

# Enhancing Patient Care through Improved Provider Data Quality: An AI - Driven Data Solution

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**Abstract:** US healthcare systems spend 4.5 trillion annually, based on CMS Data published in the 2022 report [1]. Patient Satisfaction is a crucial aspect of the care journey. Finding the right provider who is 'participating' a. k. a. 'in - network' with the member's insurance plan ensures the right services and benefits to the member. The latest generation of members uses mobile technologies such as 'Apps' to find providers participating in member insurance plans. This means that provider systems and payers should maintain the most accurate and correct information about providers, their specialties, office locations, and hours of operation and accept new patients if they are serving as primary care physicians (PCPs). CMS review found that 52.20% of the provider directory locations listed had at least one inaccuracy. Types of inaccuracies included: 1) The provider was not at the location listed, 2) The phone number was incorrect, or 3) The provider was not accepting new patients when the directory indicated they were [2] i. e., More than half of provider data available to members are either inaccurate or incomplete. The healthcare industry increasingly recognizes the critical role of data quality in enhancing patient care. This scholarly article proposes an innovative framework for improving provider data quality through integrating Artificial Intelligence (AI) and data analytics. By leveraging AI - driven capabilities, healthcare organizations can identify inaccuracies, inconsistencies, and gaps in provider data more efficiently, enabling the cleansing and standardization of data at scale. This approach streamlines provider data management and significantly impacts patient care by ensuring accurate provider information is available for clinical decision - making, care coordination, and patient engagement strategies.

**Keywords:** Healthcare Improvement, Patient Care Journey, AI - driven Solutions, Artificial Intelligence, Provider Directory Accuracy, Provider Data Management

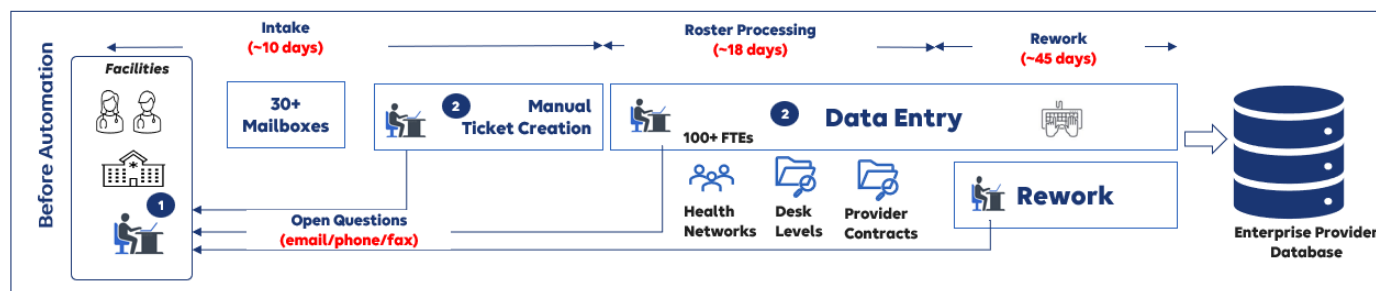
## 1. Introduction

Provider data is a foundational element in the healthcare delivery system, influencing areas ranging from patient access to care to the accuracy of health records and billing processes. However, maintaining high - quality provider data presents significant challenges due to the dynamic nature of healthcare provider information and the complexities of healthcare IT systems. The advent of AI - driven data

analytics offers a promising solution to these challenges, providing tools that can automate the identification and correction of data quality issues.

## 2. Problem Statement

The problem and complexity of maintaining the provider directory and making it available to consumers is depicted in picture 1. Let us review one by one



Picture 1

- 1) Administrative Burden for Provider
  - a) Consistently and correctly sharing details with the Payer about any of these transactions, including new provider enrolment, credentialling, provider changes, and provider terminations. Traditionally, these changes are communicated via various channels—email, phone calls, fax, etc.
  - b) Maintaining and communicating the changes to all providers whom they contracted is a tedious and complex process.
- 2) Administrative Burdens for Payers
  - a) Manual/Labor Intensive work – Once the provider notifies the Payer of the provider changes, the Payer needs to update the changes in the payer database.

