CASE STUDY

# Milliman payment integrity and AI Express

## Milliman's Payment Integrity Tool and Mastercard's AI Express Tool identified $239 million in healthcare fraud, waste and abuse

Every day, in countries around the globe, Milliman works with clients to improve healthcare systems, manage emerging risks and advance financial security. The healthcare industry is experiencing a growing fraud, waste and abuse (FWA) problem, estimated at $300 billion a year.[1]

Milliman developed a multifactor, rules-based solution called Milliman Payment Integrity (MPI) that audits health claims according to custom rules and algorithms and standard edits such as those associated with the National Correct Coding Initiative (NCCI). Scenarios from over 90 different categories are analyzed using claims, eligibility, provider and benefits information. For example, using medical and pharmacy claims data and rules we are able to determine likely impossible situations, such as a patient who is biologically male having a hysterectomy, and other clinically unlikely situations where the service units of a particular procedure exceed expected values or are part of a bundled service. These are valid and valuable services but Milliman wanted to take it a step further.

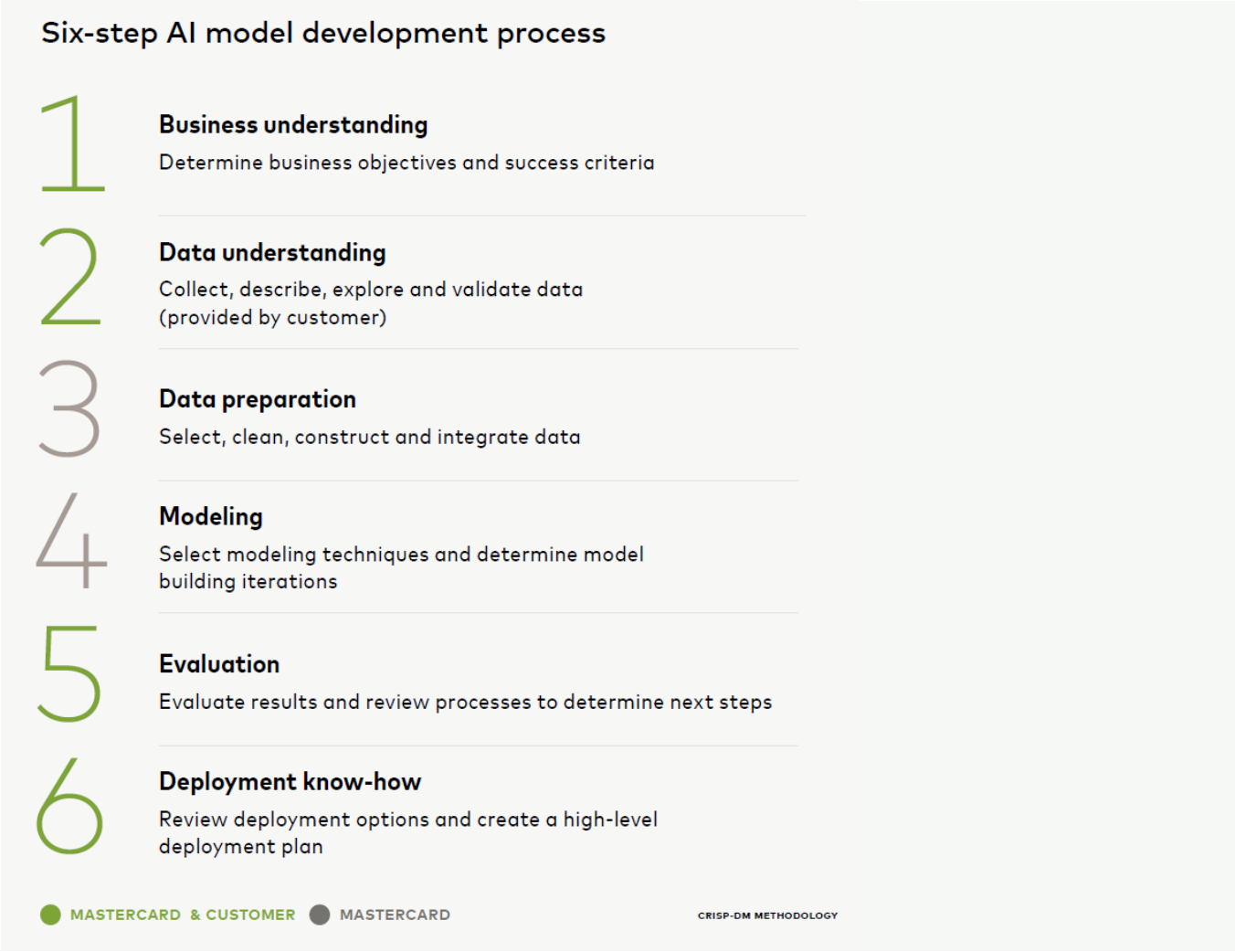
Milliman Payment Integrity was built to leverage advanced technology like artificial intelligence (AI) to identify incremental FWA savings for their clients through non-discreet testing methods (methods that do not use a test to look at a specific issue.) Internally we developed AI models to look for waste, but weren't fully satisfied with their results. Building AI models that look for healthcare claims and provider patterns has been historically difficult and has not seen wide success in the healthcare market. Oftentimes models are over-biased on results of discreet testing or identify patterns that are not actionable.

