Risk Adjustment in the Age of AI - Empowering Efficiency with NLP

Presented By:

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RISE

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Agenda

- Why the current landscape makes NLP a vital tool for organizations managing Risk

- What is NLP?

- Introduction to IQVIA NLP

- IQVIA NLP Risk Adjustment Solution

- Demo

- Other areas for NLP

- Q&A

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Why now is the time embrace AI for Risk Adjustment

There are many reasons why this makes sense – the main ones are shown below

1

Increasing Patient Numbers

- 10,000 US turn 65 every day

2

Increasing Data Volume

- Interoperability + widespread EMR

3

Increasing Regulatory Pressures

- RADV final rule

4

Evolving Rules

- Proposed V28

There is a need for solutions which enable widespread automation and augmentation of Risk Adjustment processes that provide:

Increased Efficiencies

Increased Transparency

Increased Resilience to audit

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Artificial Intelligence and Natural Language Processing are key to these requirements

What is clinical NLP?

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What is cNLP and why is it so important?

Unlock insights trapped in scientific and clinical text for decision support, bench to bedside

Search and transform **text** into…

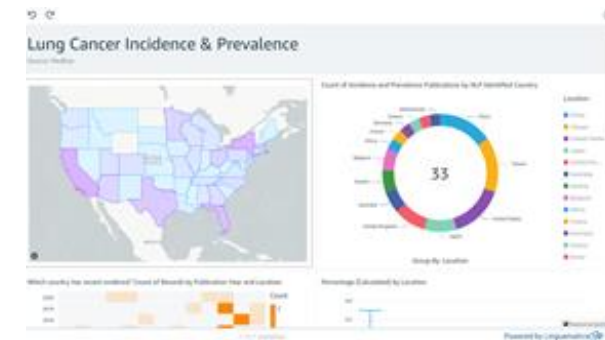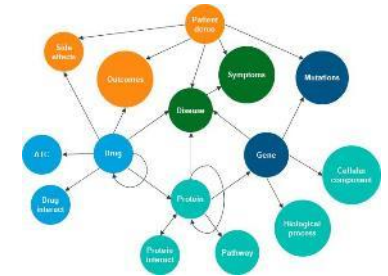… **structured data** using **powerful queries** …

… to drive **analytics** and **outcomes**

Document and Text Rich Data Sources

Databases

Natural Language Processing – Ontologies – Statistical Methods – Machine Learning – Chemistry – Regular Expressions – etc.

NLP finds information within its correct context

Different word, same meaning

- cyclosporine
- ciclosporin
- Neoral
- Sandimmune

Different expression, same meaning

- Non-smoker
- Does not smoke
- Does not drink or smoke
- Denies tobacco use

NLP

Different grammar, same meaning

- 5mg/kg of cyclosporine per day
- 5mg/kg per diem of cyclosporine
- cyclosporine 5mg/kg per day

Same word, different context

- Diagnosed with diabetes
- Family history of diabetes
- No family history of diabetes

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James Anderson, a 51 year old man with past history of hypertension and osteoarthritis, complains of tiredness, daytime somnolence, and frequently waking up at night to pass urine. He has a sedentary lifestyle with a high fat and high carbohydrates diet. He is a former smoker of 2 packs a day, quit 10 years ago. Patient states he lives alone, and is under a lot of stress. Lately, he has been drinking approximately 6 beers a day. In the past 4 years has become significantly overweight, and has had increased problems walking upstairs, he has a current body mass index of 38.2 kg/m2 and BP of 140/90. Following a visit to his PCP, he was diagnosed with type 2 diabetes (T2D), based on the following diagnosis criteria:HbA1c > 48 mmol/mol; fasting glucose concentration > 7.0 mmol/l; 2-hour post 75gram glucose load (oral glucose tolerance test) glucose concentration > 11.1 mmol/l (screening result provided below)

Additionally, based on the high-risk profile for other metabolic co-morbid conditions associated with T2D further assessments included:

Testing parameter/Time frame	Normal	Patient results
Blood glucose level measurement (HbA1c)/mmo/mol and % HbA1c	Optimum level HbA1c > 48 mmol/mol and between % HbA1c 6.5% and 7.5%	74.9 mmol/mol and % HbA1c 9%
2-hour post 75gram glucose load (oral glucose tolerance test)	> 11.1 mmol/l	15.1 mmol/l
K	3.6 – 5.2 mmol/l	4.5 mmol/l
Na	135-145 mEq/L	139 mEq/L
Total Cholesterol	<= 5.0 mmol/L or lower	6.5 mmol/L
Kidney function testing (Urinary albumin)	<30 mg/g	26 mg/g

His current medications include: OTC Advil prn; 40mg of Lotensin daily. He was prescribed metformin 500mg three times a day implemented in combination with appropriate lifestyle and dietary advice and intervention. He was also prescribed a lipid lowering agent and antihypertension agent and asked to return in 3 months.

