



The Evolving World of Natural Language Processing in Healthcare and Life Sciences

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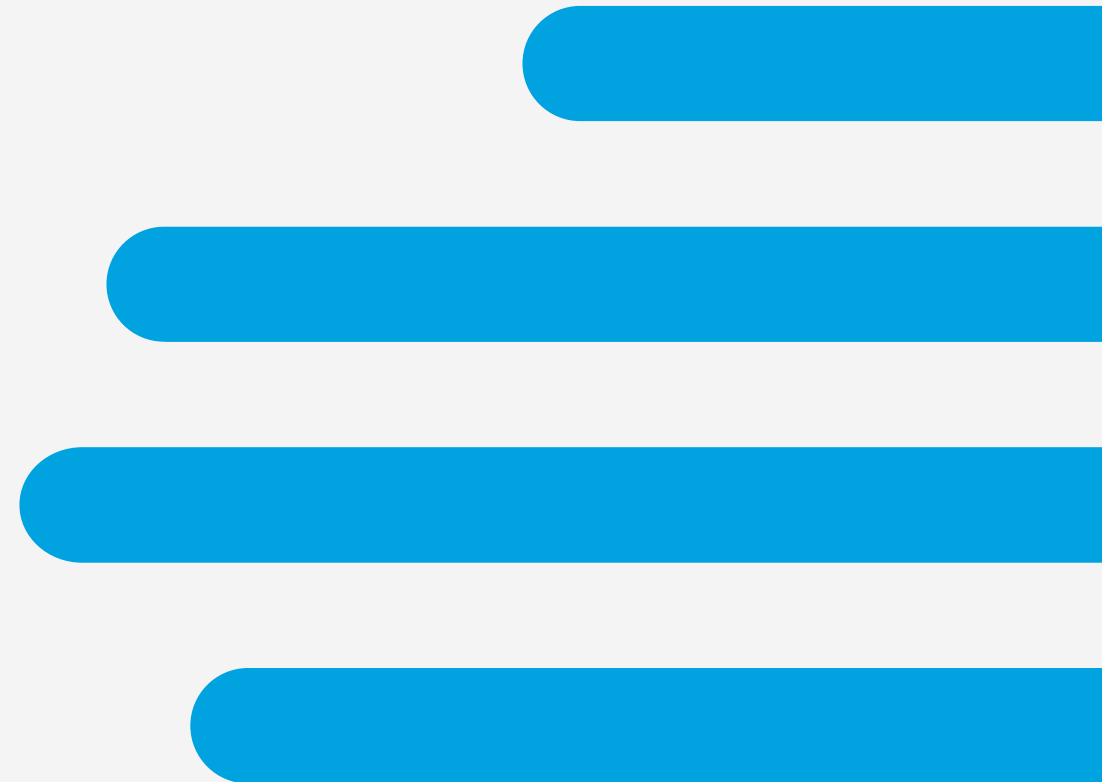




Agenda

- + Introduction to Information Extraction in Healthcare
- + Blending Methods
- + IQVIA NLP Information Extraction Pipeline
- + Demo: Applied ML in Life Sciences
 - GSK
 - Northshore
 - Using ML for Extraction of Adverse Events
- + Summary
- + QA

Information Extraction in Healthcare



Disruption in Healthcare has been accelerated by a combination of the digital revolution and COVID responses

Explosion in Data



The volume and pace of research, breadth and depth of digital and other interactions in diverse formats, all contribute to the explosion in data and information overload

Real-World & Patient centricity



Unlocking unstructured medical records, the ever-increasing role of real-world data, and focus on patient voice is disrupting development, access and commercialization

Accelerating Digital



Digital interactions have taken a leap as a result of the pandemic, with acceptance of digitalization and new technologies to handle and analyze data

AI & Expert Augmentation



Evolution and revolution in ML methods, accelerating pace of change, and need for human in the loop for impactful data and deep insights

Unlock medical, business and scientific context

Input: Raw Health Records

Increased Tumour Size
Tumour margins negative
EGFR T790 positive
Failed treatment with cisplatin
Ejection Fraction 40%
PDL1 negative

Radiology Report
Echocardiogram
Pathology Report
Admitting Note
Operative Note
Progress Note
Tumour Tissue

James Anderson, a 51 year old man with past history of hypertension and rheumatoid arthritis, complains of frequent 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 he has become significantly overweight, and has had increased problems walking upstairs, he has a current body mass index of 33.2 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	Optimum level HbA1c > 48 mmol/mol and	74.9 mmol/mol and

Result: Medical Context

Medications

Text

On M

Normal

Medic

Drug N

Metfor

Social Determinants

Text	Normalized Value
Former smoker	Ex smoker
Quit 10 years ago	
Problems walking	Ambulatory Status: walking difficulty
Lot of stress	High levels of stress/Stress
He lives alone	Social Isolation
Missed his 3 month appointment	Did not attend



Human Centric Content

Input: Patient Questions

Can I get a flu shot while taking Drug A?

Can I take Drug A while pregnant?

Should I try for a baby while taking Drug A?

Result: Business Context

Count of #Hits by Topic

Topic	Count of #Hits
Drug Info	125
Symptom	95
Other Drugs	55
Dosage	20
Non-Drug	15

Input: Research Activity

Result: Scientific Context

Study Count by Neoplasm

816

Neoplasms

- Neoplasms
- Melanoma
- Carcinoma, Hepa...
- Carcinoma, Non-Small-Cell...
- Multiple Myeloma
- Prostatic Neoplasms
- Breast Neoplasms
- Glioblastoma
- Carcinoma, Hepatocellular...
- Leukemia, Myeloid, Acute
- Pancreatic Neoplasms

Healthcare Data is Complicated

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

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

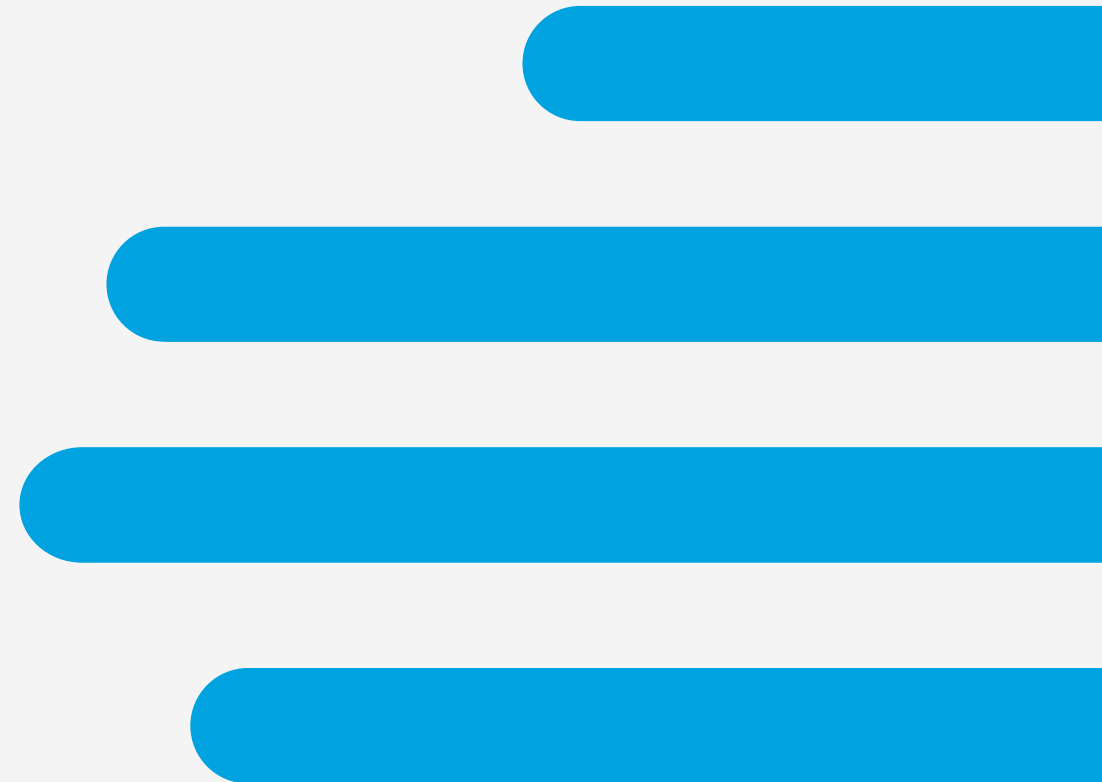
Dermatome

- An area of the skin supplied by a specific nerve root
- A surgical instrument used to cut the skin

NLP



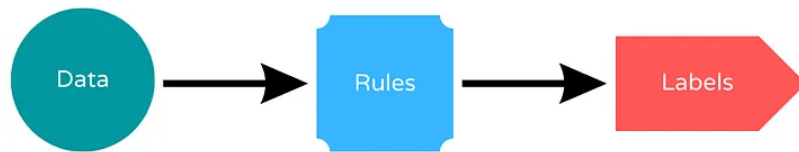
Blending Methods



Two main types of Natural Language Processing

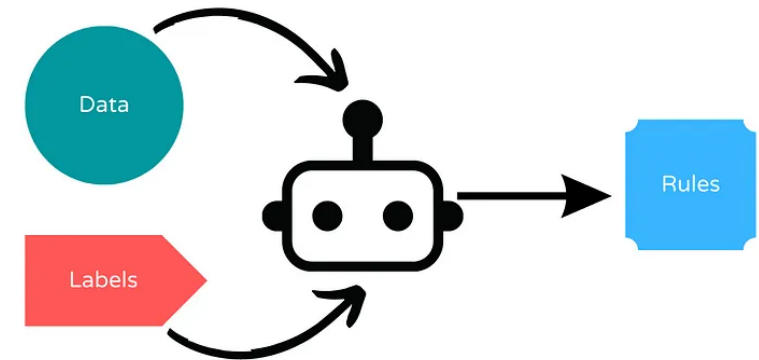
NLP for data transformation and better value from your unstructured text

There are many different natural language processing system, which fall into the two main categories:



Rules-based systems:

- Linguistic rules which are transparent, deterministic and repeatable
- Rules instruct the system to use semantically relevant elements of text to identify relevant entities, relations, categories based on its content
- Rules can be developed relatively rapidly, without large sets of training data
- If the rule doesn't exist, the system will be unable to 'understand' the human language and thus will fail