Milliman asked Mastercard® Healthcare Solutions to build an AI model leveraging their Brighterion AI technology, which is currently leveraged in the Mastercard payment network to identify card fraud on a real-time basis. Mastercard was engaged to run AI Express, its six-step AI model development process, to demonstrate a strong return on investment in detection of fraudulent providers.

> "These are exactly the kinds of insights we were hoping an AI tool would produce."
>
> **David Cusick**
> Principal, Milliman Inc.

[1] National Health Care Anti-Fraud Association (NHCAA), "The Challenge of Healthcare Fraud" (accessed April 7, 2021).

Mastercard's team included data scientists skilled at designing custom AI models with experience in both payments fraud and healthcare fraud, healthcare claims investigation expertise and strong project management oversight to make sure that the solution stayed on track toward Milliman's business objectives in the agreed upon timeline.




## Milliman's model development

### 1 BUSINESS UNDERSTANDING

The Milliman and Mastercard teams worked together to determine the business objectives and success criteria of the project. This interdisciplinary team collaborated to ensure all aspects of the business challenge were considered. Milliman's objectives were to modernize, increase detection and improve data velocity on behalf of their clients.

Milliman is unique because of its audit and analytic expertise, so there was not an immediate need for real-time risk scoring, but it could be available if required. The team established that success would be determined by increased provider and claim fraud detection, as well as scalability for production.

Milliman's objectives were to modernize, increase detection and become more efficient on behalf of their clients.

## 2 DATA UNDERSTANDING

With business understanding established, Mastercard worked with the customer-supplied de-identified data and MPI's audit results to build data labels to work within AI Express.

Milliman provided a detailed list of data points they would like to consider, and the two teams reviewed them to confirm HIPAA compliance. Mastercard ensures transaction data is anonymized as much as possible, while enabling effective FWA AI analytics. Milliman was able to provide claim data with additional "labels," identifying their potentially problematic claims. This enabled Mastercard to create properties, characteristics and classifications to train the model to accurately identify FWA.

"We worked in heavy collaboration with Milliman's team to formulate our list of questions and hypotheses," says Tim McBride, Mastercard's Director of Healthcare Product Development and Innovation and an accredited healthcare fraud investigator (AHFI). "We started with a sample of data and then worked with the full dataset to tease out the fraud results over and above what the legacy system had been detecting."

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**Tim McBride**
Director of Healthcare Product Development, Mastercard

## 3 DATA PREPARATION

With a clear understanding of the use case and data to be used, the Mastercard team set to work using proprietary techniques on selecting, cleaning, deduplicating and enhancing the data to be used in the AI model, selecting the most impactful data for the desired results and combining it to derive new conclusions. At the end of this step, the team had a clean dataset with productive labels and limited extraneous information, and was ready to build several AI models that ultimately were combined for a comprehensive FWA model.