He missed his 3 month appointment on 24th November 2014 and follow-up at 6 month on 2015/02/18 showed an HbA1c increased to 91.3 mmol/mol/HbA1c 10.5%, increased weigh to 41 2 kg/m2 along with minimal increases in blood pressure and cholesterol.

Other test (as listed in table 1) also showed trends towards worsening but were still within normal

Synthetic Data

Symptoms

Lifestyle

Diseases

Words
Synonyms
Abbreviations
Misspellings

Measurements
Units of Measure
Numbers Only
Words / Numbers

Medications

Dates / Time

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Monitoring

Assessing

Treating

Risk Adjustable Diagnosis

Evaluating

James Anderson, a 51 year old man with past history of hypertension and osteoarthritis, complains of tiredness, daytime somnolence, and frequently waking up at night to pass urine. He has a sedentary lifestyle with a high fat and high carbohydrates diet. He is a former smoker of 2 packs a day, quit 10 years ago. Patient states he lives alone, and is under a lot of stress. Lately, he has been drinking approximately 6 beers a day. In the past 4 years has become significantly overweight, and has had increased problems walking upstairs, he has a current body mass index of 38.2 kg/m2 and BP of 140/90. Following a visit to his PCP, he was diagnosed with type 2 diabetes (T2D), based on the following diagnosis criteria:HbA1c > 48 mmol/mol; fasting glucose concentration > 7.0 mmol/l; 2-hour post 75gram glucose load (oral glucose tolerance test) glucose concentration > 11.1 mmol/l (screening result provided below)

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IQVIA clinical NLP from Linguamatics

Extract value from unstructured data for rapid effective decision support

NLP Leaders

20+ years of deploying Natural Language Processing (NLP) based solutions. Working with leading Healthcare Payers and Providers, as well as 19 out of top 20 Pharma, and large government entities
Backed up by experienced professional services team

Scientifically Proven

There are over 100 publications validating IQVIA's NLP capabilities. Having processed 100,000,000s medical records – our platform is expert in extracting information from messy textual data
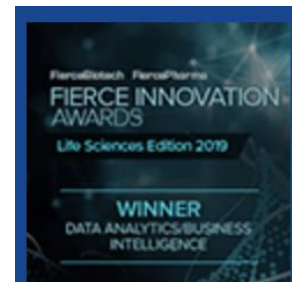
Recipient of multiple awards

> 100

publications

Proven excellence in cNLP

FierceBiotech FiercePharma
FIERCE INNOVATION AWARDS
Life Sciences Edition 2019
WINNER
DATA ANALYTICS/BUSINESS INTELLIGENCE

