

## Case Study

# Study of the results of using ProtoLytic's proprietary algorithms to evaluate medical expenditures in the workers' compensation industry.

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## Abstract

Healthcare payers are experiencing higher medical costs due to inaccurately authorized services and paying claims with incomplete controls. These challenging problems inflate medical costs and cause rework that overloads staff.

ProtoLytic analyzed more than \$10 million of medical expenditures for workers' compensation claims and recognized numerous anomalies. We identified that inappropriately authorized services exceeded \$1.5 million and improper payments resulted in an additional \$.8 million.

The study determines that improving decisions during treatment authorization together with a more rigorous analysis of bills prior to payment, will reduce medical expenditures and lower administrative costs. Payers can expect to see an improvement in their "combined ratio," which is a calculation of the total medical payments, indemnity costs and other expenses as a percentage of premiums.

Utilizing ProtoLytic's treatment-focused algorithms resulted in savings of 14.8% for inappropriately authorized treatment, despite the decision-makers having access to evidence-based-medicine guidelines (EBM). Savings of 8.1% was realized in the bill-payment phase by using the reimbursement rules. ProtoLytic's reimbursement algorithms enhance the current bill review process by adding new elements to the review.

## Introduction

States and federal entities mandate standards to ensure consistent and effective care for patients who are covered by the worker's compensation laws. These jurisdictions also specify regulations for billing that address things like inappropriate combinations of treatment. Furthermore, the Centers for Medicare and Medicaid (CMS) created the National Correct Coding Initiative (NCCI) to reduce improper billing. For a summary of ProtoLytic's implementation of state and federal treatment and billing rules, see the section detailing [ProtoLytic Algorithms](#) below.

Developing algorithms for the 51 jurisdictions and NCCI was a meticulous 5-year-long effort. The algorithms currently address requirements in the workers' compensation industry but will be adapted to the other healthcare areas as appropriate. Machine learning techniques are being used to create new algorithms. All rules were programmed in what is referred to as the ProtoLytic "rules engine."

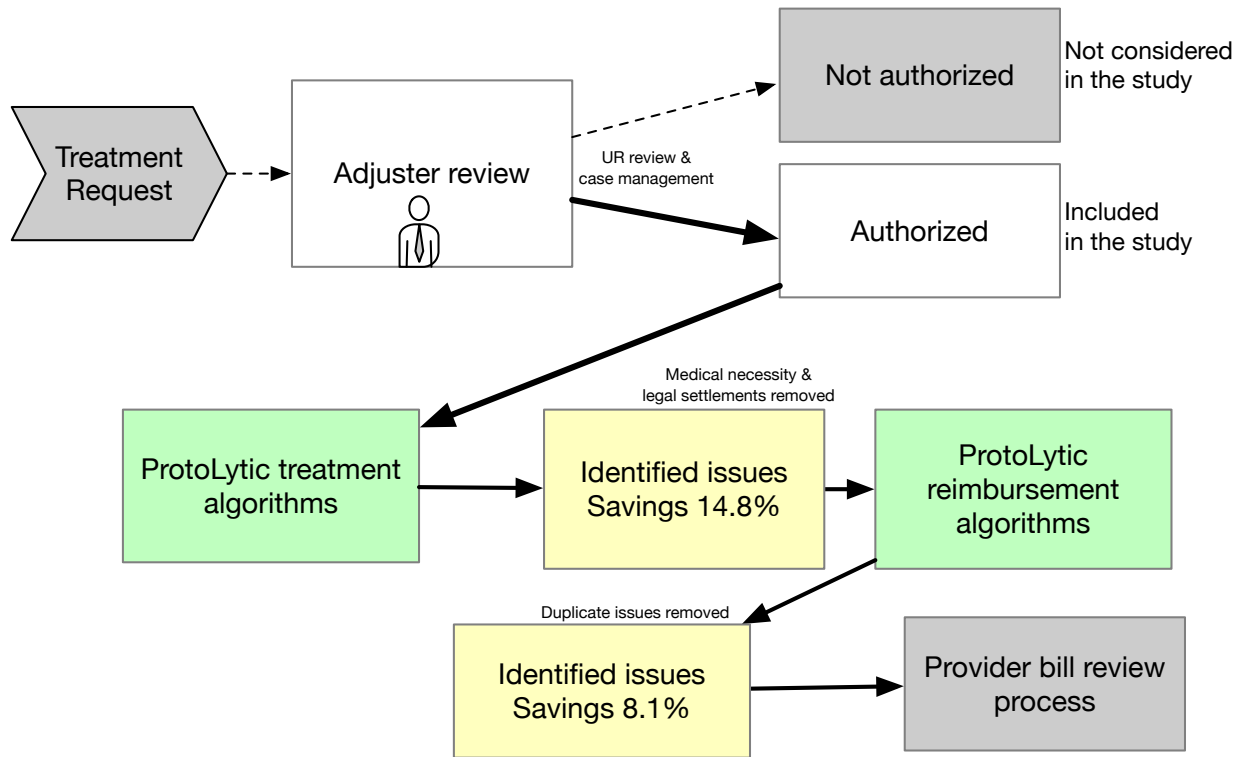
The ideal way for a client to use the rules engine would be through an application programming interface (API) where real-time data is sent by the client. ProtoLytic's system would then automatically generate the response to assist in decision making.