## 4 MODELING

The Mastercard team built three sub-models: a provider risk scorer, a claim evaluator and a decision enhancer based on NCCI codes that compared claims to the list of high scoring (frequently offending) healthcare providers. The three sub-models looked at the data from different perspectives, then combined them to arrive at a final risk score and actionable reason codes.

"We typically do three iterations, going back to the client after each," says McBride. "Based on the feedback, we made adjustments to improve the models." After three iterations, the comprehensive model was at its peak performance.

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**Tim McBride**
Director of Healthcare Product Development, Mastercard

## 5 EVALUATION OF RESULTS

Evaluating results and reviewing processes is an important step in model development. The Mastercard team reviewed the quantifiable results to ensure the customer would receive a substantial ROI.

“We looked at the top ten provider specialties using scores above 800 (out of 1,000, which is the highest risk score),” McBride says. “We then took the top two of each of those ten specialties and reviewed the data, creating a summary of those results. Among those were laboratories, family practice and oncology.”

The results were astounding. The final proof of concept showed that 70% to 80% of claims paid to the flagged providers raise some concerns about risk. The new model uncovered $239+ million in potential savings from 2,700 high-risk providers (with a score of 800 or above on a scale of 1 to 1,000) for fraudulent claims for just one midsized Milliman payer client.

Milliman’s client was stunned to see such strong results and is now reviewing cases based on the findings. The accepted proof of concept was now ready for full production and possible deployment for Milliman’s clients.

**TOP 10 PROVIDER SPECIALTIES IDENTIFIED**

- Family practice
- Cardiology
- Internal medicine
- Hospice and palliative care
- Hospital – General Acute Care Hospital
- Laboratory
- Neurology
- Ophthalmology
- Psychiatry
- Nurse practitioner


**PROVIDER FWA EXAMPLE #1**

Mastercard AI model identified suspicious billings and unnecessary prescriptions

The AI model identified a cardiology physician who was billing services using incorrect “place of service codes” (a residential address), submitting unusual procedure codes, and prescribing drugs that are inconsistent with the provider's specialty.

As a result, $51,019 was identified as a potential recovery .

Source: Milliman online seminar PPT.

## 6 DEPLOYMENT KNOW-HOW

After reviewing options, Mastercard prepared a high-level deployment plan to provide a blueprint as they moved forward. Milliman and Mastercard are collaborating to deploy the AI for FWA solution to be made available to all clients.

## Conclusion

Milliman engaged with Mastercard to build an AI model that would improve its fraud detection capabilities and improve operational efficiencies, with the potential to save millions of dollars in fraudulent or inappropriate claims to Milliman's clients. An ensemble model was built that combined a provider risk scorer, a claim evaluator and a decision enhancer using both supervised and unsupervised methodologies.

The AI model test results identified 2,700 high-risk providers and more than $230 million of recoverable claims paid, three times the results of its legacy fraud detection solution for the same data. Milliman proceeded with development, making Mastercard's Brighterion AI available to its clients and prospects.

**PROVIDER FWA EXAMPLE #2**

Laboratory identified billing unnecessary laboratory tests.

Drug testing is generally performed in two stages: presumptive (qualitative) and definitive (quantitative.) Presumptive testing is performed first to determine the presence of a drug/metabolite within the specimen. When the results are positive, definitive testing is used to understand the quantity of the identified drug within the sample for care planning and treatment options.

The AI model, trained using labeled data, identified a clinical laboratory routinely billing for presumptive and definitive drug testing for the same metabolites, regardless of positive or negative outcomes on presumptive testing.

The provider routinely submitted the same 28 individual definitive drug screening codes across claims/patients regardless of presumptive testing outcomes or patient diagnosis, ignoring the protocol and thus increasing reimbursement.

Source: Milliman online seminar PPT.

Milliman

Milliman is among the world's largest providers of actuarial and related products and services. The firm has consulting practices in life insurance and financial services, property & casualty insurance, healthcare, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe.

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