INNOVATIVE PRACTICES AWARDS
WINNER
Bio-IT World 2020

INNOVATIVE PRACTICES AWARDS
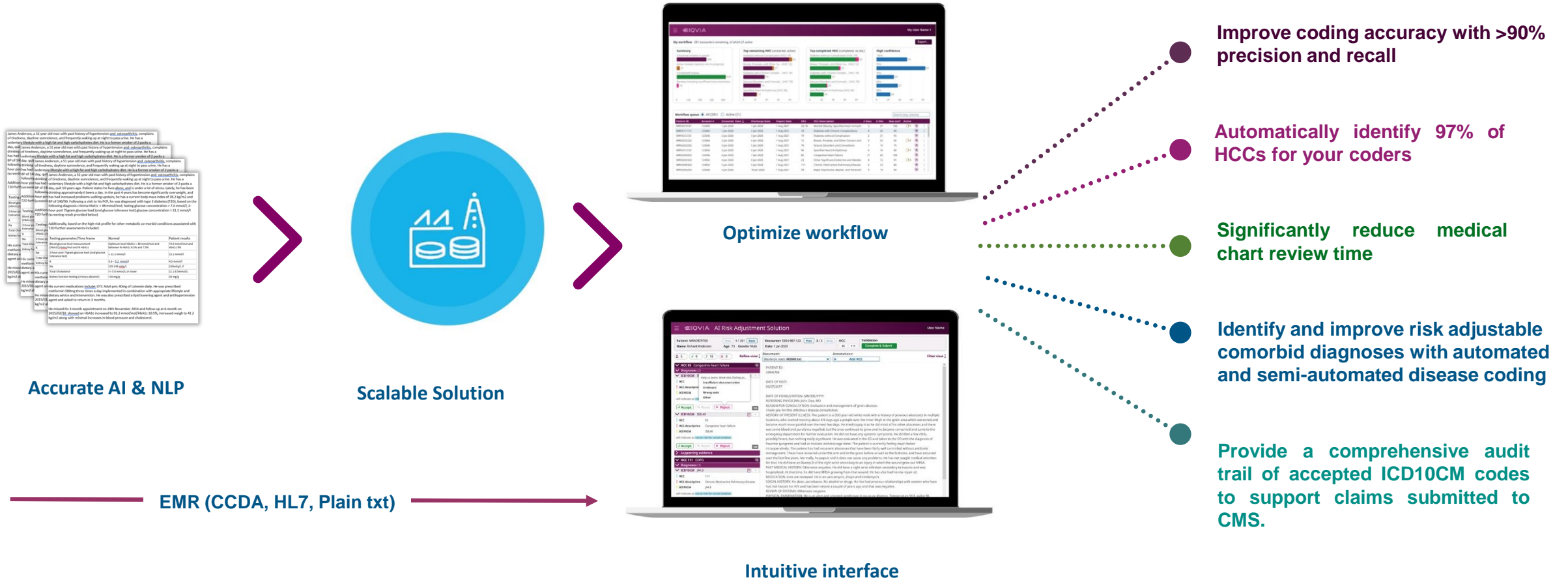**WINNER**
Bio-IT World 2022

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IQVIA NLP Risk Adjustment Solution

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IQVIA NLP Risk Adjustment Solution

Improve efficiency and accuracy of medical record review for a more holistic risk adjustment coding
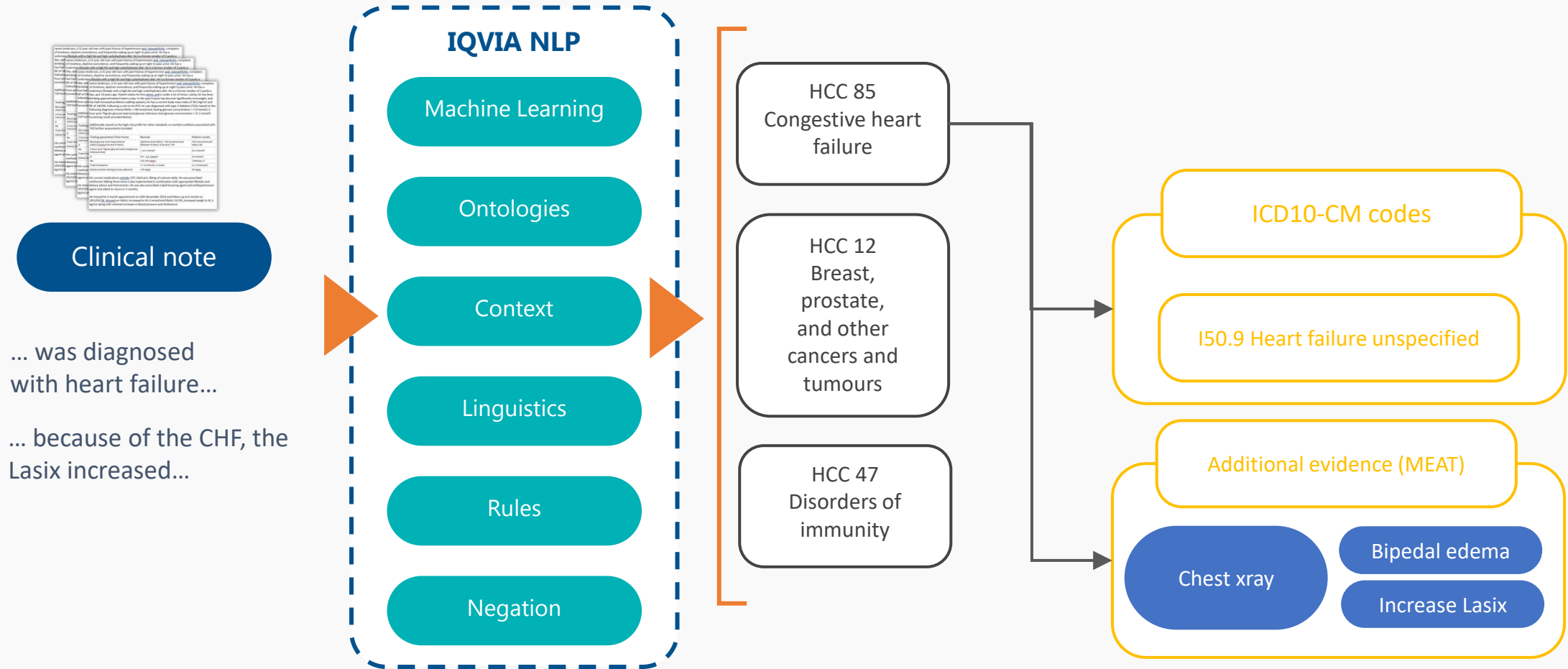

