

DiagnosisOne Case Study:

Leading Northeast based Health Plan Studies the Ability of Clinical Decision Support to Impact Patient Care

Organizations: A leading Northeast based health plan with more than three million members and a large group practice with over 500 physicians.

Challenge: Improving patient health and safety while reducing costs by analyzing lab enriched claims data to identify and alert care providers to patients with significant gaps in care, including those at high risk for cancer

The Solution: DiagnosisOne’s smartPath Clinical Decision Support and Analytics Platform

Results:

- Cost reduction of between \$400 and \$800 per patient, per year for claims paid, based on addressing gaps in care.
- Automated identification of cases with quality concerns by applying DiagnosisOne’s smartPath algorithms to a clinical and claims database.
- Interventions with clinicians and patients to improve the quality and safety of care for high risk cases and reduce the risk of professional liability.
- DiagnosisOne alerts were found to be 100-percent accurate, and more than half (55 percent) pointed to quality concerns that were significant enough to require care provider intervention.

According to the American Cancer Society estimates, 1.5 million new cancer cases were predicted in the U.S. in 2010, while the National Institute of Health estimates that the overall costs of cancer in 2010 were over \$263 billion. A leading private health plan in the Northeast sought to evaluate the ability of Clinical Decision Support (CDS) technology to analyze care gaps, perform patient safety surveillance and to deliver alerts to help physicians direct appropriate medical attention to patients most at risk.

The DiagnosisOne Challenge

The health plan turned to DiagnosisOne, a leading provider of clinical decision support and analytics solutions, who conducted a two-phase study sponsored by the health plan to prove the efficacy of DiagnosisOne’s smartPath solution in improving patient safety and reducing costs. This study covered over 77,000 patients over a period of 18 months and consisted of a retrospective study followed by a prospective study.

Phase One – Leveraging CDS for Retrospective Study of Claims Data

For the first phase of the study, DiagnosisOne’s smartPath CDS system was used to perform a retrospective study based on anonymized patient claims data enriched with laboratory data. smartPath is the only technology solution that integrates end-to-end data capture, decision support, intervention and reporting platforms into a unified environment.

DiagnosisOne was provided a set of claims, lab and pharmacy data by the insurer. This data was analyzed using the smartPath CDS engine. The data consisted of:

- 90,139 medical claims
- 82,025 pharmacy claims and
- 2,537 lab claims with lab results.

These claims were generated by 9,753 unique member numbers over approximately a 12 month period.

The high level summary of results we obtained is as follows:

- 62,915 alerts off of 9,491 unique patient profiles.
- 116 rules activated out of 250 rules used
 - 66 panic alerts
 - 1,947 critical alerts
 - 3,934 recommendations
 - 9,299 pay for performance alerts
 - 19,562 warning alerts
 - 28,106 Informational alerts

1. Approximately 97% of the claims records generated some sort of an alert. The distribution of the alerts is shown in the figure below.