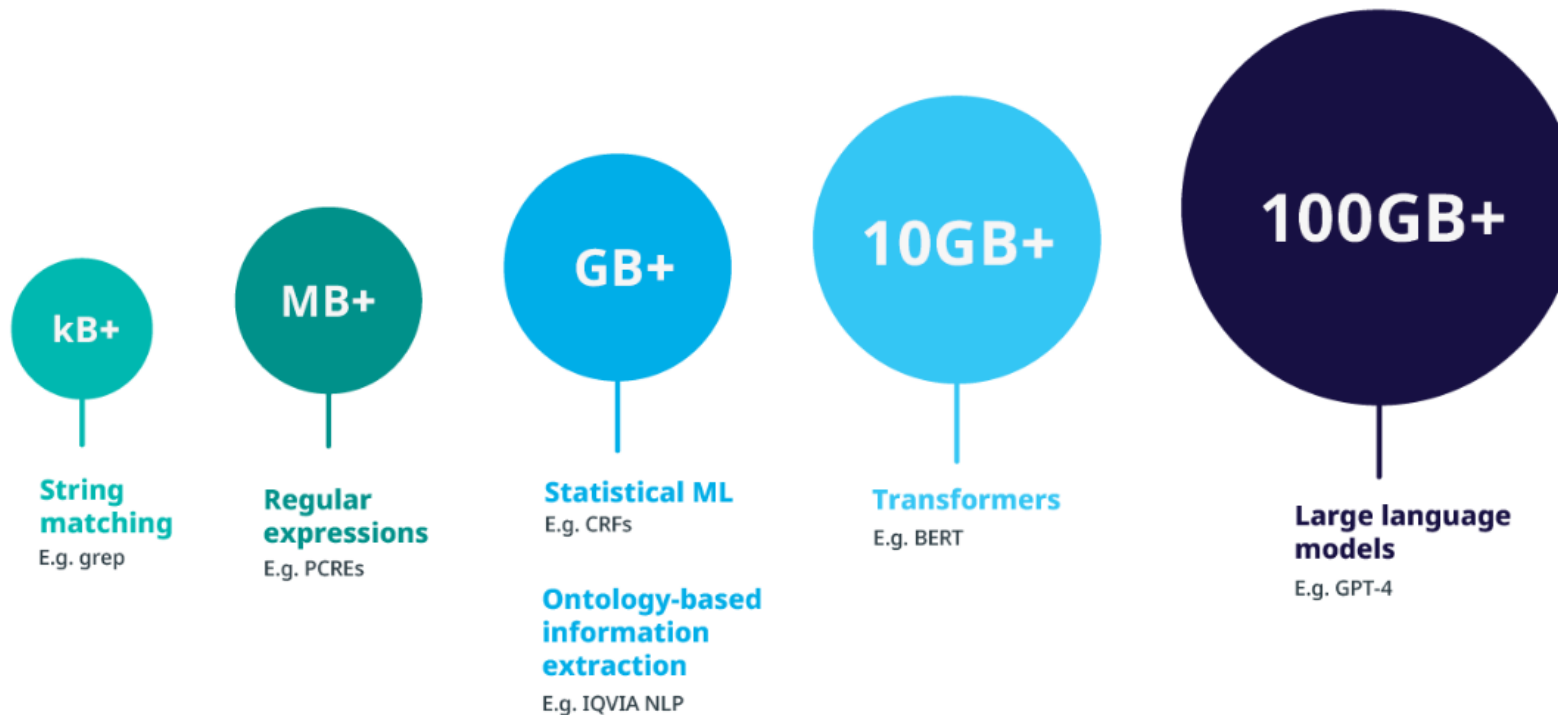
Machine learning-based systems:

- Use statistical methods to create a "black box"
- ML systems learn to perform tasks based on training data they are fed, and adjust their methods as more data is processed
- Can use deep learning, neural networks, transformer models (e.g. BERT), large language models (e.g. GPT)
- Generally need large volumes of annotated training data

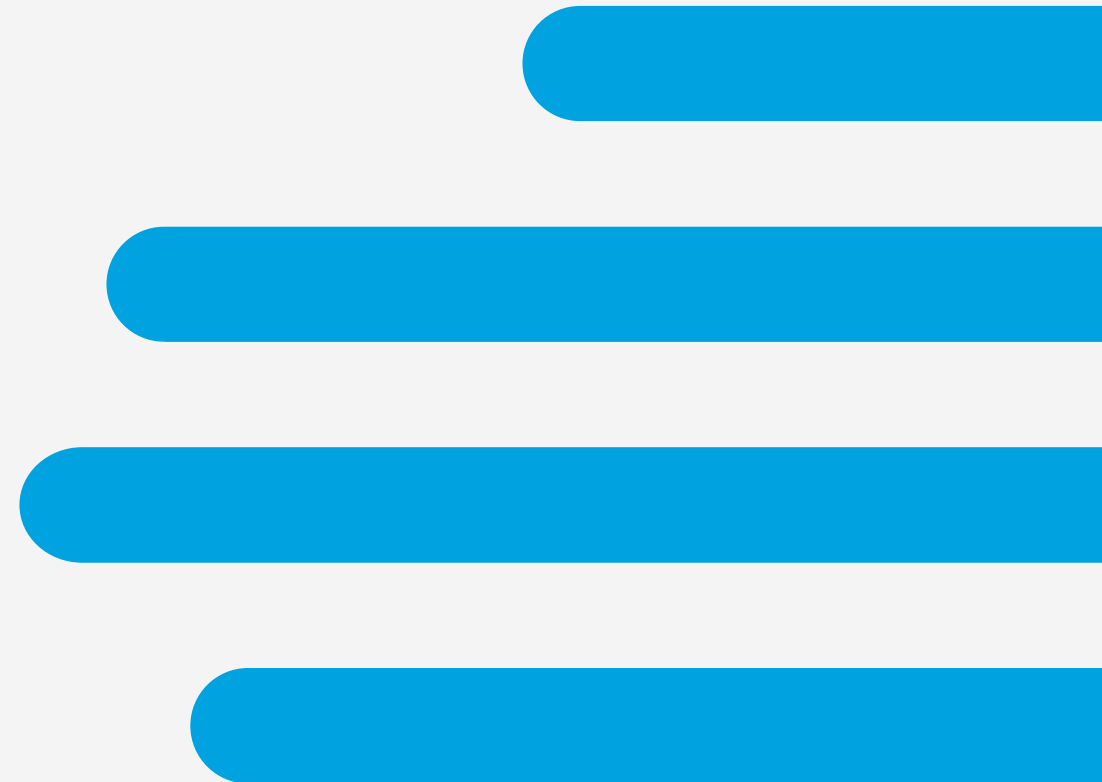
Figures from <https://towardsdatascience.com/human-learn-rule-based-learning-as-an-alternative-to-machine-learning-baf1899ecb3a>

Newer Tools are Bigger. And Better?

- Cost, Convenience, Accuracy
- The latest tools require massive amounts of compute to create the models and then to run them at production scale, risking large bills and vendor lock-in
- Simple problems should not require complex solutions.



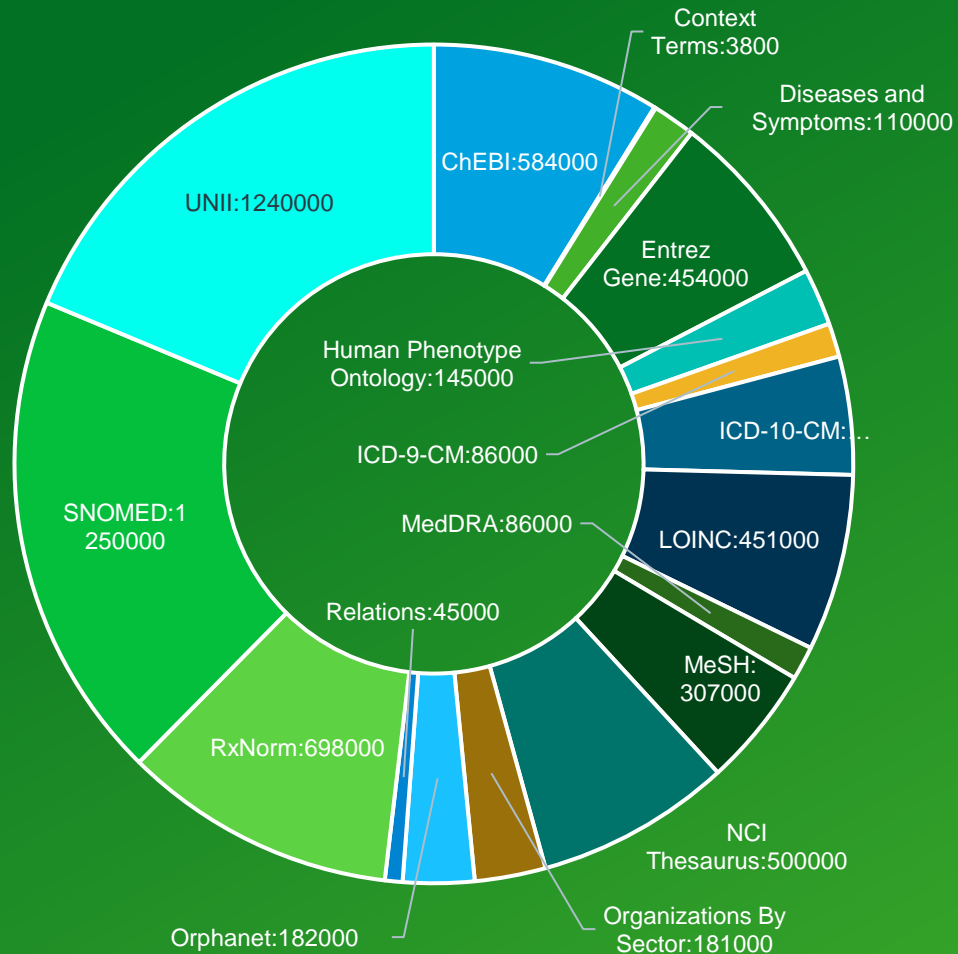
IQVIA NLP Information Extraction Pipeline