Accurate AI & NLP

Scalable Solution

Optimize workflow

Intuitive interface

EMR (CCDA, HL7, Plain txt)

Improve coding accuracy with >90% precision and recall

Automatically identify 97% of HCCs for your coders

Significantly reduce medical chart review time

Identify and improve risk adjustable comorbid diagnoses with automated and semi-automated disease coding

Provide a comprehensive audit trail of accepted ICD10CM codes to support claims submitted to CMS.

IQVIA NLP Risk Adjustment Solution

Clinical note

… was diagnosed with heart failure…

… because of the CHF, the Lasix increased…

IQVIA NLP

- Machine Learning
- Ontologies
- Context
- Linguistics
- Rules
- Negation

HCC 85 Congestive heart failure

HCC 12 Breast, prostate, and other cancers and tumours

HCC 47 Disorders of immunity

ICD10-CM codes

I50.9 Heart failure unspecified

Additional evidence (MEAT)

Chest xray

Bipedal edema

Increase Lasix

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Market Research – what is most important to Risk Adjustment teams

Ease of use is the most important factor to my team. If it doesn't obviously make our lives easier – we won't use it.

Post sales support has been poor from our vendor which makes adoption difficult

Accuracy is the most important variable for us

We need a solution our internal auditors can use

Technical support and education regarding the usage of NLP based solutions is a must, firstly for operational use and, secondly, to derive maximum benefit from the solution

A solution that we can adapt to our program is very important to us. We want to make sure our in-house rules can be accommodated

Key Differentiators

Scalable
8 million records processed an hour using the IQVIA NLP Data Factory.

Accuracy
Advanced AI powered chart extraction drives identifies 97% of HCCs automatically

Deployment
A variety of deployment models are available – on your hardware, in the cloud, in our cloud.

Partner
Our dedicated services team will take you through every step of the way from deployment to training.

Accountability
Provides a comprehensive audit trail of accepted ICD10 codes to support claims submitted to CMS.

Our customers' success is our success

60

40   80

20   100

100% support tickets responded to within 4 hours

IQVIA is with you for the whole journey

- Dedicated support team

- Dedicated customer success manager

- > 95% tickets responded to within 1 hour

- 90% tickets fully resolved within 10 days

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Large Blue Payer – AI augmented Risk Adjustment

125,000 charts reviewed per year

90% Precision and Recall

10% increase in Risk Adjustable diagnoses identified

NLP identifies relevant information, in context, and normalizes to ICD10CM codes and HCC categories

OCR converts unstructured documents to structured hOCR files

Evidence is presented to reviewers from the entire record, enabling them to focus on relevant documentation

Case study – Large US Health System:
Using NLP to augment human review and reduce risk burden

Situation

- Accountable Care Organisation (ACO) struggled to identify **high-risk patients, report on quality measures**, and i**mprove clinical documentation because key data was trapped in clinical notes.**
- As ACO– very important to accurately understand **patients disease burden and risk**

> **Manual chart review identified 1 care gap from 1000 patients**
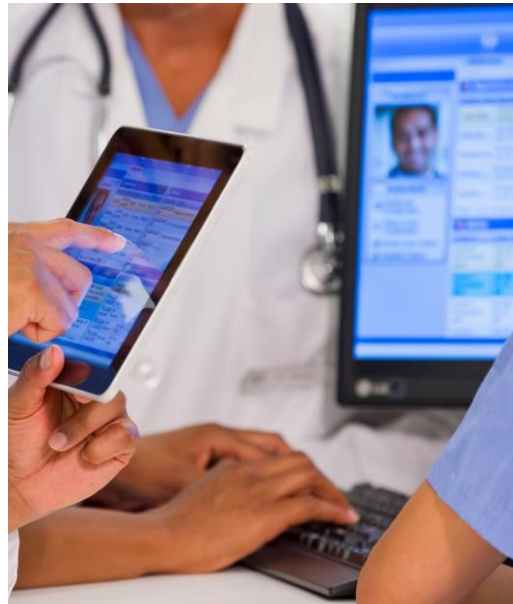
Solution

- IQVIA NLP pipeline implemented to mine unstructured medical records
- Queries to **extract clinical data from** free-text fields within **clinician progress notes** and **clinical reports** for **high disease burden** areas.