This manual heavy work as this requires a team of 100 - 200 associated to

- Understand the ask from the provider.
  - Make the updates to the Database correctly.
- b) Manual mistakes and errors—Since it's manual work done mainly by offshore agents, the way they understand the ask and interpret the intent sometimes triggers an inappropriate action, such as terminating the location instead of terminating one provider or terminating the provider instead of terminating one network with which the provider is contracted.
  - c) The longer Turnaround time to reflect the changes – A manual, labor - intensive process will lead to long hauls to complete the task as multiple hops or teams are in the Journey. A team will create the ticket for

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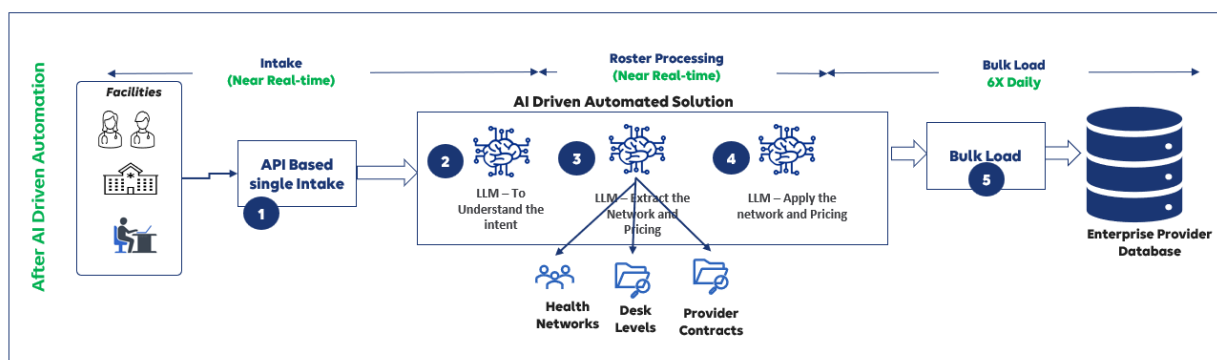
each submission, another team will make the actual key, and maybe a different team will be used for all the error corrections. As the Picture 1. A represents the total turnaround to

- 3) Patient Dissatisfaction
  - a) **Erroneous PCP Termination:** A Primary Care Provider (PCP) is incorrectly terminated from the network.
  - b) **Member Reassignment:** The system automatically moves affected members to a new PCP based on the incorrect termination.
  - c) **Member Notification:** Members receive letters of reassignment and new ID cards related to their new PCP.
  - d) **Impact on Care:** The incorrect termination and reassignment disrupt member care and service,

causing significant dissatisfaction as the original PCP can no longer provide services.

- 4) Provider Abrasion
  - a) Delayed/Incorrect claim payments
    - Incorrect Removal of PAR Networks: Provider networks are mistakenly removed from the Participating (PAR) list.
    - Claims Impact: Claims are processed as non - PAR, which leads to incorrect claims payments.
    - Member/Provider Impact: Incorrect payments are issued to members and providers, causing financial discrepancies and dissatisfaction.

**Artificial Intelligence (AI) Driven Solution**



The proposed framework involves

- 1) **Streamlined intake—The provider administration agent can trigger an** Application Programmer Interface (API) with a list of changes happening to the organization. This will lead to a more streamlined intake, a precise capability to track all submissions, and seamless access to the status of each change submitted.
- 2) **Intent Identification - AI - driven algorithms** (Large Language Model) to read and understand the intent of the transaction.  
Ever since the inception of the Large Language Models (LLMs), the technology world has been utilizing the fantastic capabilities of LLMs to understand the human likelihood of texts and conversations and to summarize or understand the true intent [3]. Harnessing the power of Artificial Intelligence (AI) to understand the correct purpose of a provider transaction will be a massive win for maintaining accurate provider data. This will help Payors to overcome several issues and mistakes introduced by manual task forces.
- 3) **Business Rule Extraction - AI - driven algorithms** (Large Language Model) to identify the correct network and pricing rules based on contracts  
Another problem resides in the details. The details are maintained in Word or contract documents for a more significant payer with contracts with several provider systems nationwide. Identifying and extracting the details from each document corresponding to the provider is tedious, complex, and time - consuming. Again, the best use case to solve with the power of LLMs, which are capable of processing larger data sets within seconds.

- 4) **Business Rule Augmentation - AI - driven algorithms** (Large Language Model) to configure the network and pricing rules based on contracts  
Once the correct details are identified in step #3 and the AI engine is easy to use, the following steps will be easy. Augment the provider details with proper business rules – networks, pricing, director display, accepting patients, patient gender, patient age, panel count, etc.
- 5) **Bulk load approach to load the data to the Enterprise Provider Database**  
Finally, the structured data will be loaded to the Enterprise Provider Database using a bulk load processing system daily.