## Study Methodology

We analyzed 18 months of workers' compensation medical expenditures that were provided by four companies and their third-party administrators (TPAs). This included (1) a large trash-collection company; (2) an operator of parking garages; (3) a mid-size restaurant chain; (4) and a manufacturer of auto tires. All the companies involved in this study are self-insured and use two different TPAs with well-established bill review systems.

To conduct this study, payment data was processed using computer programs to identify anomalies for further analysis. Because of the nature of the data in this study, it was handled in batch using the ProtoLytic algorithms and rules engine.

Savings methodology – showing how savings calculations were conducted.



For various reasons, claims adjusters might not authorize a request for a treatment, surgery, drug, or medical equipment. This can result from internal company policies or after a review of the general EBM. Because paid data was used, this study did not evaluate or include savings for any of the “Not Authorized” requests.

The study also attempted to exclude both medical appeals and legal settlements that might have exaggerated savings.

When a rule violation was identified in both the authorization and reimbursement phases, the resulting amount was removed from the reimbursement process to avoid duplicating the savings.

## Conclusions

The study analyzed \$10 million of previously authorized and paid expenditures to identify problems and calculate savings. It is likely that savings would have been greater if the ProtoLytic API had been used prospectively (i.e., prior to initial authorization and before bill payment) because alternate treatments might have been recommended, and some issues were difficult to evaluate after the fact. We find that ProtoLytic's treatment and reimbursement algorithms are different than – and complementary to – other EBM resources and current bill review processes.

A 2019 study conducted by the Workers' Compensation Research Institute (WCRI) on the use of evidence-based-medicine guidelines (EBM) during authorization shows that if the adherence to EBM can be increased to 50%, medical cost reductions of up to 37.9% and reductions in indemnification costs (i.e., payments for lost wages) of 13.2% will be possible<sup>1</sup>. However, surveys also show that EBM use can be cumbersome and consequently not used in many cases, and a surprisingly high number of claims adjusters were not aware of how to use this data – or that it even exists<sup>2</sup>. An American Medical Association survey and other studies lead to the conclusion that if the currently available EBM search tools were to be used on just 5 more cases per day, it would increase adjuster processing time by at least ten minutes per review, which is approximately a 10.4% increase in work time<sup>3</sup>.

On the other hand, the ProtoLytic rules-engine is designed to be automatically integrated into existing systems. The treatment rules differ from the general EBM because they automatically compute the specific requirements and complex modifications made by each state and the federal government. Use of ProtoLytic's treatment rules shows a savings of 14.8% of the total spend even on previously authorized bills, with virtually no additional review time.

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<sup>1</sup> Kathryn Mueller, Dongchun Wang, Randall Lea, M.D., "State Policies on Treatment Guidelines and Utilization Management: A National Inventory," (WCRI, February 5, 2019).