Results

- **At-risk patients** are easier to identify
- **92 otherwise undocumented** congestive heart failure and chronic obstructive pulmonary disease **patients.**
- **$75k - $150k in additional annual** risk-adjusted **revenue gained per disease area**
- **200-fold increase** in the efficiency of their chart reconciliation process

Other uses for industry leading clinical Natural Language Processing

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The ONC is calling for payers to adopt AI and NLP

"

Once that 18 months is over, it is everything. It's text notes, transcriptions, and other kinds of documents. The only way that we'll be able to get our arms around that is using algorithms, machine learning, and other kinds of approaches, such as natural language processing, to be able to take advantage of on behalf of the patient, on behalf of better quality, to be able to take advantage of that broader, comprehensive information that's available

Micky Tripathi
National Coordinator for Health IT, ONC

https://ehrintelligence.com/news/onc-leader-tripathi-offers-tips-for-interoperability-rule-success

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"There are so many uses of unstructured data in a health plan that NLP must be a core competency. IQVIA has accelerated our adoption of NLP across multiple business areas without needing to hire high cost AI/NLP experts"

Medical Record Review

Key to many provider and payor processes

- The average medical record review takes 20 minutes when unaided by AI

- Some records are 100s of pages long and can take hours

- Vital process in key administrative and research applications
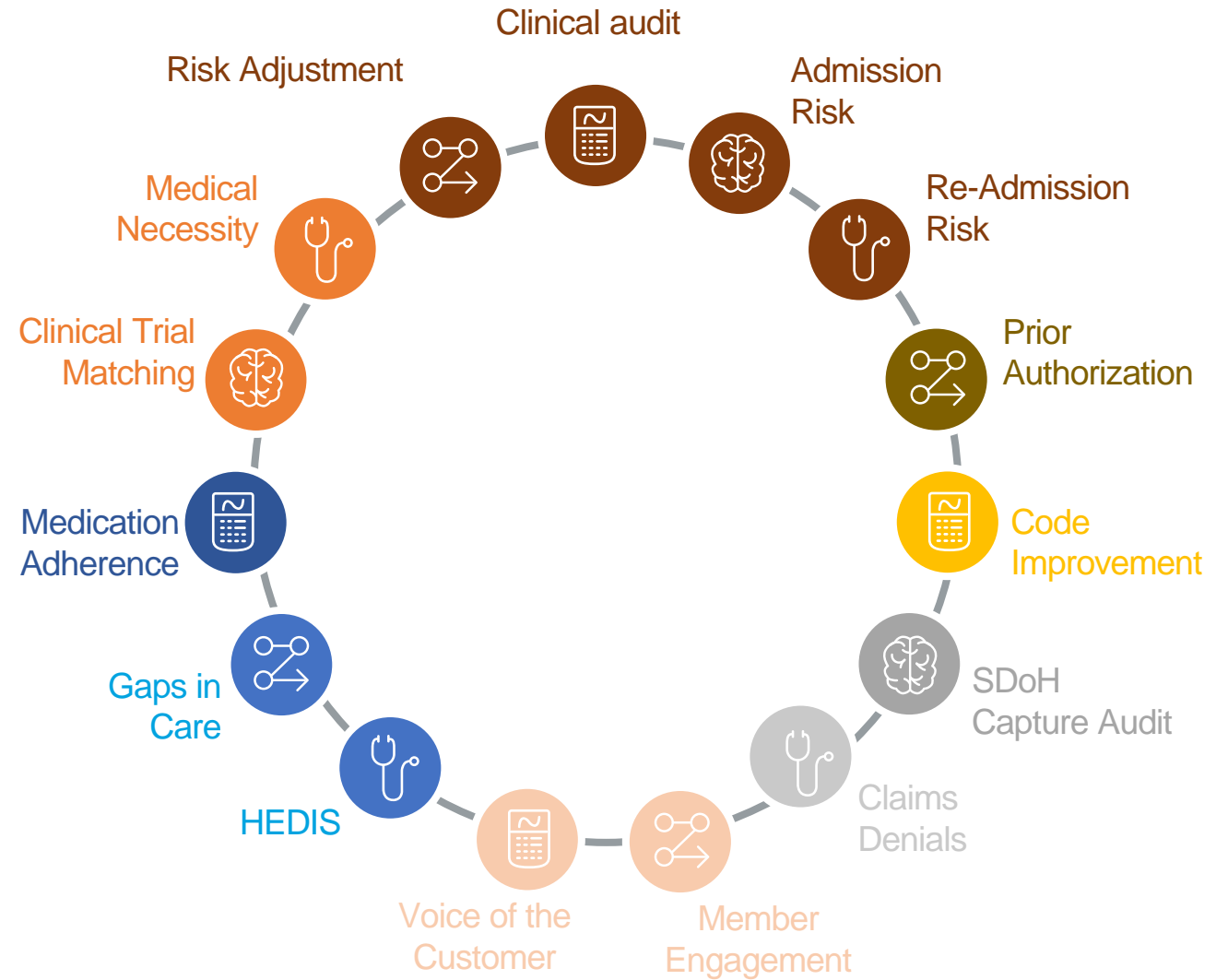
Other key areas of value from cNLP