IQVIA NLP Ontologies



Over 6.5 million synonyms from a wide range of ontologies in many categories



Diseases & Phenotypes

Coronavirus
Diseases & Symptoms
HPO
MedDRA
MeSH
NCI

Orphanet
ICD-9-CM
ICD-10-CM
ICD-O
LOINC
SNOMED
TNM Stages



Biological Entities

Genes/Proteins
MeSH
Mutation
NCI



Drugs

ChEBI
Name-to-Structure
Drug Lab Code
MeSH
NCI
RxNorm
SNOMED
UNII



Anatomy

MeSH
NCI



Metrics

Measurements
Numerics
Units



Dates

Date
Duration & Frequency



Demographics

Age
Email
Person
Telephone Numbers



Linguistics

Context Terms
Relations

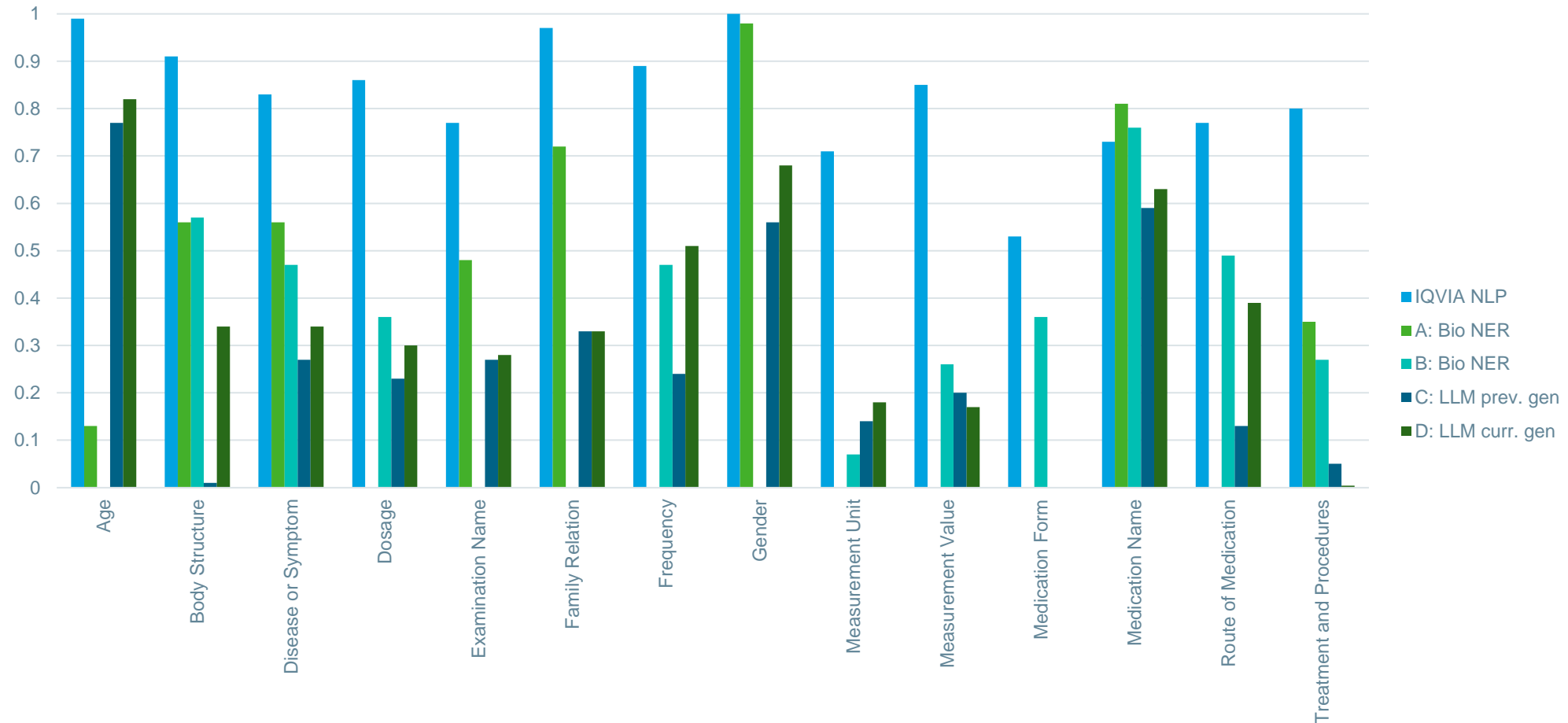


Organizations

MeSH
NCI
Organizations by Sector
Organizations by Type

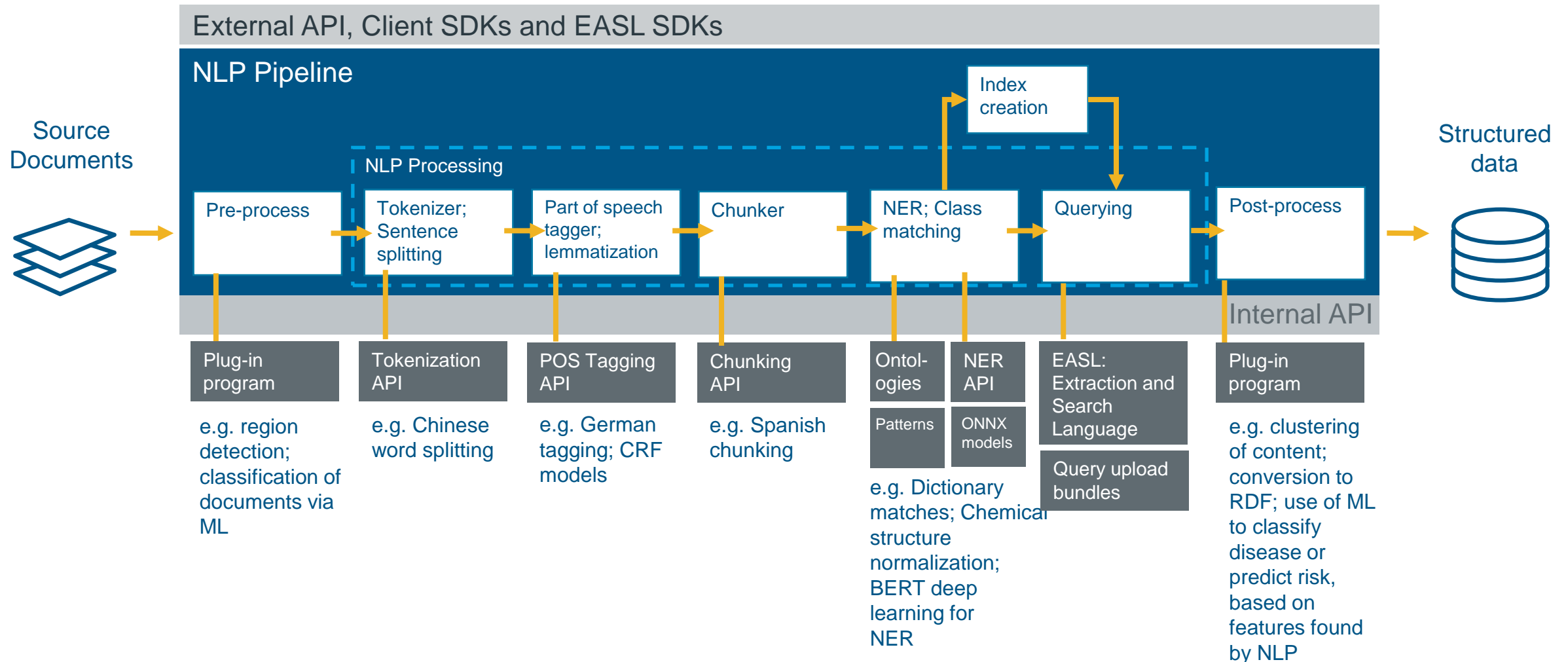
Very Accurate Biomedical NER across a Range of Entities

Identical NER benchmark run with IQVIA NLP tools plus four other systems



Our Core Pipeline

APIs within the NLP pipeline allow integration of existing components, prototyping and extensibility



