Select’ cohort (#3), in which the AI in the Platform did selective routing to a human CDI, performed best overall.

Physicians did not report any user-experience issues related to the selective routing approach.

Comparative Performance of Curation Health Cohorts

(February 2022-June-2022)

Success Metric	Cohort 1 Control Group	Cohort 2 ‘Tech Only’	Cohort 3 ‘CDI Select’
Percentage of HCCs captured on Outgoing Claim (Provider Acceptance Rate)	Baseline	17% increase over baseline	52% increase over baseline
Average Number of HCCs Captured Per Patient	**Baseline**	**26% increase over baseline**	**55% increase over baseline**

Cohort 1 n= 1,228 patients with 1,451 completed encounters, Cohort 2 n=2,820 patients with 3,603 completed encounters
Cohort 3 n - 1,992 patients with 2,458 completed encounters

Results From Tests of Statistical Significance*

Test	Purpose	Equation and Variable Descriptions	Results
Chi-square test of independence	Tests the relationship between two categorical variables. In this case, those variables include the patient’s cohort (predictor variable) and whether an HCC presented in the encounter was captured (outcome variable)	$X2 = \sum(Oi - Ei)2/Ei$ Oi= observed value E1= expected value	Chi-square: 49 P value: 2.60E-11 Statistically significant**
Kruskal-Wallis H	Tests the relationship between a categorical variable with 3+ groups and a quantitative variable. Respectively, those variables are the patient’s cohort (predictor variable) and the volume of HCCs captured in a given encounter (outcome variable).	$H = (12/n(n+1) \Sigma (R12/n1) - 3(n+1)$ n1=number of observations in each sample (“i”) n=total number of observations in all samples Ri = sum of the ranks for each sample (“i”)	H statistic: 19.51 Chi-square: 9.21*** P value: .0000581

*Based on performance from encounters through 4/12/2022 **Considered statistically significant when the test statistic is greater than the critical value (e.g., chi-square) and/or the p value is less than 0.05 ***Assumes a significance level of 0.01

Technology

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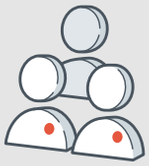

Human Expertise

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55%

Increase in HCC Capture Volume Per Patient

52%

Increase in HCC Capture Rate/ Provider Acceptance Rate

Commentary:

The increase in total HCC capture rate was attributed to a more succinct, high-merit-only presentation of information for physicians, which helped prevent legitimate care gap opportunities from accidentally becoming lost in the noise.

“This is about value creation,” said Vice President and Chief Medical Officer. “What we are getting are better results and, at the same time, we found we were twice as efficient with our CDI Nurse Professional resources.”

“This was the first group that was interested in doing this with us. They enabled us to develop this really advanced approach to load balancing,” said Kevin Coloton. “Now that we have identified how we can load-balance pre-visit work, that opens a new world of possibilities for us to serve clients of all sizes and complexity. Because we can tailor our tech to meet their priorities and their existing resources and scale up and down based on their evolving needs.”

References:

1 “40.9% of health care dollars in a composite of Categories 3 & 4 (e.g., shared savings, shared risk, bundled payment, population-based payments, integrated finance and delivery system payments)”. Source: Health Care Payment Learning & Action Network. “Measuring Progress: Adoption of Alternative Payment Models in Commercial, Medicaid, Medicare Advantage, and Traditional Medicare Programs.” December 15, 2021. Available at: https://hcp-lan.org/apm-measurement-effort/2020-2021-apm/#1638982499890-78a9577c-d60c

2 “About 203,200 openings for registered nurses are projected each year, on average, [from 2021 to 2031]. Many of those openings are expected to result from the need to replace workers who transfer to different occupations or exit the labor force, such as to retire.” Source: Bureau of Labor Statistics. “Occupational Outlook Handbook: Registered Nurses.” Last modified Thursday, September 8, 2022. Available at: https://www.bls.gov/ooh/healthcare/registered-nurses.htm

3 “[As of May, 2022] Hospital labor expenses increased by more than one-third from pre-pandemic levels”. Source: Kaufman Hall. “The Financial Effects of Hospital Workforce Dislocation: A Special Workforce Edition of the National Hospital Flash Report,” May 2022. Available at: https://www.kaufmanhall.com/insights/research-report/special-workforce-edition-national-hospital-flash-report

4 “Hospitals reported median operating margin of -0.98 percent in July, 2022.” Source: Swanson, E. “National Hospital Flash Report,” Kaufman Hall, August 2022. Available at: https://www.kaufmanhall.com/news/hospital-financial-performance-sputters-after-months-improvement

5 Reveleer. "Clinical Intelligence Solution". Available at https://www.reveleer.com/solutions/clinical-intelligence

6 Curation Health. ‘The Case For Data Minimalism’. June 4, 2022. Available at: https://curationhealthcare.com/data-minimalism/