**3. Results**

Implementing an AI - driven data analytics approach to provider data quality management can result in several tangible benefits for healthcare organizations and their patients. Improved accuracy and completeness of provider data enhance the reliability of provider directories, reducing patient frustration and increasing access to Care. Additionally, cleaner provider data supports more effective care coordination and health information exchange between providers, leading to better patient outcomes. This section will present case studies or pilot projects that have successfully applied AI techniques to improve provider data quality, highlighting measurable improvements in data accuracy, operational efficiency, and patient satisfaction.

**How Members are benefited in their Care Journey**

- 1) Avoids the incorrect PCP Termination and Reassignment
- 2) Patient Care Journey continues without any disruption
- 3) It avoids the customer care call

- 4) Helps to gain confidence in the treatment plan
- 5) Realtime access to provider Directory via Mobile Apps

#### How Providers are benefited in the Care Journey

- 1) On - time processing of the claims
- 2) Reduction in administrative burden to resubmit the claims
- 3) Timely payments
- 4) Better Provider engagement and experience
- 5) Resulting in better patient care

#### How Payers are benefited

- 1) **Correct Payments:** Correct claim payments are sent to members and providers, preventing financial errors and consumer dissatisfaction.
- 2) Avoid any Fines, Penalties, and DOI Compliance.
- 3) Improved Provider Experience
- 4) Reduces administrative overheads to reprocess the claims
- 5) Better Directory Accuracy
- 6) Faster turnaround to reflect the Provider Directory changes to FindCare applications.

## 4. Discussion

While the potential benefits of applying AI to provider data quality management are significant, some challenges and considerations need to be addressed. These include ensuring the privacy and security of patient and provider information, managing the potential biases inherent in AI models, and integrating AI - driven processes with existing healthcare IT systems. The discussion will explore these challenges in - depth, offering strategies for mitigating risks and maximizing the positive impact on patient care.

#### Application to Various Organizations

Since the solution solves the provider data management issues for Payers nationwide, the five - step approach outlined in the AI - driven solution can be leveraged within healthcare and other domains within the US.

#### Healthcare System

- 1) **Member Data Interfaces**—The solution can process membership data coming from sources in various formats. Since LLM - based data standardization and structuring are crucial parts of the solution, it can also read and understand changes to membership demographics, enrollment, termination, etc.
- 2) **Clinical Data Interfaces**—Electronic Medical Records are considered the next significant initiative in the Healthcare Industry. According to the Centers for Medicare and Medicaid (CMS), EMR data and its timeliness and availability will enable providers to make better decisions and provide better Care [4]. Every hospital system uses different forms of data exchange to transmit patient health information to payers. Standardizing the data to a standard format is pivotal in EMR - based patient care cases. The solution can be effectively leveraged here. [5] [6]
- 3) **Third - Party Claims Data** – Gathering medical, dental, and pharmacy claims data processed by various third - party claims processing systems is critical to healthcare systems to drive healthcare analytics and generate member

health insights and profiles. Not using a common standard or file format is a pivotal issue for large payer systems. Standardizing each data set received from various sources seems like a complex groove. The solution can process any number of formats and records. The immense power and capabilities of the LLM model can be leveraged to standardize the claims data so that actionable insights can be generated out of the data. [7]

#### Benefits of Solutions

##### a) Artificial intelligence Driven

- **Accuracy**—Since the AI model is trained with terabytes or petabytes of data, accuracy and precision are paramount. This ensures that operations can be achieved with a high level of confidence. [8]

- **Efficiency**

##### b) End - to - End Solution approach

- The solution tries to solve the end - to - end pipeline of the workflow by addressing all types of limitations – technology, process, and people. It ensures a streamlined approach to accepting the provider data changes via a streamlined channel, standardizes and processes using the high accuracy LLMs and the faster data update process. This addresses and solves the problem end to end. Rather than fixing one or two steps in the workflow, the solution solves the problem end - to - end.

##### c) Faster Turnaround

- Since the solution ensures higher accuracy and efficiency by implementing the cutting - edge solution, the total turnaround time to complete the provider data change is reduced to one day from 45 - 60 days before the solution.

##### d) Can generate results at scale

- The beauty of all AI - driven solutions is that they can be done at scale. Depending on the server's capacity and configuration, any number of files, records, and volumes of data can be processed in hours or days.

##### e) Applicable across the Industry

- The solution is repeatable for membership, claims, and provider data sets.

## 5. Conclusion

Integrating AI - driven capabilities into provider data management represents a forward - thinking approach to enhancing patient care through improved data quality. As healthcare organizations navigate the complexities of data management in a rapidly evolving digital landscape, adopting AI and data analytics solutions will ensure that provider information remains accurate, accessible, and actionable. Ultimately, this approach not only streamlines administrative processes but also facilitates a healthcare environment where patients receive timely, effective, and personalized Care.

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