

## Natural language processing turns search speed into light speed

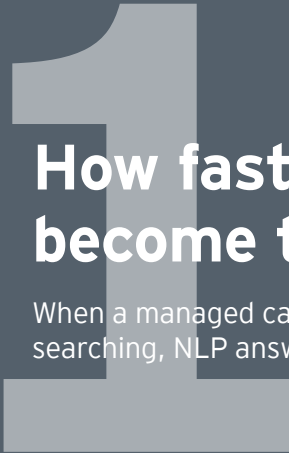
Technologies like optical character recognition help a managed care leader track compliance requirements in a fraction of the previous time.

The EY logo consists of the letters 'EY' in a bold, white, sans-serif font. A yellow diagonal line is positioned behind the 'Y', extending from the bottom left towards the top right.

Building a better  
working world



The better the question



## How fast can a million words become the one you need?

When a managed care company was losing time to manual searching, NLP answered the need for speed.



Millions of Americans spanning every state depend on Medicaid for **health care** coverage. The federally regulated program is especially vital in helping pregnant women, young mothers and children receive routine checkups, vaccinations and preventive care, a benefit for the US health system overall.

The Medicaid program is largely federally funded but state-managed, creating a labyrinth of compliance requirements for states to navigate. The majority turn to private managed care organizations (MCOs) to administer the program and keep critical health benefits flowing to the high volume of Medicaid consumers.

One of the largest MCOs in the competitive US Health Insurance Marketplace® found that it was losing valuable time to arduous compliance verification processes. The company's compliance analysts were spending hundreds of hours manually combing through cumbersome Medicaid contracts to confirm that state requirements were being met. In a highly competitive industry, that lost time was costing the MCO the edge it needed to serve Medicaid consumers efficiently and to be positioned to win new contracts.

Medicaid compliance requirements differ from state to state, and noncompliance results in stiff penalties to providers with state service level agreements (SLAs). Continual contract updates were adding to the time and labor drain for analysts at this MCO and negatively impacting the company's bottom line

The managed care organization sought the help of Ernst & Young LLP (EY US) practitioners to create a more efficient system for its compliance analysts. EY teams combined more current technologies with the backing of [health care regulatory](#) teams to bring firsthand [health industry insight](#), helping the client sharpen its decision-making and improve people's lives.

The outcome is a searchable database configured for the MCO's needs and trained by the smartest [emerging technology](#) available.



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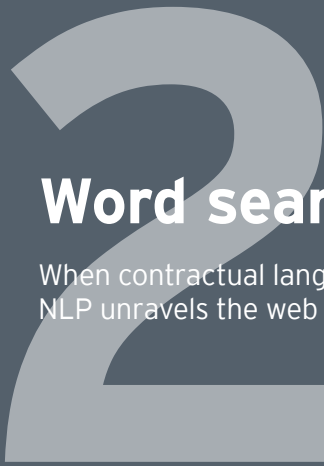
EY health care regulatory teams are dedicated to tracking the national policies and practices that affect health care. We're passionate about helping health organizations make more informed decisions to improve people's lives by providing leading-class technology innovations with a human touch. When our policy insights join forces with our technology experience, improving the tools that health care organizations depend on, everyone wins.

**Heather Meade**

Principal, Washington Council Ernst & Young, Ernst & Young LLP.

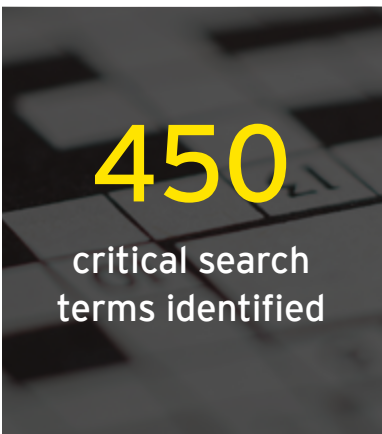


The better the answer



## Word search on warp speed

When contractual language is tangled, NLP unravels the web for better business.



**EY professionals** began by interviewing the MCO's compliance analysts to gain a thorough understanding of the organization's core challenges. They also assessed the existing Medicaid contracts across multiple states to broadly identify the commonalities and variations in the contractual formats and language.

Data scientists turned to **artificial intelligence (AI)**, which emulates human cognition by devouring large data sets, then applying algorithms to metabolize the raw material into usable information that can be harvested at astonishing speed. Natural language processing (NLP) is a form of AI that uses machine learning to serve as a translator between words as raw data - all of them - and words as functional data - only those relevant to a specific need or task.