Predictive modelling and machine learning

Care Gaps

Social Determinants of Health

Improve the predictive power an accuracy of machine learning algorithms by providing high quality structured data, derived from clinical notes

Identify uncoded diseases, or at-risk patients, not otherwise shown in structured data

Identify 300X more member level SDOH data points using NLP to mine member medical records, or call center transcripts

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Driving Predictive Models

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Case Study - Predicting Diabetic Foot Amputation

Situation

- The burden of care for patients with **diabetes** is increasing globally

- **Diabetic foot ulcers** are a major issue for a **large US insurance company,** costing **$400m per year**

- **38,000 members** have diabetic foot ulcers with **3,100 amputations** at **$21,684** each

Solution

- Key concepts known to increase **risk of amputation** were extracted from the **unstructured data** using Linguamatics

- Results in a **predictive risk model** being built using the three features with the highest PPV: Mention of **Ulcer,** patient's **BMI, Medications**

Results

- A modest improvement from NLP resulted in **155 fewer amputations**

- The translated ROI is between **$1.5m** and **$3.3m annual savings**

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Identify gaps in care

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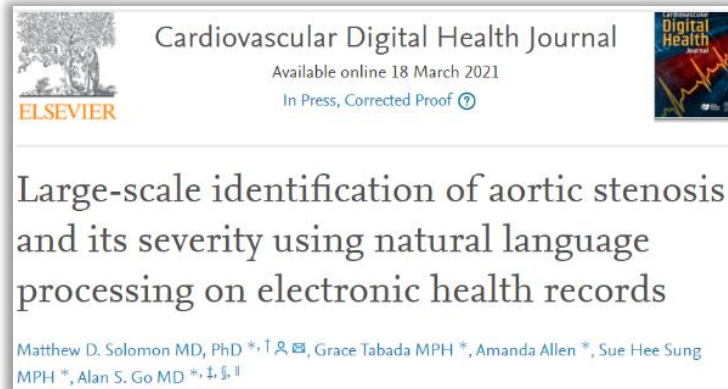# Kaiser Permanente: Large Scale Analysis of Aortic Stenosis Care Gaps

Challenge

- Systematic, population-level tracking and management of chronic diseases is critical to **improving individual and population health**
- **Diagnosis cod**es for conditions such as valvular heart disease/Aortic Stenosis can be **inaccurate** and vary across health systems leading to care gaps
- Echocardiography (echo) data contain detailed clinical information **but are generally unstructured**, e.g. Body Surface Area, aortic valve area, peak gradient

Solution

- IQVIA NLP deployed against to **927, 884** echo reports for **519, 967** patients across 2008-2018
- NLP queries created for multiple variables relevant to Aortic Stenosis including: **physician diagnosis** of AS, **severity** of AS, AV max, peak AV gradient, **Left Ventricular Hypertrophy,** End-systolic diameter

Cardiovascular Digital Health Journal
Available online 18 March 2021
In Press, Corrected Proof ⑦
ELSEVIER

Large-scale identification of aortic stenosis and its severity using natural language processing on electronic health records

Matthew D. Solomon MD, PhD [*,†] ⚹ ✉, Grace Tabada MPH [*], Amanda Allen [*], Sue Hee Sung MPH [*], Alan S. Go MD [*,‡,§,‖]

Result

- Linguamatics NLP identified AS with **PPV and NPV of >95%**
- 104, 090 echos and 53, 791 patients were identified as having aortic stenosis
- Represented **50% increase** in patients identified

❝ A validated NLP algorithm applied to a systemwide echocardiography database was substantially more accurate than diagnosis codes for identifying AS.