Combine NLP techniques using GUI or SDK

Run interactively or programmatically

Integration with pre- and post-processors

YAML-based rich query language

Configuration GUI

Built-in Sentence Detection

Configurable distance constraints

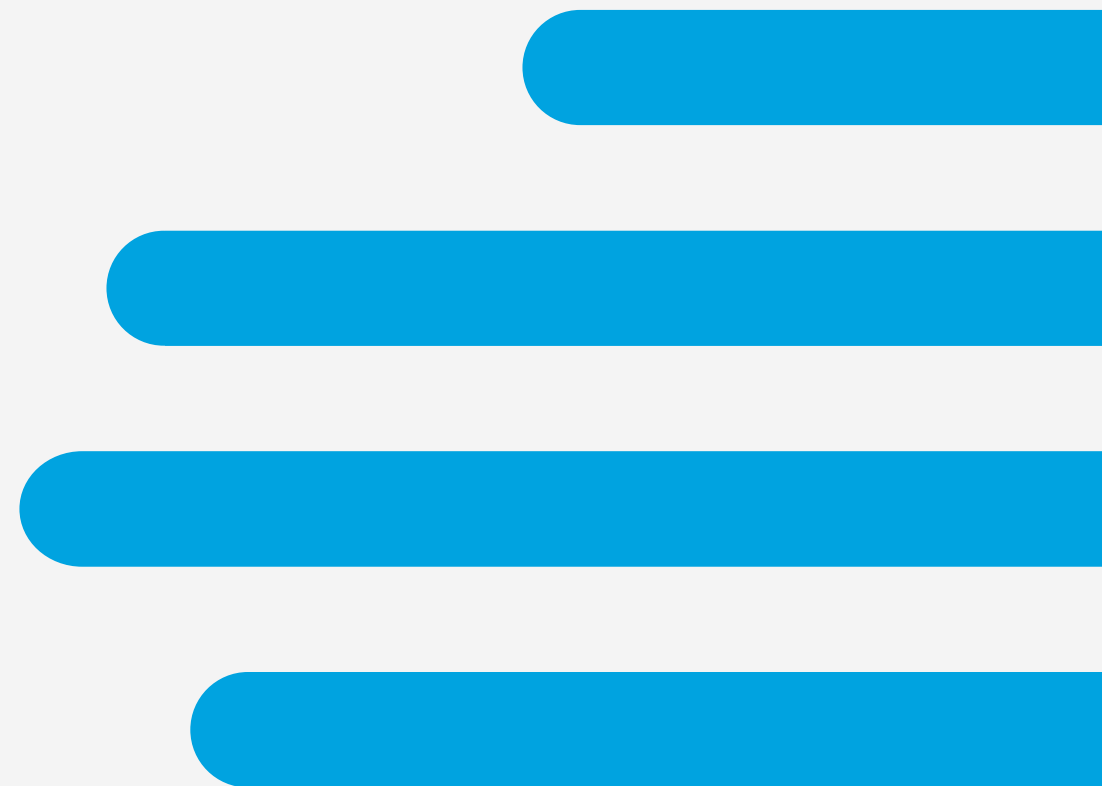
Linguistic wildcards

Transformer-based NER

Dictionary-based entity normalization

Output schema definition

Applied ML in Life Sciences



NLP-enhanced Social Media & News analysis for brand teams

Situation

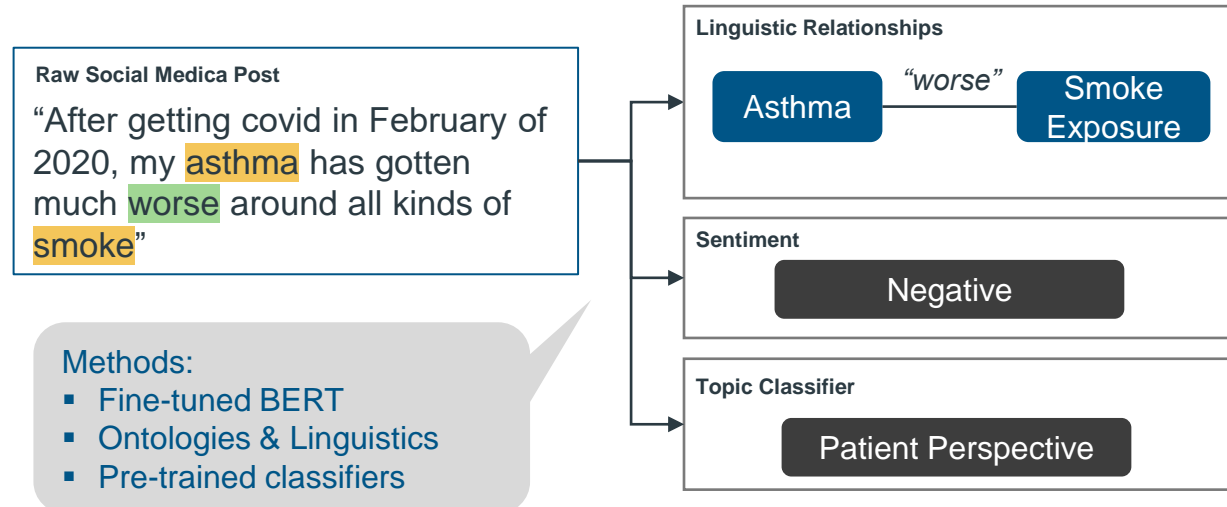
- Global, regional and country brand teams needed social media derived analysis and insight to inform marketing and stakeholder engagement for multiple products across key therapy areas
- For indications with high volumes of posts and mentions there is a high % of noisy or irrelevant posts that make usable insights challenging to derive

Outputs and User Impact

- By categorising posts with sentiment, written perspective, medical terms, treatment and many more dimensions the analysis allows brand teams to get a better understanding of the key needs, concerns and experiences of patients and other stakeholders
- Topic analysis of news articles helps understand the media content that patients and others are seeing and reading
- Beyond core topics of interest, the analyses identified adjacent topics and profiles that might inform targeted marketing and communication activities
- Thanks to noise reduction it was easier to quickly understand the content and move from insight to action

Solution

- IQVIA used a combination of **social listening tools, machine translation and natural language processing** to create an enhanced data feed
- This data feed was then ingested into a **data warehouse** and then fed into interactive visuals developed to surface trends, highlight key topics
- The algorithms make use of a combination of comprehensive bio-medical ontologies, linguistics, pre-trained models and supervised machine learning to create powerful tags and remove noise



Methods used to combine i2e, ML and GPT

Relationships (i2e)

- Linguistic relationships used to identify key content

Topic Analysis (i2e)

- Known topics are defined within i2e queries

Topic Cluster Naming and Simple Summaries

- GPT3.5 used to create topic cluster names



Ontologies (i2e)

- Broad use of ontologies to classify and explore the data

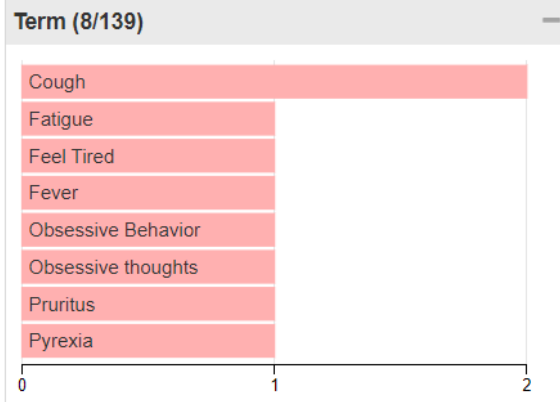
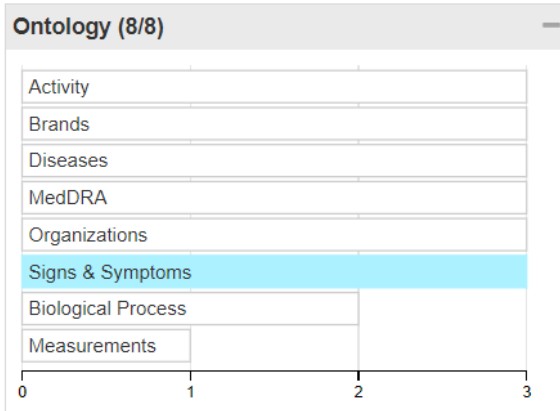
ML BERT Classifier (Perspectives)

- Classify which tweets are written from the perspective of patients, HCPs or caregivers

Unsupervised Topic Modeling

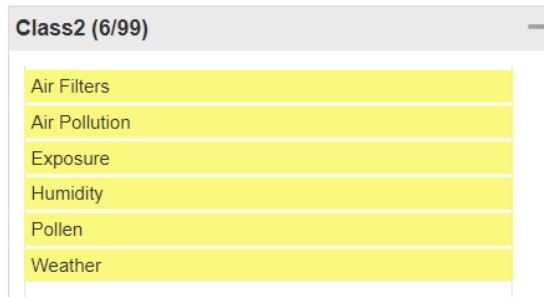
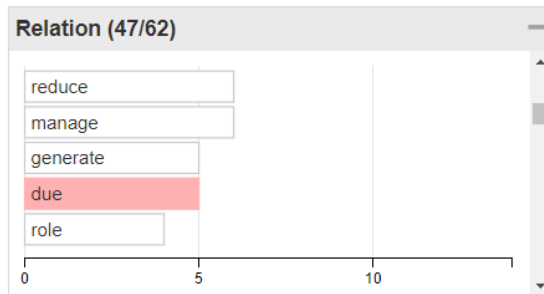
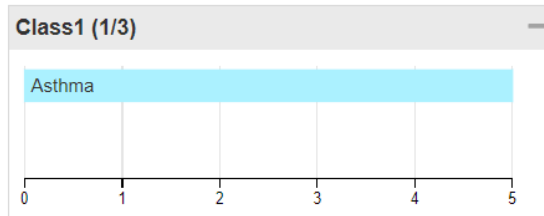
- Top2Vec used to generate unsupervised topic clusters based on the data

Ontology-Based Extraction



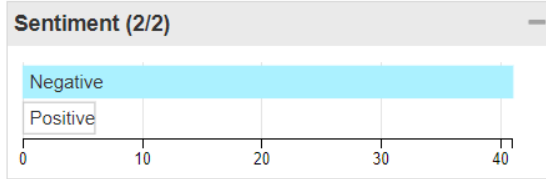
Ontology	Term	Text Snippet	Doc	#Hits	Hit	Export?
Signs & Symptoms	Pruritus	itches	999	1	cause it itches and you are left with ...	✓
Signs & Symptoms	Feel Tired	tired	999	1	beyond tired of repeating myself by saying...	✓
Signs & Symptoms	Fatigue	tired	999	1	beyond tired of repeating myself by saying...	✓
Signs & Symptoms	Cough	cough*	998	2	... the Brazos Valley - *cough* *cough* would have been ...	✓
Signs & Symptoms	Obsessive thoughts	self-obsession	999	1	... there is no vaccine for self-obsession, vanity and stupidity.	✓
Signs & Symptoms	Obsessive Behavior	self-obsession	999	1	... there is no vaccine for self-obsession, vanity and stupidity.	✓
Signs & Symptoms	Pyrexia	fever	1000	1	@MissFrancaise nono, fever & tickly cough.	✓
Signs & Symptoms	Fever	fever	1000	1	@MissFrancaise nono, fever & tickly cough.	✓
Signs & Symptoms	Cough	cough	1000	1	... nono, fever & tickly cough.	✓
Signs & Symptoms	Cough	a cough attack	1000	1	jus had a cough attack.	✓

Relationships



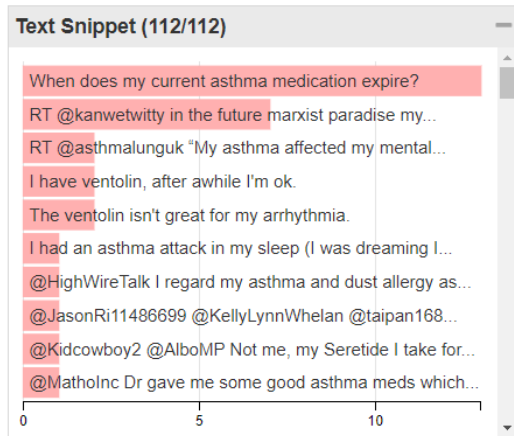
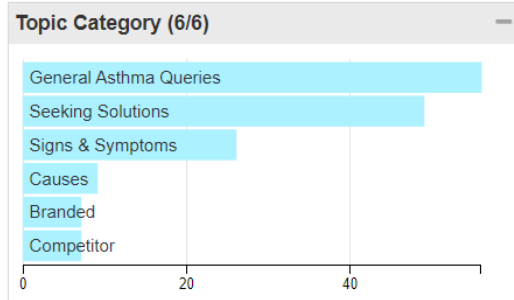
Class1	Relation	Class2	Doc	#Hits	Hit	Export?
Asthma	due	Exposure	4729	1	My research went from asthma due to aerosol exposure to mf pesticide exposure because of frequent use of baygon auhnshjd	✓
Asthma	due	Pollen	1804	1	I'll remember that next time I have a severe asthma attack due to pollen, dust, perfumes, or smoke from prescribed burning.	✓
Asthma	due	Air Filters	57	1	RT @ankitaup 41% reduction in acute asthma events due to air purifier use: AIIMS-IIT Delhi study indianexpress.com/article/cities... via @IndianExpress	✓
Asthma	due	Air Pollution	3584	1	The traditional Kujirabune Festival made a comeback to revitalize the Isozu area of Yokkaichi, Mie Prefecture, where many people suffered from asthma due to the air pollution in the city.	✓
Asthma	due	Weather	7329	1	I thought it was her asthma playing up due to Spring weather and high humidity.	✓
Asthma	due	Humidity	7329	1	I thought it was her asthma playing up due to Spring weather and high humidity.	✓