For this client, the raw data was numerous state contracts written with little or no consistency in language, wording, topical organization or formatting. The words used to write contractual requirements may be similar, but they are often organized and combined differently.

EY teams used NLP to custom-train an algorithm to extract requirements that would then populate a central database, enabling the company's analysts to rapidly search key words, phrases and characters by both state and business function. The searchable business areas include claims centers, call centers, appeals and grievances, and others with compliance implications.

In the first phase, the EY teams identified common, relevant paragraph and sentence structures, flagging phrases such as “In the case of” and “is required to.” They also classified characters such as bullets and Roman numerals. Since these special characters can vary by state contract, different combinations were necessary for the NLP algorithm to learn the individual contracts and requirements. In some cases, the state contracts were only available in PDF format, which required the application of optical character recognition software to convert pictures of words to readable characters before NLP could be taught what to find.

The teams then took a deep dive into the syntactical and semantic language to build a dictionary of about 450 critical search terms for the algorithm to zoom in on. The key words are primarily related to formal obligations and requirements. Words like “required,” “shall” and “must” denote obligation, while “within” signals a quantitative requirement, as in “within 48 hours.” Verbs such as “comply,” “fulfill” and “reside” figured prominently in the NLP application dictionaries and libraries built specifically for the MCO’s state contracts.

The NLP algorithm took about four months to develop and fine-tune, through a staged process that increased its accuracy from 50% to 84% to nearly 100%, with repeated testing, additions and clarifications to the searchable library. In total, some 170,000 compliance requirements were identified and classified by the words and characters that describe them in the state Medicaid contracts.



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Unstructured data is the largest type of data in organizations today, yet it remains largely untapped for insights and can be an ongoing burden to manage. Application of modern artificial intelligence changes our ability to rapidly use this impactful type of information and drive value from it.

**Traci Gusher**

EY Americas Data and Analytics Leader



The better the world works

## Better compliance analysis on its own terms

A new database reduces manual search time from about 250 hours to 15 minutes.

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months to create the AI-enabled database

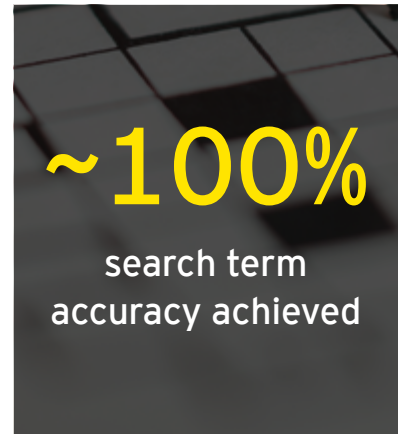
The NLP-driven database developed and trained by EY teams allows the managed care organization's compliance analysts to access, search and review designated Medicaid contracts quickly in one centralized source.

Those responsible for the MCO's contract compliance across multiple states and requirements can now open a dashboard and search highly differentiated Medicaid contracts by fields, including state, function, requirement, compliance terms and key words. The new database has decreased compliance analysts' search time from about 250 hours to 15 minutes across multiple state contracts, greatly reducing the potential for instances of noncompliance and related penalties.

The user-friendly dashboard also reveals state contract differentiation across capabilities. For example, if one state has a call center response time of 60 seconds, and another has a call center response time of 30 seconds, analysts can note and highlight the information for relevant business stakeholders in the organization.

Coupled with the 200-plus hours of manual search time saved, that fresh perspective positions analysts in the managed care company to help the organization grow business awareness and better compete with the handful of peer organizations vying for additional state Medicaid contracts.

The longer-term impact of this capability helps Medicaid consumers receive a critical benefit that is already funded but challenging to disperse. For millions of pregnant mothers and young children around the US, daily struggles are made easier when improved MCO compliance makes fundamental health care more efficient.



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EY teams are using leading-edge, AI-enabled technologies to drive innovations forward. Our teams unlock the power of data to infuse health care organizations with strategies and solutions that redefine value.

Sezin Palmer

Managing Director, Consulting, Data and Analytics, Ernst & Young LLP

# The team



**Heather Meade**

Principal, Washington Council Ernst & Young, Ernst & Young LLP



**Traci Gusher**

EY Americas Data and Analytics Leader



**Sumitro Sarkar**

EY Global Nexus for Health Leader

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