<sup>2</sup> Legare, F, MD, "Access to decision aids is important for evidence-based medicine," (BMJ, August 31, 2017, 358)

<sup>3</sup> Hunt, Dan L., DO, et al., "A New Method of Assessing the Impact of Evidence-Based Medicine on Claim Outcomes," (JOEM, Vol. 58, No. 5, pp. 519–24, January 2016). DuChene, Courtney, "Claims Adjusters Spend Too Much Time on Compliance: What Tools Might Help?," (Risk & Insurance, March 10, 2020).

Our analysis also confirms the reimbursement rules produced a savings of 8.1% in the payment phase. This is the result of payment issues associated with state and federal rules for improper coding and the violation of reimbursement regulations that the bill review systems do not consider. The ProtoLytic algorithms identified violations complementary to the bill review process. See the Sample Data and Analysis below for specific information.

The following charts summarize these savings.

Payment Type	Amount Paid	
<b>Total paid medical expenditures</b>	<b>\$ 10,181,113.06</b>	
<b>Authorization Rules</b>		
<b>Total authorization rule violations (adjusted)</b>	<b>\$ 1,506,804.73</b>	<b>14.80%</b>
Evaluates all aspects of patient recovery stages	\$ 294,234.17	2.89%
Adjudicates healthcare treatment (exceeds limits or duplicate requests for service)	\$ 295,252.28	2.90%
Identified red-flag (treatment changed based on recovery progress)	\$ 213,803.37	2.10%
Treatment not appropriate for recovery stage (acute, subacute or chronic)	\$ 122,173.36	1.20%
Treatment request not appropriate for injury	\$ 91,630.02	0.90%
State mandated provider specialty and licensing requirement violated	\$ 20,362.23	0.20%
NCCI violation (mutually exclusive codes requested)	\$ 143,553.69	1.41%
Other authorization rules	\$ 325,795.62	3.20%
<b>Total authorization rule savings (adjusted)</b>	<b>\$ 1,506,804.73</b>	<b>14.80%</b>
<b>Reimbursement Rules</b>		
<b>Payment Issues (adjusted)</b>	<b>\$ 824,670.16</b>	<b>8.10%</b>
Duplicate payments (same service)	\$ 240,274.27	2.36%
State mandated maximum reimbursement allowances	\$ 73,304.01	0.72%
Payments to multiple providers for the same service	\$ 60,068.57	0.59%
Payment for overlapping dates of services	\$ 69,231.57	0.68%
State service specific edits	\$ 167,513.59	1.65%
Ineligible payments	\$ 156,689.15	1.54%
Other reimbursement rules	\$ 57,589.00	0.57%
<b>Total Reimbursement Rules Savings</b>	<b>\$ 824,670.16</b>	<b>8.10%</b>
<b>Total Savings</b>	<b>\$ 2,331,474.89</b>	<b>22.90%</b>

Note: Adjustments were made so overlapping violations are not counted in both categories. Legal settlements and physician appeals were attempted to be removed so savings were not exaggerated.

## ProtoLytic Algorithms

Over a period of five-years, ProtoLytic codified each of the 51 jurisdiction's guidelines and regulations into more than 7,000 algorithms dealing with both treatment adjudication and medical reimbursement. These adjudication algorithms provide recommendations and source references for a client's claims system. ProtoLytic reimbursement algorithms enhance traditional bill-review programs to apply the complex billing regulations and CMS NCCI initiatives.

The Proto-Link™ API rules cover all 51 jurisdictions:

- Adjudicates health care treatment for drug utilization, diagnostic testing, physical medicine, surgery, and other categories
  - State medical treatment guidelines are based on standard medical evidence (EBM), and the states often make modifications to the standard guidelines to set treatment guidelines and facilitate decision-making in their state
- Provides clinical reasoning for medical decisions to resolve disputes among provider, payer, and patient
  - Provides documents and provides rationale and backup for decisions
- Evaluates all aspects of patient recovery stages: diagnosis, education, informed decision making, treatment parameter duration, active interventions, positive patient response, and surgical interventions
  - For example, after six weeks of conservative treatment, the patient has not improved, therefore, a different approach is recommended.
  - Useful for educating the patient about side effects and other negative aspects of treatment so the patient understands how they could be affected.
  - For example, advise of gastrointestinal issues with certain medications, along with alternative medications to use as substitutes will be provided
- Tackles the treatment of physical conditions that occur with the greatest frequency, or which require the most expensive treatments
  - Will provide recommendations for specific injuries such as lower back sprain and recommend, or not recommend, treatment based on symptom indicators.
- Covers all phases of an injury; acute, subacute, and chronic to ensure the proper treatments during the correct clinical stage
  - Certain treatments are not recommended in different stages. For example, a patient with chronic pain should not receive extended prescriptions of opioids.
  - Certain treatments must be tried before others, such as physical therapy for a certain duration before a surgery is recommended.
- Identifies red flags that may suggest the presence of serious underlying medical conditions
  - Cases flagged are not a normal injury so special evaluation is suggested. For example, the algorithms will identify a potentially serious fracture, infection, or neurological condition that requires additional diagnostic or laboratory tests to rule out a complicating injury.

- Finds these serious underlying conditions up front to prevent progression through suboptimal treatment.
- State mandated provider specialty and licensing requirements for specific products and services to prevent unqualified medical treatment
  - The algorithms identify treatment provided by non-qualified person personnel. For example, it flags items such as a PT assistant performing or billing for services mandated to be conducted by a licensed PT.
- State mandated coding requirements for products and service as well as provider specialties to ensure proper coding
  - States specify certain billing codes and modifiers for specific products or services. For example, anesthesia requires distinct procedures to be billed along with other codes.
  - The algorithms also require that add-on codes must be associated with certain primary codes.
- State mandated non-reimbursable codes to flag improper billing
  - Certain items such as vitamins and supplements should be billed with a code that is not reimbursable. Additionally, many states have rules that require sales tax not to be billed separately for durable medical equipment, for example.
- State mandated maximum reimbursement allowances to reduce costs
  - States set maximum allowable reimbursement or MAR that stipulates reimbursement amounts such as reimbursement is not to exceed 85% of fee schedule
  - Reimbursement of a primary surgical procedure can be 100% of MAR, but limiting reimbursement for additional surgical procedures to only 50% of MAR when performed during a single operative session
- State mandated reductions in maximum allowable reimbursement based on modifiers/provider specialty for proper billing
  - Certain modifier codes can increase or decrease the MAR reimbursement. For example, a bi-lateral procedure with a correct modifier can result in MAR of 150% of fee schedule, rather than 200% for both procedures.
  - Provider specialty determines the MAR such as a nurse practitioner must bill less than physician for the same procedure.
- State mandated facility-specific coding and billing requirements to ensure proper treatment/billing
  - For example, an independent radiology facility can only bill the technical component for an MRI, and they are not allowed to bill for the physician portion of the test.
- CMS - National Correct Coding Initiatives (NCCI) to reduce excessive/incorrect products/services
  - Mutually exclusive codes cannot be billed on the same day by the same physician.
  - Add-on physical medicine codes must be billed with the primary codes, for example, work hardening can be billed for the initial 2 hours, but the add on code is only billable for each additional hour.

## Sample Data and Analysis

The following are just a few examples of issues identified during the analysis of the paid bills.

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**Mutually Exclusive violation:**

29880 is mutually exclusive of 29876

Date of Service: 8/4/2019

Quantity requested: 1 each

29880 (Arthroscopy W/ Meniscectomy Repair (Medial and Lateral)) Amt Paid: \$1872.18

29876 (Knee Arthroscopy Synovectomy Major) Amt Paid: \$1727.82

Refund Amt: \$1727.82

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**Adjudicates Healthcare Treatment Violation (state limit violation):**

Activities of daily living limit 10 sessions for carpal tunnel syndrome

Injury: Carpal tunnel syndrome

97535 (Activities of Daily Living)

Quantity requested: 18

Authorized: 10

Denied: 8

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**Phase of Recovery Violation:**

Surgery is not recommended for acute or subacute Achilles Tendinopathy without rupture, but is recommended for moderate to severe chronic Achilles Tendinopathy patients who have failed multiple non-surgical treatments and whose condition has lasted at least 6 months

Injury: Achilles Tendinitis

Recovery Phase: Acute

27654 (Repair Achilles Tendon, Secondary, W/ or WO/ Graft)

Quantity requested: 1

Requested Denied

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Duplicate payment for the same service on the same day for the same claimant.