Sentiment



Sentiment	Text Snippet	Doc	#Hits	Hit	Export?
Negative	I was given an inhaler but i was warned that if I healed that means covid worsened my asthma.	9305	2	... that if I healed that means covid worsened my asthma.	✓
Negative	It's 2am and my asthma has flared up so I can't sleep ☐ literally coughing non stop.	3354	1	... asthma has flared up so I can't sleep ☐ literally coughing non stop.	✓
Negative	new car smell triggers my asthma lmao	3871	1	new car smell triggers my asthma lmao	✓
Negative	I cannot wear the Disposable masks as they trigger my Asthma I wear australianfacemasks.com.au WHO approved	9578	1	I cannot wear the Disposable masks as they trigger my ...	✓
Negative	not me feeling extremely guilty that I got sick on tuesday (I'm the one that usually and mostly gets sick if anything cause my asthma and allergies suck) and now my parents and brother are sick when they haven't gotten sick in months 🤔👉	9686	1	... and mostly gets sick if anything cause my asthma and allergies suck) and ...	✓
Negative	RT @stu_dowling @ProfGlantz ANTZ: Vaping causes asthma Us: My asthma's better now ANTZ: Vaping causes COPD Us: My COPD symptoms are gone ANTZ: Vaping causes lung damage Us: I no longer have to use oxygen ANTZ: Vaping causes lung infections Us: I haven't been sick in years ANTZ: YOU'RE WRONG!	1213	1	RT @stu_dowling @ProfGlantz ANTZ: Vaping causes asthma Us: My asthma's better now ...	✓
Negative	Because I can't go to the shed (my asthma is very bad right now, and the shed triggers the asthma) partner photographed some of the bookshelves.	9137	2	... go to the shed (my asthma is very bad right now, and the ...	✓
Negative	I forgot how bad my asthma hit me from sprints yEESH	1468	3	I forgot how bad my asthma hit me from ...	✓
Negative	i think something just triggered my asthma hehe just making sure it's not covid again so im wearing mask na 😊 have a nice day!	2072	1	I think something just triggered my asthma hehe just making sure it's not covid again so im ...	✓

NLP-Topic classification & extraction (known Topics)



Topic Category	Text Snippet	Doc	#Hits	Hit	Export?
Branded	I have ventolin, after awhile I'm ok.	7332	1	I have ventolin , after awhile I'm ok.	✓
Branded	RT @Dayyeeb17 I used to apply those two but now only seretide ease my pain.	6935	1	RT @Dayyeeb17 I used to apply those two but now only seretide ease my pain.	✓
Branded	Massive thanks to our ambulance service, my colleagues in emergency department and Ventolin.	6554	1	Massive thanks to our ambulance service, my colleagues in emergency department and Ventolin .	✓
Branded	I've given in, I'm taking ventolin.	5425	1	I've given in, I'm taking ventolin .	✓
Branded	The ventolin isn't great for my arrhythmia.	7337	1	The ventolin isn't great for my arrhythmia.	✓
Branded	I have ventolin, after awhile I'm ok.	7337	1	I have ventolin , after awhile I'm ok.	✓
Branded	Best to carry Ventolin or other reliever medication.	2761	1	Best to carry Ventolin or other reliever medication.	✓
Branded	@Kidcowboy2 @AlboMP Not me, my Seretide I take for my asthma isn't getting cheaper,the pharmacist actually said it will go up.	5605	1	@Kidcowboy2 @AlboMP Not me, my Seretide I take for my asthma isn't getting cheaper,the pharmacist actually said it will go up.	✓
Branded	The ventolin isn't great for my arrhythmia.	7332	1	The ventolin isn't great for my arrhythmia.	✓
Causes	"I started training and I learned that I actually was much stronger than I realized and my allergies were what was causing my asthma.	7814	1	"I started training and I learned that I actually was much stronger than I realized and my allergies were what was causing my asthma .	✓
Causes	RT @CaptMarvelNews "I started training and I learned that I actually was much stronger than I realized and my allergies were what was causing my asthma.	7487	1	RT @CaptMarvelNews "I started training and I learned that I actually was much stronger than I realized and my allergies were what was causing my asthma .	✓
Causes	@GovKathyHochul Do you know what triggers my asthma, RATS.	2684	1	@GovKathyHochul Do you know what triggers my asthma, RATS .	✓
Causes	Not my asthma being triggered by cold air 🙄🙄🙄 not today huhu	2410	1	Not my asthma being triggered by cold air 🙄🙄🙄 not today huhu	✓

ML-BERT based patient perspective classifier

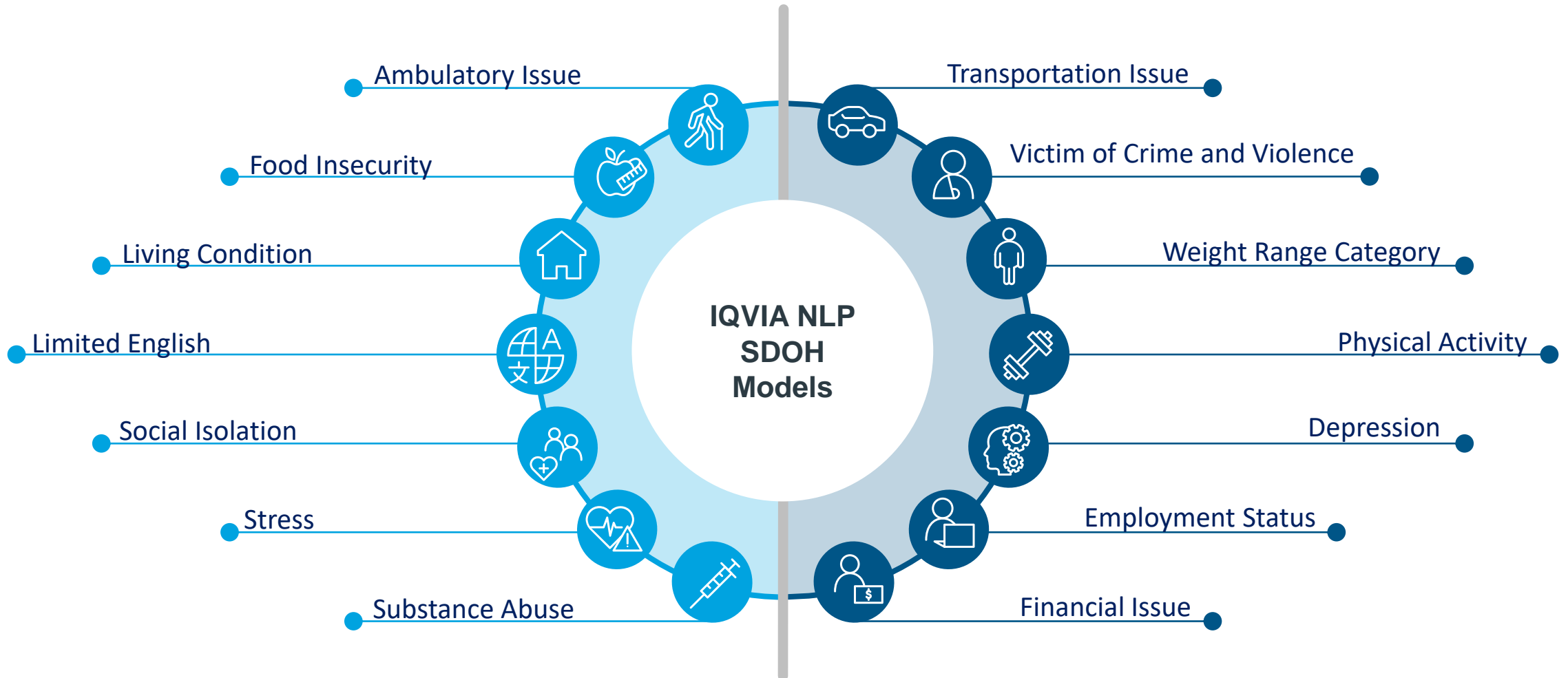
Post	label	Patient	Caregiver	HCP
In the ongoing saga of my health I snuck in a drâ€™s visit today: bronchitis (caught it before COVID pneumonia) Knocking it out nor before surgery. /r4de1l	Patient	0.993712	0.002499	0.0004
Im gonna see how i go tmr anyway and see if my lungs decide to relapse with my asthma hahahaha buuuut will see how i go. Cant wait to rock up all	Patient	0.993244	0.003432	0.000353
Today is my last day as a 32-year-old ðŸŒ³ I wanted to take this time to thank my body for keeping me alive, for carrying me through the darkest time of my life, for living through getting COVID despite my asthma, and for reminding me that rest is a part of the process â™¥í,âœ”	Patient	0.993144	0.003284	0.000304
//tw mentioning topic of suicide I think it's been almost two months since I started taking anti- depressants and I haven't had an episode of self harm or intense suicidal ideation since. Think these meds might be saving my life and like... Wow.	Patient	0.993129	0.002557	0.000307
hey so I caught COVID and it didn't help my transition but my depression just became way worse? do i get my money back?	Patient	0.993112	0.00361	0.000317
Friday night: yay! I can breathe again and seem fully recovered from my chest infection. Sunday afternoon: *tests positive for covid* ðŸœŒ Ah well, at least I didn't get covid on top of the chest infection. With my asthma, that would have been BAD.	Patient	0.993104	0.002232	0.000308
I haven't put myself out there because I'm still healing and trying to stabilize my epilepsy.	Patient	0.993089	0.003147	0.000309
16 wks after testing positive to covidâ€¦ Cough, breathlessness, and fatigue remain. My respiratory system is broken. Iâ€™m now on regular asthma medication (I didnâ€™t have asthma before). CT scan last week. Next step, lung function test and referral to a lung specialist. #LongCovid	Patient	0.993088	0.003027	0.00031
Fuck sore throat, man, I feel like I'm going to rip my skin open and scratch it inside, just to treat this itchy irritating shit.	Patient	0.993087	0.003625	0.000331
The CDC says 5 days â€¦ I didnâ€™t develop a fever til Day 5, I did not lose my taste and smell til Day 6 â€¦ My Covid case turned into pneumonia and A lung infection â€¦ I spent the night in the hospital on my 11th day â€¦ and my fever did not break til my 13th day.	Patient	0.993072	0.003138	0.000298
I was supposed to go back to work on Wednesday, not looking likely though. I'm very fortunate my asthma wasn't playing up before this horridness hit me and I'm lucky to have some asthma medication that I hope is helping before it becomes a problem.	Patient	0.99304	0.003896	0.000326
Same happened to me last week and i am still suffering from congestion in chest with thick flu. But i did not opt for STEROIDS due to side effects which people usually undergone with during Pneumonia medication during Covid. Luckily i am recovering with Antibiotic/Anti-AllergicðŸ™•	Patient	0.992999	0.003607	0.000338
I started taking magnesium for my asthma years ago and my mind has been much quieter since then	Patient	0.992978	0.002599	0.000292
Update: I went to the doctor and he told me that my heart and lungs are ok and that it doesn't seem like my heavy breathing episodes are caused by asthma, covid or allergies either. That means that this is all probably caused by anxiety and that I need therapy	Patient	0.992974	0.003407	0.000331
Fun fact, I had been put under meds for bipolar disorder even before any doctor told be the word "bipolar". It was "to regulate my depression and my anxiety". Even today I say I've been diagnosed but my psychiatrist just said the word many times talking about my experience... 1/2	Patient	0.992919	0.003003	0.000336
its been a year since i started my depression/PTSD meds and 6 months since i started my anxiety meds can i get a W in chat	Patient	0.992918	0.003589	0.000402
Between a bad allergy attack and resulting headache and congestion limiting my ability to breathe properly, and then dizziness and drowsiness from the antihistamine mixed with the painkillers and decongestant I took, I've had a rough morning.	Patient	0.992896	0.003127	0.000282
glad to hear it Ian. Ventolin taken via a spacer helped to settle my airways when I was sick with a cold and then covid this year. especially at night ðŸœ»	Patient	0.992866	0.00288	0.000334
upped my meds again ðŸŒ so ready to feel better for two days and then be violently depressed again	Patient	0.992862	0.002973	0.000362
I had pneumonia,i took 9 aps of 500 mgs of Helmintazole via a Doc and in a day i was getting better in 3 days it had gone..pneumonia is a parasite..and the above is a parasite killer..and not had since aug.2019.. available from vets in usa..) & i was copd still hav copd noabove	Patient	0.992862	0.003598	0.000314