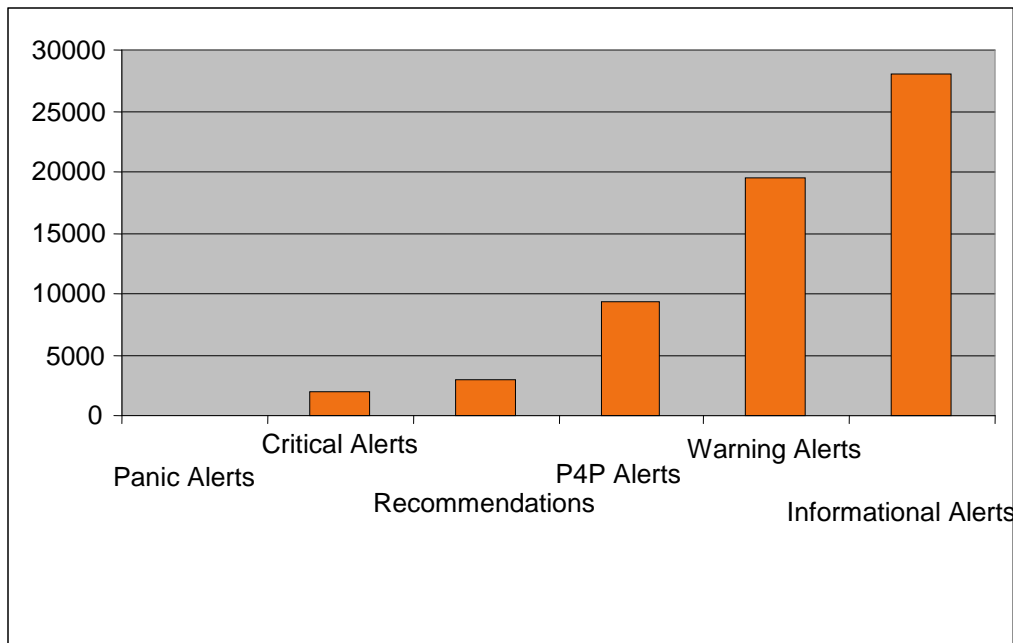
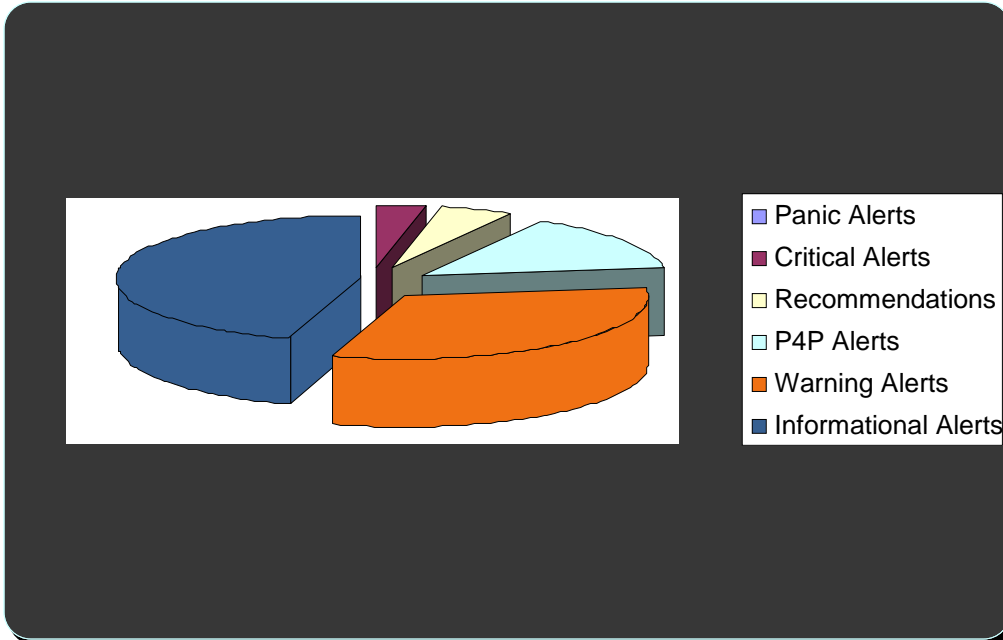


Figure 2: The distribution of the various types of guidelines generated by our Clinical Decision Support engine.



2. About 0.1% of patients (0.1 % of alerts) generated Panic Alerts. These include:
 - a. 67 claims missing important lab tests to monitor drugs that can be potentially harmful to the patient for example a missing INR to monitor Warfarin.
3. About 11% of patients (3% of the alerts) generated Critical Alerts. These include:
 - a. 199 claims with missing Prescriptions for the indicated diagnoses.
 - b. 1,745 claims with missing Investigations for the indicated diagnoses and/or previous Procedure (inc. labs) results.
4. About 34% of the patients (31% of the alerts) generated Warning Alerts, including
 - a. 10,161 alerts were generated by missing Prescriptions for the indicated diagnoses.
 - b. 8,804 missing Investigations (such as Microalbumin for a Diabetic) for the indicated Diagnoses.
 - c. 578 missing lab tests to monitor medications.
5. About 28% of patients (6% of the alerts) generated Recommendation Guidelines, including:
 - a. 2,424 claims with missing Prescriptions for the indicated diagnoses
 - b. 677 claims generated missing Investigations for the indicated diagnoses.
6. About 81% of the patients (15% of the alerts) generated Pay for Performance alerts.
 - a. 9,299 were pay for performance alerts. We ran only a few P4P rules at this time.
7. About 86% of patients (45% of the alerts) generated Informational Guidelines such as:
 - a. Utilization suggestions (52% of Patients)
 - b. Alternate drug suggestions, clinical notes regarding laboratory values etc.

DiagnosisOne’s smartPath CDS system leverages a knowledge base comprised of the world’s largest, most robust collection of evidence-based care rules, combined with powerful analytics. These rules incorporate

triggers that are based on patient demographics, age, sex, vital signs, state, status, as well as previous and present test results, diagnoses and medications. Using the claims data, the DiagnosisOne CDS system was leveraged to search for patients that met specific criteria.

Using this and similar sets of criteria, the DiagnosisOne smartPath CDS system identified potential cases of delayed diagnosis of cancer and alerted the quality reviewer at the medical group. Then a detailed chart review was undertaken that displayed the gaps in care and necessary follow-up care scheduled for the patient.