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Patient stratification using Social Determinants of Health

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Drive Health Equity initiatives

- Extract patient level SDOH data using NLP

  - SDOH information extracted from millions of records per hour to provide value at scale
  - Extracted terms are normalized across 14 domains
  - Each domain has subcategories which allows for rich stratification of patients
  - These can be customised and added to as required
  - Both present and negated findings are surfaced
  - Data is output to a custom ontology as well as ICD Z codes and SNOMED codes
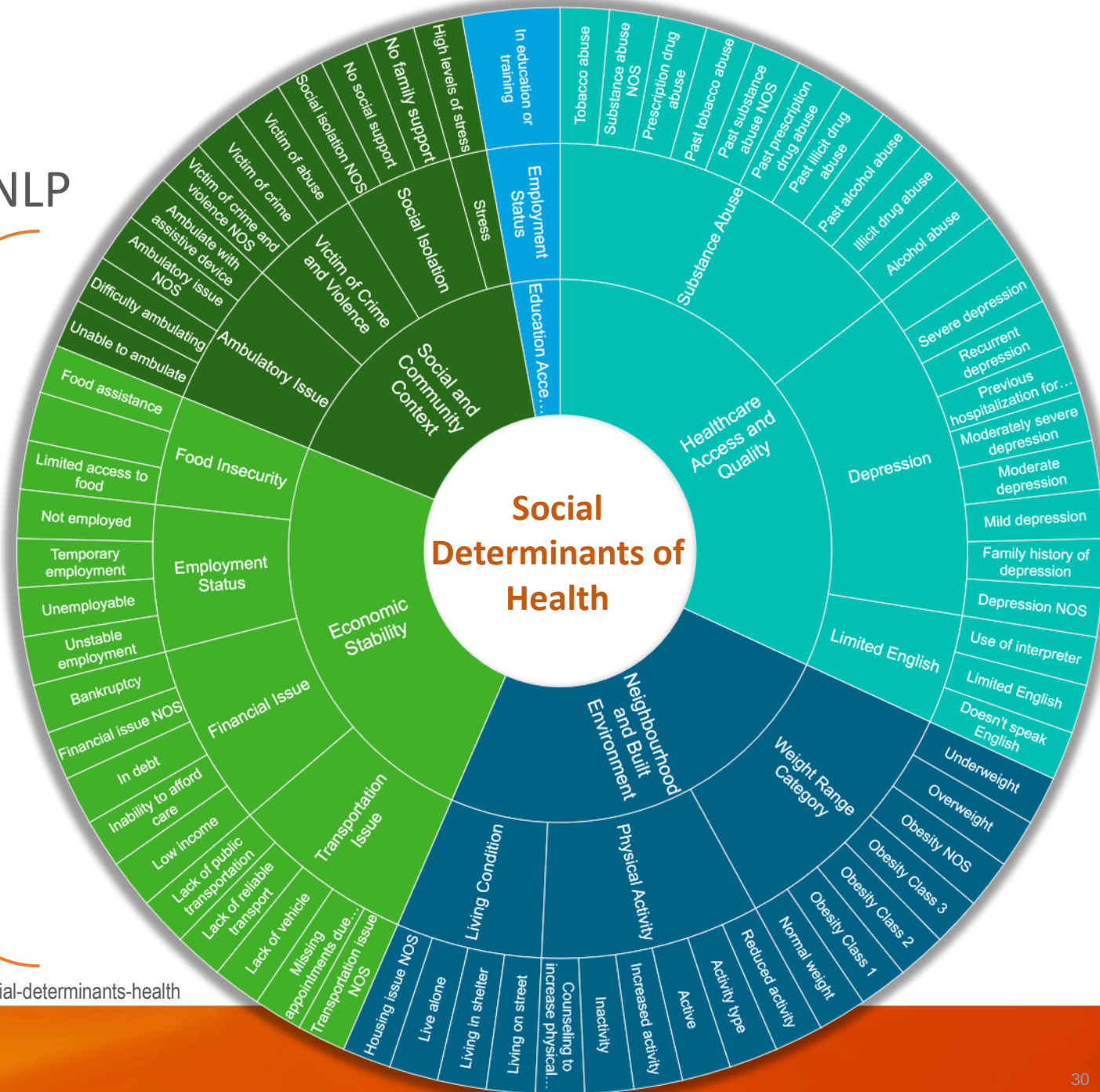
*SDOH can be grouped according to Healthy People 2030 https://health.gov/healthypeople/priority-areas/social-determinants-health