Examples of GPT Generated Topic Naming

'antibiotics' 'antibiotic' 'augmentin'
'azithromycin' 'amoxicillin' 'flu'

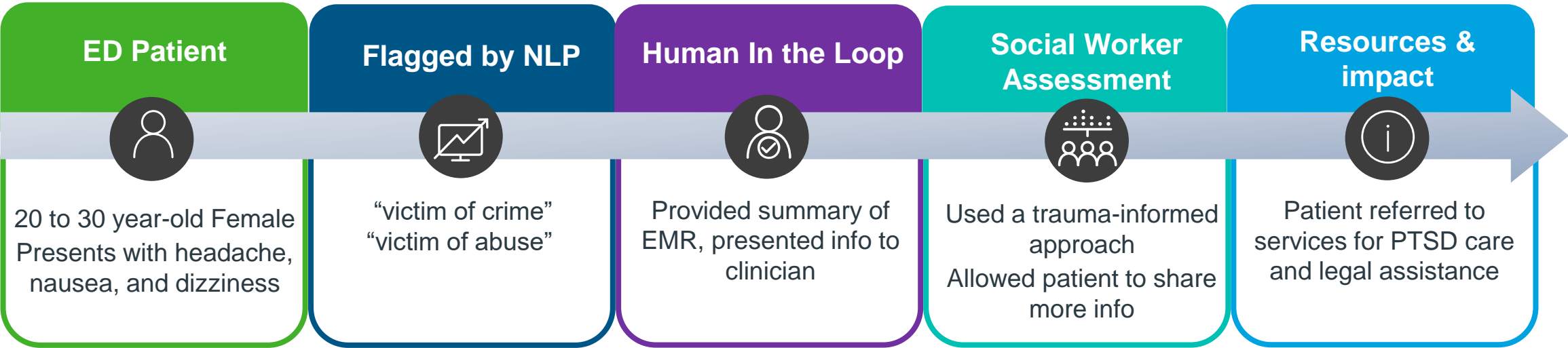
Therapeutic Area	Cluster ID	Number of posts per cluster	Topic	Short Description
Anti-Infectives	6	3050	Common Bacterial and Viral Infections Treatments	This topic is about different types of antibiotics, antivirals, and medicines that are commonly used to treat bacterial and viral infections.
Anti-Infectives	13	2590	Antibiotic Prescriptions	A topic related to prescribing antibiotics, including the names of various antibiotics, physicians, pharmacists, and prescription medications.
Anti-Infectives	67	1704	Antibiotic Prescriptions	Social media discussions related to the prescription, dosage, and side effects of antibiotics such as amoxicillin, cephalexin, and azithromycin.
Anti-Infectives	12	1101	Patient Experiences and Feedback	Social media posts about experiences and opinions on medical treatments and healthcare providers.
Anti-Infectives	138	865	Prescription Medication	Social media users discussing various prescription medications, including antibiotics and psychiatric drugs, as well as healthcare professionals who prescribe them.
Anti-Infectives	97	724	Alternative medicine in India	This topic pertains to discussions on alternative medicine practices and products in India.

14 SDOH models with over 60 subcategories



Case Study: Clinical Risk for Social Determinants of Health

Real World Impact of applied AI with Northshore University Health System



ED Social Workers assessed 56% more patients for SDOH needs that would not have otherwise been identified.

1 2 3 4 5 6 7 8 9 10 >>>

AdverseEffect	#Docs	Doc	#Hits	Hit
SciBERT	56970	12587019	123	NTP Toxicology and Carcinogenesis Studies of Salicylazosulfapyridine ...
		7691501	93	0012-6667
		7516663	89	Clinical toxicity of the interferons.
		20207278	85	Heart & lung : the journal of critical ...
		3315625	80	0012-6667
		19453201	73	CNS drugs
		15090069	72	1471-5945
		21163766	71	... Metastatic prostate cancer complicated with chronic disseminated intravascular coagulopathy causing acute renal failure, ...
		19355810	68	1557-8518
		12695782	68	Toxicology and Carcinogenesis Studies of 8-Methoxypsoralen ...
		20503305	67	A new Ehlers-Danlos syndrome with craniofacial characteristics, multiple ...
		8652081	67	Clinical toxicity of cytokines used as haemopoietic ...
		20411336	65	Mycopathologia
		19917430	65	[Neonatal Volkmann's syndrome].
		19690836	61	... TRPV1 receptor antagonist SB-705498 on trigeminovascular sensitisation and neurotransmission.
		20525204	60	Senescence evasion by MCF-7 human breast tumor-initiating ...
		20417247	59	1873-5118
		19559056	59	Regulation of mitochondrial respiratory chain biogenesis by estrogens/estrogen receptors ...
		11641084	59	[Methotrexate, liver and rheumatoid arthritis in tropical ...
		20687499	58	0065-2598
		20610601	58	... /IGF-binding protein-3 treatment on glucose metabolism and fat distribution in human ...
		19843487	58	... in 117 hospitalized adults with previous vancomycin-induced fever, rash, or neutropenia...
		20429953	57	Inhibition of metastasis, angiogenesis, and tumor ...

"Adverse Event" BERT model captures general medical terms, not true adverse effects

Browser tabs: i2e | i2E: Adverse Effect - Alone.i2qy | +

Address bar: Not secure | https://ml-first-onnx.nlp-internal-demo-hub.vmos.internal.imglobal.com:8334/client/i2e/

Page Title: i2e 6.8R24

Navigation: Indexes, Queries, Classes, Regions

Menu: Query1, Adverse Drug Reacti..., New +

Close Tabs... I2EAdmin Log out

Smart Query [ON] SUBMIT

Output Mode: HTML

Table style: [Grid icons]

Ordering: Frequent first

Show doc group: [Off]

Produce: Results with links

Docs/assertion: All

Hits/doc/assertion: 10

Matches/column/hit: All

List delimiter: [Blank]

Cross product: [Checked]

Hit words displayed: 5

Limits: Limit docs [Off] to 10000, Limit hits [Checked] to 1000, Limit hits/doc 10000, Limit time [Checked] to 60, Limit rows [Checked] to 10000

Global Settings (Within Query): Disambiguation 12, Boundaries Default, Language Any

Column Options: Default [Dropdown] Custom options...

Query: MEDLINE Abstracts

Word Phrase Sentence Alternative And Chemical Save Save As Edit Select Undo Redo Editor Smart EASL Zoom 100%

Adverse Drug Reaction

Adverse chemical reactions as reported in the specified index.

Chemical [Restore default]

- Pharmacologic Substance

Effect [Restore default]

- Diseases and Symptoms

[Restore all defaults]

Description

This query extracts chemical dosages and combinations along with their associated adverse events. It is part of the Chemical Profile query pack.

Example hits:

- ... with nafamostat mesilate combined with gemcitabine chemotherapy... Cardiac arrest caused by nafamostat mesilate
- Treatment with dapagliflozin 2.5mg, 5mg, or 10mg once daily is accompanied by an increased risk of vulvovaginitis or balanitis, related to the induction ...
- Skin toxicity induced by gefitinib is common

Parameters:

- Chemical: The chemical name or class for profiling.
- Effect: The class used to identify the adverse event.