Phase One Results: Cost Savings Revealed

After identifying the gaps in care, the DiagnosisOne analysis then used the data to estimate the potential cost savings that would have been realized if the gaps were filled. The results showed that alerts would have reduced the claims paid for these patients between \$400 and \$800 per patient per year.

Phase TWO: Surveillance Based on “Enriched Claims Data” to Determine Accuracy and Appropriateness of Treatment

In the second phase of the study, a Massachusetts physician organization used DiagnosisOne’s smartPath CDS system to perform patient safety surveillance based on “Enriched Claims Data” from the health plan that incorporated pharmacy and lab data. This surveillance covered both cancer and certain high profile chronic conditions.

The alerts and guidelines generated by smartPath were delivered to a quality control group within the physician organization, which then randomly selected some of them for a manual review of the patient’s EMR. The records were analyzed for both accuracy and appropriateness, and alerts were then delivered to the appropriate care provider for final disposition.

Cancer Surveillance

Cancer surveillance must draw upon multiple sources of information, including existing diagnoses and procedures, genetic predisposition, environmental and behavioral risk factors, as well as a patient’s screening practices. This project used the DiagnosisOne CDS engine to analyze drugs, tests and conditions based on claims data to generate alerts for patients who were identified to be at risk for cancer.

The search targeted patients who are at risk for one of four common cancers - breast, lung, cervical and colon - and who may not have received an appropriate follow-up after an initial symptom or “trigger” diagnosis. For example, a set of search criteria was specified for patients over 35 years of age who presented with Hemoptysis (blood in the sputum). It further focused on patients who did not receive a PET scan or other similar procedure more than 9 months after the original diagnosis of Hemoptysis, and no other cause of bleeding--such as tuberculosis--had been identified.

Using similar criteria for patient evaluation as those described in the first phase of the study, the smartPath system identified potential cases of delayed diagnosis of cancer and alerted the quality reviewer at the medical group. Then a detailed chart review was undertaken and necessary follow-up care was scheduled for the patient.

The following table summarizes the results of the analysis for some of the alerts generated. It lists the total number of patients that presented with a condition or profile that was of interest to the payer and the provider and the number of times the alert was triggered for that presentation. As the table shows, trigger rates varied widely between presentations from about 5 percent to over 45 percent.

Target diagnoses and triggering rule	# of Times Target Diagnosis Presented	# Cases Triggered when Target Diagnosis Occurs	Triggered Cases : Target Dx Cases
Breast Mass follow up	762	37	37/762 = 4.9%
Hemoptysis	42	19	19/42 = 45.2
Hematuria	578	80	80/578 = 13.8%
INR testing not performed for patients on Warfarin	290	67	67/290 = 23.1%
Cardiac patients not on Beta Blockers/Ace Inhibitors	1458	337	337/1458 = 23.11%
HTN patients not on Beta Blockers/Ace Inhibitors	19769	2558	2558/19769 = 12.9%
HbA1c/Eye Exam not performed for diabetics	7968	739	739/7968 = 9.3%

Ten percent of the alerts were selected for manual review. Upon manual review, all of the cases were found to have been accurate (100-percent accuracy). Additionally, provider feedback was that 55 percent of the sampled alerts were found to have quality concerns that were significant enough to require care provider intervention (55 percent relevance). The quality concerns identified fell into the following categories:

- Lack of documentation
- Atypical case diagnosed late
- Discontinuity of care
- Patient failure to follow up
- Incomplete treatment plan / documentation
- Patient refusal for work up.

The care providers reported that they were very satisfied with the alerts and felt that it was well worth their time to respond to them.

Phase Two Results – Conclusions of the Study

This study verified that DiagnosisOne’s search engine of clinical algorithms can be effectively and accurately applied to a clinical and claims database to create a “Patient Safety Surveillance Report” to identify cases with quality concerns, including care gaps. These alerts can then prompt clinician interventions with patients to improve the quality and safety of care, “close the loop” on high risk cases and reduce the risk of professional liability.

About DiagnosisOne

DiagnosisOne provides an unparalleled breadth and depth of analytics and clinical decision support solutions based on template and patient-specific order sets to the healthcare industry. Leveraging the world’s largest library of evidence-based medical knowledge, DiagnosisOne’s standards-based solutions

integrate seamlessly with existing hospital and laboratory information systems to deliver actionable information that result in better patient care, reduced errors and better clinical outcomes. DiagnosisOne's customers include healthcare providers, payers, EMR companies, systems integrators and government entities, including the Centers for Disease Control (CDC), Massachusetts Department of Public Health, Greenway Medical and Blue Cross Blue Shield. Based in Lowell, Mass., DiagnosisOne was formed in late 2003 by a team of physicians and healthcare IT professionals. For more information, visit www.DiagnosisOne.com.