Mid West IDN – driving Health Equity with NLP Insights

Situation

With the COVID pandemic and the drive to push into value-based care, healthcare providers need to understand Social Determinants of Health (SDOH) to effectively and equitably care for populations. In this case, **only 0.1% of patient**s had structured data on SDOH in their EMR

Aim

- Identify patients with limited English proficiency and primary language to enable targeted patient satisfaction surveys in different languages → increase the voice of underrepresented populations

Results

- 300X increase in patients with at least 1 SDOH in their EMR (30%)
- Identified 6.32% (**17,500 patients**) of patients listed in EPIC as English Speaking, for whom **English was actually not their first language**
- 96% accuracy for identification of patients with limited English

17,479

Number of patients with incorrect spoken language documented in their EMR identified by NLP

Query Category	Precision	Recall	F1 - score
Employment Status*	95%	93%	94%
Financial Issue	77%	100%	87%
Food Insecurity	65%	100%	79%
Limited English*	90%	96%	93%
Living Condition	90%	94%	92%
Stress	64%	100%	78%
Transportation Issue*	69%	90%	78%
Spoken Language*	N/A	N/A	96.92% (accuracy)

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Summary

IQVIA NLP can help you transform risk adjustment and more with clinician NLP
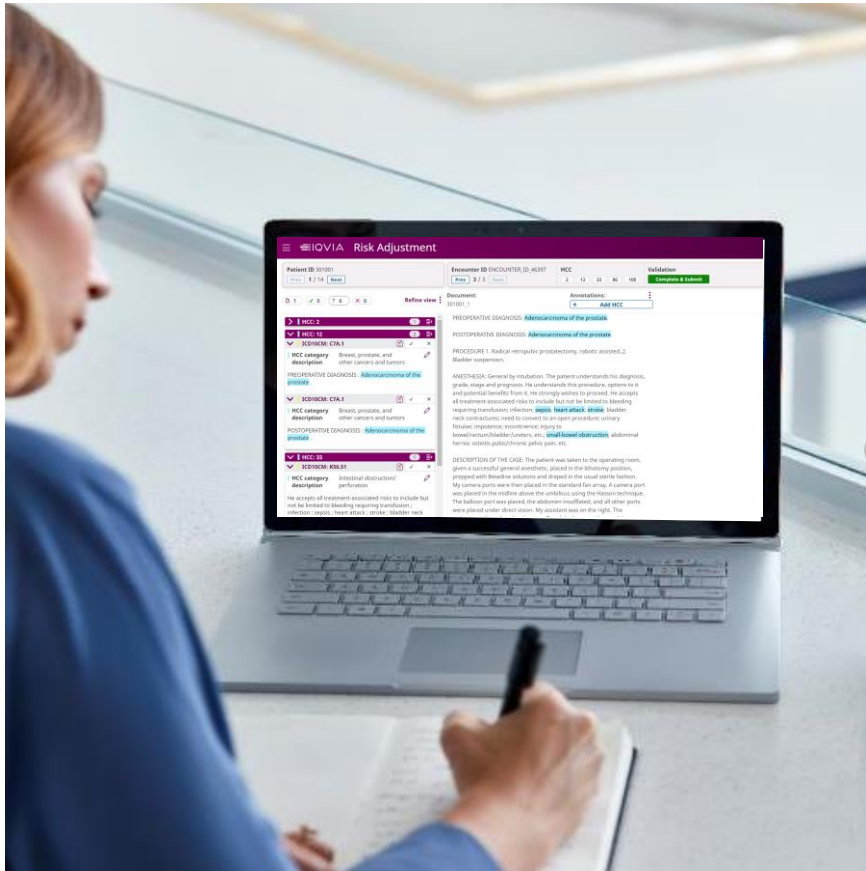
Summary

- Now is the time for organizations to adopt AI/NLP in Risk Adjustment

- IQVIA is a leading expert in clinical NLP

- IQVIA provides excellent implementation and post implementation services

- IQVIA NLP can be deployed on your infrastructure to enable AI to augment teams in risk and beyond

Ways forward

- Visit iqvia.com/nlp to view the breadth and depth of our expertise in healthcare

- Get in touch at nlp@iqvia.com to arrange a demo and discussion

THANK YOU

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