Left sidebar: Filter published query, Open Queries, Adverse Drug Reaction, Query1, My Queries, SciBert Demo, SciBert Examples, ADR_subqueries, Adverse Drug Reaction - Doc Count, Adverse Drug Reaction, Adverse Effect - Alone, Working_demo_query, _disease_basic, adverse_effects_phrases_Chemical_cause_Reaction, adverse_effects_phrases_Reaction_Chemical, chemical_causes_disease, chemical_causes_effects_such_as_disease, disease_caused_by_chemical, injury_caused_by_chemical, SciBert_Demo, SciBert_Demo_working, My Results, Shared Queries, All, Healthcare, Resources

- BERT
- Diseases and Symptoms (2023)
- MedDRA (25.1)
- NCI Derived (22.07d)
- Numerics
- Organizations by Sector
- Organizations by Type
- Relations (Life Sciences)
- SciBERT
- AdverseEffect
- Drug
- Person
- chunk
- entity: basic
- entity: pronoun
- preposition
- relation: verbal
- word
- Cancer Pathology
- Clinical Negations and Family Terms
- Diagnosis status of disease
- extended linguistic units
- Gender
- Gene/Protein Fusions and Combinations
- Heart Disease Risk Factors in Diabetic Patients
- Hematology
- IHC Markers
- Smoking terms
- word classes

Adverse Drug Reaction

Adverse chemical reactions as reported in the specified index.

Submit query

Chemical Restore default

[Cyclosporine X Fluorouracil X] X

Effect Restore default

[Diseases and Symptoms X MedDRA X AdverseEffect X] X

Restore all defaults

Description

This query extracts chemical dosages and combinations along with their associated adverse events. It is part of the Chemical Profile query pack.

- Example hits:
- ... with nafamostat mesilate combined with gemcitabine chemotherapy... Cardiac arrest caused by nafamostat mesilate
 - Treatment with dapagliflozin 2.5mg, 5mg, or 10mg once daily is accompanied by an increased risk of vulvovaginitis or balanitis, related to the induction ...
 - Skin toxicity induced by gefitinib is common

- Parameters:
- Chemical: The chemical name or class for profiling.
 - Effect: The class used to identify the adverse event.

- Find
- All results
 - Shortest match
 - Longest match

- Output columns
- Single column
 - Multiple columns

- Prioritization of children
- None
 - Same span
 - Within container
 - Allow constraints

- Items in list
- Order alphabetically
 - Remove duplicates

Load from file... Add more from file...

Diseases and Symptom..	Chemical	Relation	Effect	#Docs	Doc	#Hits	Hit
nim_plus	Cyclosporine	induce	psoriatic lesions	2	10594756	1	... either 1alpha, 25-dihydroxycholecalciferol or cyclosporine A, to induce psoriatic lesions if they were injected into ...
SciBERT	Cyclosporine	induce	Changes in numbers of epidermal cell adhesion molecules	2	7907611	1	Changes in numbers of epidermal cell adhesion molecules caused by oral cyclosporin in psoriasis.
		risk	a temporary increase in blood pressure	1	11275806	1	Side effects were a temporary increase in blood pressure during initiation with 200 mg cyclosporin A/day.
		increase	NMSC	1	20810498	1	Cyclosporine and prior phototherapy significantly increase the risk of NMSC.
		produce	higher blood concentrations	1	17584318	1	... therapeutic drug monitoring indicated that cyclosporin administered before meals produces higher blood concentrations than an equivalent dose administered ...
		proliferate	human dermal fibroblasts	1	18553108	1	This study thus indicates that CyA influences ECM metabolism and the proliferation of human dermal fibroblasts, and that the effects ...
		associate	differentiation induction	1	18353617	1	... gene expression is modified by CsA through NFAT activity in association with differentiation induction.
		augment	the beta-adrenergic adenylate cyclase response	1	2840037	1	Cyclosporin A induced augmentation of the beta-adrenergic adenylate cyclase response of pig epidermis.
		develop	a mass in the left maxillary sinus	1	1613146	1	... months after the discontinuation of cyclosporine, the patient developed a mass in the left maxillary sinus extending to the orbit, ...
		due	gastrointestinal complications	1	20464112	1	Chlorambucil and cyclosporine A were discontinued due to side effects in 21% ... (nephrotoxicity, 36% and gastrointestinal complications, 21%), respectively...
		exacerbate	a aggravation of the joint condition	1	12218252	1	... in whom the withdrawal of cyclosporin A induced a generalised pustular exacerbation and a aggravation of the joint condition.
		implicate	BM component production	1	8073854	1	... effect of immunomodulation determined by CsA in the regulation of the functional activity of cells implicated in BM component production.
	Fluorouracil	induce	Egr-1	1	20372793	1	... Egr-1 and TSP-1 mRNA by 5-FU, while LV increased the expression of Egr-1 and TSP-1 mRNA in KB...
		develop	developed bilateral incomplete lid closure	1	21077799	1	... fatal but in addition to typical 5-FU related adverse effects, the patient developed bilateral incomplete lid closure, secondary corneal exposure and ...
		prolong	prolonged therapeutic 5-FU concentrations	2	20225231	1	... higher peak plasma concentrations of 5-FU and prolonged therapeutic 5-FU concentrations compared with continuous infusion of ...
		associate	worse QoL	1	19398145	1	... history of ever use of 5-FU and present AKs was strongly associated with worse QoL.
		higher	irregular pits	1	19560817	1	... showed that the surfaces of 5-FU-PGSs with higher concentration of 5-FU had irregular pits.
meddra	Cyclosporine	induce	a psoriatic	1	12602995	1	Multiple cutaneous squamous carcinoma in a psoriatic associated with cyclosporin, alcohol abuse and ultraviolet

Cutan Ocul Toxicol. (Cutaneous and ocular toxicology). 2011 Jun;30(2): 157-9

Article date (Epub): 2010 11 16;

A bilateral cicatricial ectropion and bilateral upper lid shortening caused by 5-fluorouracil toxicity in a patient with dihydropyrimidine dehydrogenase deficiency.

Obi, Ebube E¹; McDonald, Alec; Kemp, Ewan

Author Info [+]

Abstract

CONTEXT (BACKGROUND): Well-known causes of a cicatrizing ectropion are chemical/thermal injuries, dermatitis, cutaneous diseases, malignancies, and trauma. We add to this preceding list a systemic cause of a cicatrizing ectropion as a result of a rare side effect of 5-fluorouracil (5-FU), a common and frequently used chemotherapeutic agent.

METHODS (METHODS): A case report demonstrating the clinical presentation of a cicatricial ectropion caused by (5-FU) chemotherapy toxicity in a patient with dihydropyrimidine dehydrogenase deficiency. We also describe the subsequent investigations and management of this case.

RESULTS (RESULTS): A bilateral cicatrizing lower lid ectropion, bilateral upper lid shortening, cicatrizing and sclerosing facial skin changes occurred in an 80-year-old male, undergoing preoperative chemoradiotherapy, incorporating Capecitabine, an oral 5-FU prodrug for a locally advanced rectal carcinoma. Severe 5-FU toxicity ultimately proved fatal but in addition to typical 5-FU related adverse effects, the patient developed bilateral incomplete lid closure, secondary corneal exposure and keratopathy. Due to the patient's extreme ill health, he was managed conservatively with a moist chamber.

CONCLUSION (CONCLUSIONS): 5-fluorouracil chemotherapy in patients with dihydropyrimidine dehydrogenase deficiency, can give rise to ocular and cutaneous toxicity. We also present the complex management problems that have to be anticipated in treating such systemically compromised patients.

PMID: 21077799

ISSN: 1556-9535

Publication Types:

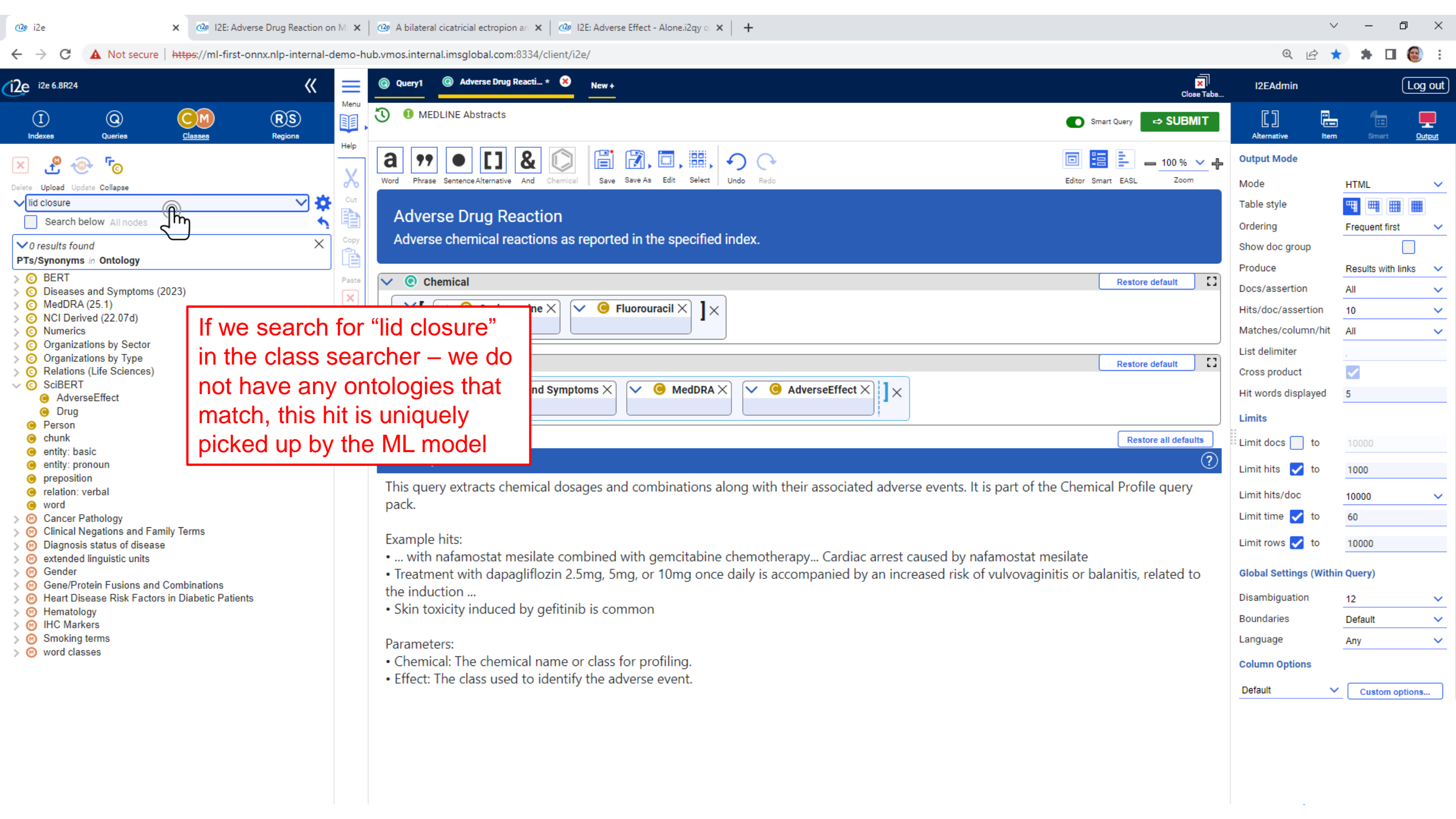
- Case Reports
- Journal Article

MeSH Terms:

- Aged, 80 and over
- Antimetabolites, Antineoplastic
 - adverse effects*
 - therapeutic use
- Carcinoma
 - drug therapy
- Dihydropyrimidine Dehydrogenase Deficiency*
- Ectropion
 - chemically induced*
 - classification
- Fluorouracil
 - adverse effects*
 - therapeutic use
- Humans
- Male
- Rectal Neoplasms
 - drug therapy

Substances:

We are capturing unique hits with each ontology:
 "ectropion" with Diseases and Symptoms
 "bilateral incomplete lid enclosure" and "second corneal exposure" with SciBERT
 "keratopathy" with MedDRA



If we search for "lid closure" in the class searcher – we do not have any ontologies that match, this hit is uniquely picked up by the ML model

This query extracts chemical dosages and combinations along with their associated adverse events. It is part of the Chemical Profile query pack.