Procedure Code	Mod	Qty	DOS From	DOS To	Check Date	Check #	Bill Charges	Amount Paid	Refund Due
97110		2	1/5/2019	1/5/2019	1/26/2019	90665141	120	50.11	\$0.00
97140		1	1/5/2019	1/5/2019	1/26/2019	90665141	60	22.71	\$0.00
97110	GP	2	1/5/2019	1/5/2019	3/2/2019	90707874	120	31.09	\$31.09
97140	GP	1	1/5/2019	1/5/2019	3/2/2019	90707874	60	14.09	\$14.09

Payments have been made to multiple providers/vendors for the same service(s) for the claimant.

Procedure Code	Mod	Qty	DOS From	DOS To	Check Date	Check #	Bill Charges	Amount Paid	Refund Due
97124	25	1	12/1/2018	12/1/2018	1/4/2019	63062837	12.18	12.18	\$0.00
97124	25	1	12/1/2018	12/1/2018	4/13/2019	66389495	12.18	12.18	\$12.18

Payments have been made to multiple providers/vendors for the same service(s) for the claimant.

Procedure Code	Mod	Qty	DOS From	DOS To	Check Date	Check #	Bill Charges	Amount Paid	Refund Due
97014		1	1/5/2019	1/5/2019	1/26/2019	90665141	60	12.53	\$0.00
97110		2	1/5/2019	1/5/2019	1/26/2019	90665141	120	50.11	\$0.00
97140		1	1/5/2019	1/5/2019	1/26/2019	90665141	60	22.71	\$0.00
97014	GP	1	1/5/2019	1/5/2019	2/12/2019	66387329	60	13.6	\$13.60
97110	GP	1	1/5/2019	1/5/2019	2/12/2019	66387329	120	54.4	\$54.40
97140	GP	1	1/5/2019	1/5/2019	2/12/2019	66387329	60	24.65	\$24.65

Payments have been made to multiple providers/vendors for the same service(s) for the claimant.

Procedure Code	Mod	Qty	DOS From	DOS To	Check Date	Check #	Bill Charges	Amount Paid	Refund Due
97110		2	1/27/2018	1/28/2018	6/11/2018	90366453	75.58	53.42	\$53.42
97110		2	1/28/2018	1/28/2018	6/11/2018	90366453	75.58	53.42	\$53.42
97110		2	1/27/2018	1/27/2018	5/7/2018	58471936	75.56	50.4	\$0.00
97110		2	1/28/2018	1/28/2018	5/7/2018	58471936	75.58	50.4	\$0.00

Per GA workers compensation rules of reimbursement, CPT code 97001, Physical therapy evaluation, and CPT code 97003, Occupational therapy evaluation, are onetime-only charge per facility.

Procedure Code	Mod	Qty	DOS From	DOS To	Check Date	Check #	Bill Charges	Amount Paid	Refund Due
97001		1	8/1/2018	8/1/2018	9/2/2018	90926468	111.60	106.38	\$0.00
97001		1	10/17/2018	10/17/2018	12/2/2018	91021471	111.60	106.39	\$106.39
97003		1	10/17/2018	10/17/2018	12/2/2018	91050254	111.60	106.39	\$0.00

Payments have been made to multiple providers/vendors for the same service(s) for the claimant.

Procedure Code	Mod	Qty	DOS From	DOS To	Check Date	Check #	Bill Charges	Amount Paid	Refund Due
A9300	NU	1	6/7/2020	6/15/2020	7/9/2020	91814601	4.26	3.37	\$3.37
A9300	NU	1	6/15/2020	6/15/2020	7/18/2020	76773491	4.26	3.24	\$0.00