Example hits:

- ... with nafamostat mesilate combined with gemcitabine chemotherapy... Cardiac arrest caused by nafamostat mesilate
- Treatment with dapagliflozin 2.5mg, 5mg, or 10mg once daily is accompanied by an increased risk of vulvovaginitis or balanitis, related to the induction ...
- Skin toxicity induced by gefitinib is common

Parameters:

- Chemical: The chemical name or class for profiling.
- Effect: The class used to identify the adverse event.

Output Mode

Mode: HTML

Table style: [Grid icons]

Ordering: Frequent first

Show doc group:

Produce: Results with links

Docs/assertion: All

Hits/doc/assertion: 10

Matches/column/hit: All

List delimiter: ,

Cross product:

Hit words displayed: 5

Limits

Limit docs: to 10000

Limit hits: to 1000

Limit hits/doc: 10000

Limit time: to 60

Limit rows: to 10000

Global Settings (Within Query)

Disambiguation: 12

Boundaries: Default

Language: Any

Column Options

Default: Custom options...

Reformat HTML as producing Results with links

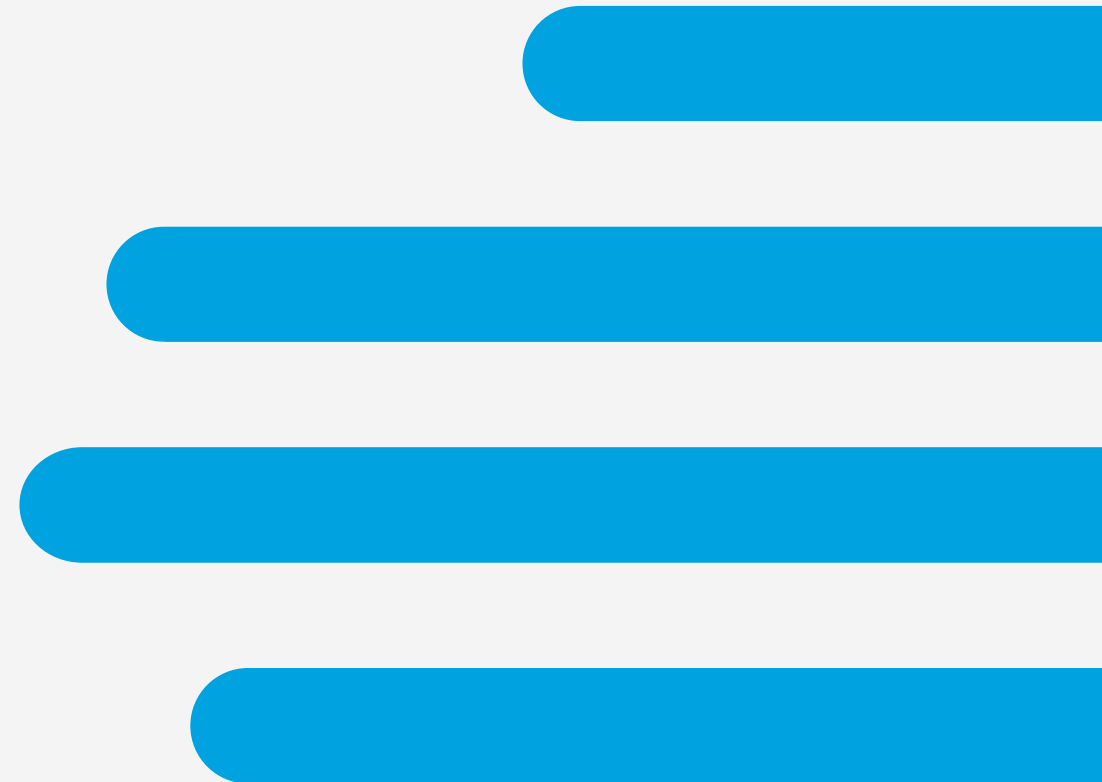
Results Found 3 assertions from 161 hits in 88 docs. Examined all 57021 docs. [more details]

Diseases and Symptom..	#Docs	Doc	#Hits	Hit
nlm_plus	53 >	12055538	3 >	... provokes serious adverse reactions especially nephrotoxicity and arterial hypertension.
meddra	39 >	20091657	3 >	... of indications for cyclosporine therapy will lead to more patients receiving chronic ...
SciBERT	35 >	1431212	3 >	... , and cyclosporin A on TNF- or IL-1 beta-induced IL-6 production ...

Out of the 88 documents the query hit, SciBERT had unique hits in over 1/3 of them. However, Diseases and Symptoms and MedDRA still matched the greatest number of documents, and are still necessary for high precision and recall. The ML model is ideal for picking up unique or unexpected hits not defined in the ontologies. The NLP rules help us set the context for the ML hits and ensure our results are meaningful.


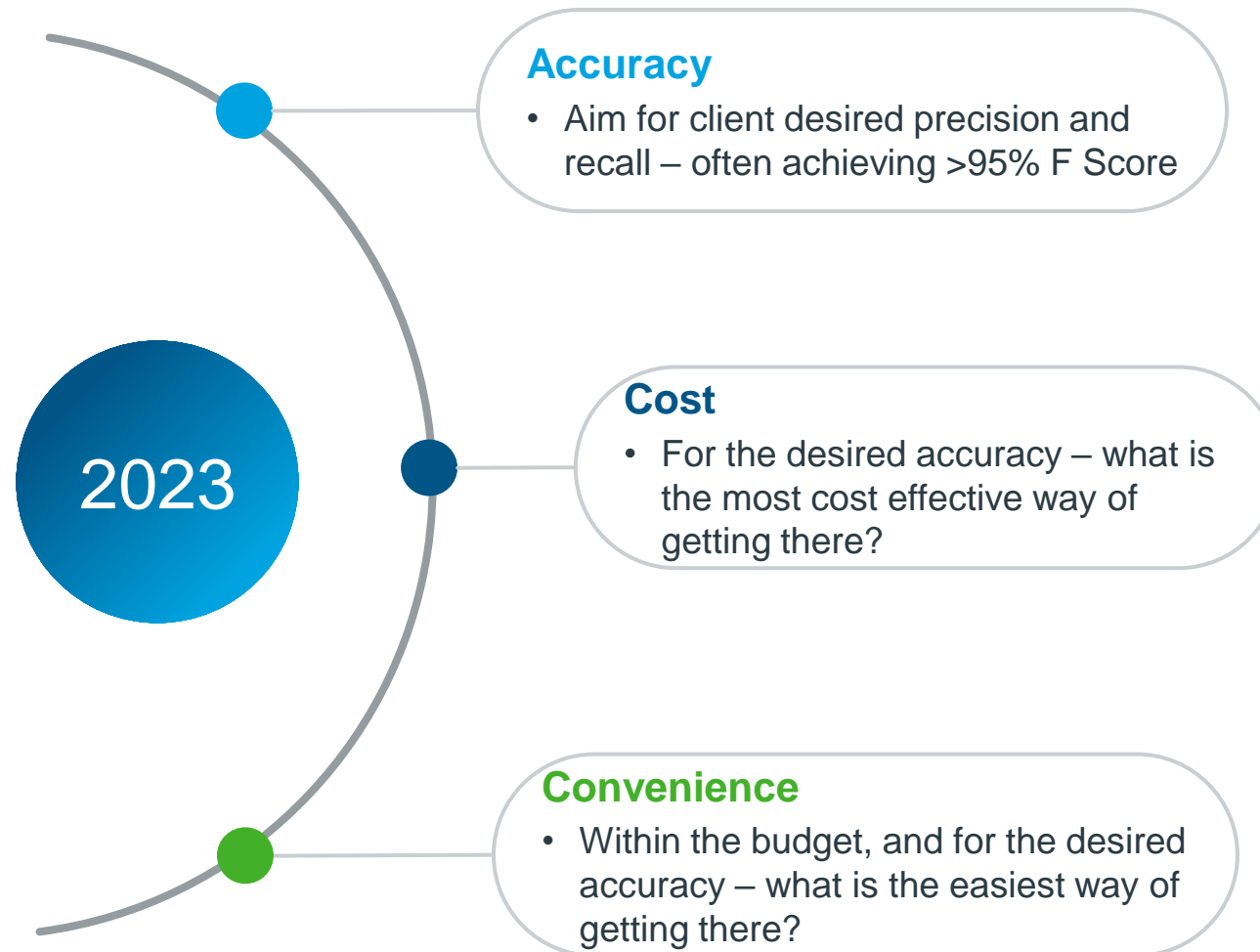
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meddra	Cyclosporine	induce	a psoriatic	1	12602995	1	Multiple cutaneous squamous carcinoma in a psoriatic associated with cyclosporin, alcohol abuse and ultraviolet

Summary



Natural Language Processing has evolved over the years

IQVIA NLP has kept pace with these evolutions



- Continue to use a blend of methods to ensure that our clients get the best result possible within their needs
- LLMs are the latest example of NLP methods that can be used within the IQVIA NLP toolkit

QA



End